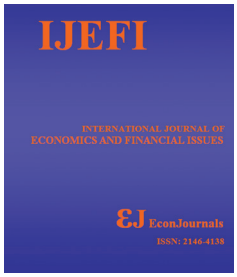

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Industry 4.0 in Finance, Digital Financial Services and Digital Financial Inclusion in Developing Countries: Opportunities, Challenges, and Possible Policy Responses

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ABSTRACT

Fintech and the adoption of Fourth Industrial Revolution (industry 4.0) technologies have expanded the provision and uptake of digital financial services (DFSs) globally. Digital transformation in the financial industry intended to modify financial service provisioning by reducing the costs of accessing and challenges such as inaccessibility due to remoteness, not having a bank account, not having a credit history, or having erratic incomes. Digital financial inclusion (DFI) aims to ensure that financial services, such as deposits, payments, transfers, withdrawals, investments, accessing insurance and credit, checking account balances, receiving money, and making international remittances, are conducted conveniently, easily, safely, reliably, and affordably. DFI focuses on ensuring access to financial services through digital channels and platforms for individuals, businesses, and households, to promote financial inclusion for all stakeholders, especially previously financially excluded groups. Through a critical review of the literature, this study explores the opportunities and challenges of DFI or the adoption and use of DFS. The review unpacks the possible benefits of using DFSs, which include the broadening financial inclusion, increasing diversity and innovation in the financial services sector, attainment of the SDGs, reduction of poverty, increased economic growth, and minimization of the gender financial inclusion gap, as well as reduction in inequalities. The constraints include the inadequacy of digital infrastructure, taxes on DFS, literacy challenges, digital exclusion, poverty and the gender divide, risks, and lack of trust in the financial services sector. The study recommends appropriate regulation and oversight, literacy enhancement initiatives, investment in digital infrastructure, and increased consumer protection as measures to improve DFI in developing countries.

Keywords: Digital Financial Services, Digital Financial Inclusion, Challenges, Opportunities, Sustainable Development Goals
JEL Classifications: D14, G02, G28

1. INTRODUCTION

Digitalization and digital transformation are contemporary issues on development agendas worldwide, leading to the proliferation of digital and mobile devices that have transformed business processes, business models, people's lives, as well as the behavior of consumers, their preferences and attitudes. The widespread usage of digital devices, technologies, and platforms has disrupted or transformed current business models, encouraging the development and deployment of innovative and sustainable business models. The transformative and disruptive power of digital transformation has affected all sectors of the economy, including the financial services sector. Kshetri (2016, 2021) argues that the adoption and utilization of financial technologies (fintech) in the financial services sector has tremendously transformed the financial services landscape, especially service provision and access, promoting sustainability in the industry. The growth of fintech and the increasing usage of digital financial services (DFSs) has significantly altered the operations of businesses across the economy. Technological advancements and digitalization have digitally transformed service provisioning in this important and sensitive sector (Mpofu, 2022a).

Industry 4.0, which is also to referred as the Fourth Industrial Revolution, has enhanced the use of fintech in the financial services sector. Industry 4.0 is dominated by the use of technologies such as robotics, big data, the internet of things and artificial intelligence (AI). These technologies have had significant impact in digitally transforming the financial services sector (Mpofu, 2023). Digital transformation has led to changes in the provisioning of financial services in emerging and developing economies, providing novel opportunities to previously unwelcomed and underserved groups, often referred to as the financially excluded (Ozili, 2018; 2020a), thus promoting financial inclusion. These groups normally include the poor, the informal sector, women, and children, as well as the youth (Ojo, 2022). The services offered include insurance, credit, savings, payments, transfers, and purchases. Recognizing the likely opportunities offered by DFSs such as mobile money (Ahmad et al., 2020) and other digital finance technologies, mobile network operators, fintech companies, microfinance institutions, banks and governments are collaborating to provide a wide range of financial products, innovations, and services to digitally modify the provision and access to financial services through digital means (Shipalana, 2019; Pushkareva, 2021).

The outbreak of the COVID-19 pandemic, as well as the measures put in place and laws enacted to minimize transmission, exposed the vulnerability of financial institutions in developing countries to respond to the crisis. It was evident that the financial sector was not equipped and prepared for the crisis, as the provision of financial services was negatively affected. The pandemic heightened the provision and uptake of DFSs as financial institutions and customers worked towards finding ways to continue to offer and access financial services, respectively, considering face-to-face interactions were restricted and lockdown measures in place (Mhlanga, 2022; Ozili, 2020b). The COVID-19 pandemic was associated with both challenges and opportunities for the financial services sector, especially in driving the usage of DFSs in the face of lockdown regulations and social distancing requirements. The COVID-19 pandemic led to an intensification of the digitalization of financial inclusion. The COVID-19 pandemic reaffirmed the need for digitalization and broadening of financial inclusion for all segments of the population and more so for the poor, the elderly, those in rural areas, low-income earners, and the unemployed in developing countries. The usage of bank notes and coins was minimized due to a lack of access to banks and the fear of increasing COVID-19 transmissions by changing hands of money. According to Agur et al. (2020) and Mhlanga (2020) and Gutiérrez-Romero and Ahamed (2021), the COVID-19 crisis not only led to disruptions to social lives and interactions, but also altered the economic landscape and the way companies do business. Governments, businesses and people had to find ways to transact and send remittances across and within borders. The use of DFSs such as digital banking, mobile money, and mobile banking expanded rapidly, to expand DFI. To illuminate this consequential growth in Africa, GSMA (2022) highlights that in 2021 there were 621 million registered mobile money accounts, 184 million active accounts, and 36.7 billion transactions worth US$701.4 billion. Mobile money usage is very prevalent in SSA with the region representing considerable portions of the mobile money statistics in Africa. For the year 2021, the mobile money registered accounts were 605 million, with 183 active accounts, a transaction volume of 36.6 billion with a transaction value of US$697.7 billion (GSMA, 2022b). From the statistics, while Africa constitutes a great portion of the value of the global mobile money transaction value in 2021, SSA has a greater share of US$701.4 (representing US$ 697.7 billion, which is 99% of Africa's transaction value).

Pal et al. (2020) posit that mobile money is one of the key components of DFSs, having facilitated socioeconomic development through DFI, while Menyelim et al. (2021) acknowledge the roles played by DFSs in promoting inclusive digital finance, green consumerism, economic growth, and sustainability. Financial inclusion is important for economic growth because it allows people to save, invest, and borrow money, which can help them to start businesses, grow their businesses, and improve their livelihoods. In Kenya, M-Pesa, a mobile money service, has been credited with helping to reduce poverty and increase economic growth. M-Pesa has made it easier for people to save, invest, and borrow money, which has helped them to start businesses and improve their livelihoods. In Rwanda, the government has partnered with a mobile money company to provide financial services to farmers. This has helped farmers to access credit and markets, which has increased agricultural production and economic growth (Mpofu and Mhlanga, 2022). In Tanzania, a microfinance institution has used DFS to provide loans to women entrepreneurs. This has helped women to start businesses and improve their livelihoods. Making it easier to pay for green products and services. This can help to increase demand for green products and services, which can lead to increased production and investment in green businesses. DFS can provide information about green products and services to consumers, such as their environmental impact and cost. This can help consumers make informed choices about the products and services they buy. DFS can make it easier for investors to invest in sustainable businesses by providing access to information about these businesses and by facilitating transactions between investors and businesses.

Menyelim et al. (2021) further argue that DFSs promote financial stability and the inclusion of underbanked and underprivileged groups of the population. They further contend that digital finance is a fundamental driver of sustainable growth as it provides equitable and efficient redistribution of financial resources and capital in the economy (Menyelim et al., 2021; Vo et al., 2021; Wang and Luo, 2022). Babajide et al. (2015) articulate that mobile money transactions promote the development and expansion of digital business, including e-Commerce, by convenient, quick, and reliable payment options, as well as promoting the accessibility of financial products and services. These services and products include credit (loans), insurance, health insurance schemes, funeral cover, investments, savings, transfers, and payments. While acknowledging the possible opportunities associated with DFSs such as mobile, Pal et al. (2021) posit that there are also several challenges and risks associated with DFSs. Mpofu (2022 a, b, d) alludes to taxes on DFSs negatively affecting the usage of DFSs.

Taxes such as mobile money taxes, digital financial services taxes, direct digital services taxes (DSTs) and indirect taxes on digital services such as value-added tax (VAT) are some of the constraints to digital financial inclusion (DFI).

Despite the growth of fintech, the use and acceptance of DFSs remain a debatable topic among researchers, especially regarding the opportunities, challenges, and risks of using DFSs in developing country contexts. The debate on the role of digital finance in promoting DFI in emerging and developing economies is ongoing (Ozili, 2018, 2021a, b, 2022). This paper contributes to the debate on DFI inclusion in developing countries. By unpacking the benefits and challenges of DFI inclusion and making possible suggestions on how to maximize on the benefits and minimize the impact of the constraints in developing countries, the paper not only contributes to theoretical literature on any embryonic subject area, but also contributes to policy construction. Policymakers can also make policy suggestions that could improve the novel but important field and industry of DFS. Financial systems are the glue that holds economies together, and the circulation of funds a lubricant to the development and growth of the economy.

2. MATERIALS AND METHODS

This review article adopted a qualitative approach. A critical review approach was used. The objective of the review was to collect literature on the adoption and usage of DFS in developing countries; this was also meant to understand the opportunities and challenges affecting DFI in developing countries. Through a critical assessment and synthesis of the literature, the review sought to identify and highlight possible research gaps or policy shortcomings that can be addressed through future research. Mpofu (2021) posits that critical reviews are effective in identifying areas of agreement and convergence in previous researchers' works, as well as showing possible policy and methodological gaps.

For this review, the literature was searched from the Google scholar database. The Google scholar database is considered to be comprehensive and expansive (Mpofu, 2021). Most of the articles reviewed were from Scopus-indexed journals. The search terms used include "Provision of and access to digital financial services in developing countries," "Opportunities and challenges associated with DFS provisioning and access in developing countries," and "Digital financial inclusion in developing countries." Furthermore these search phrases were also used "Opportunities and challenges for DFI in developing countries," "barriers to digital financial inclusion in developing countries," "risks associated with digital financial services in developing countries," "risks associated with digital financial inclusion in developing countries." The search revealed 127 articles whose abstracts were reviewed for relevance. Of these articles, 40 were excluded for lack of relevance. Of the 87 remaining articles, 20 were excluded because the full papers could not be accessed for review. In total, 67 articles were accessed and reviewed. Most of the articles reviewed were from between 2015 and date, reflecting the infant nature of DFI. This is still a fertile field of research surrounded by debates, research, and policy gaps.

The themes identified from the research guided the thematic analysis of the data. Figures and narrative discussions were used to present the findings. Quotations were applied where relevant to emphasize, clarify, and elaborate on some arguments.

3. LITERATURE REVIEW OF THE LITERATURE

This section reviews the literature on DFS and their role in promoting the inclusion of DFI in developing countries. Recognizing that DFSs are driven by fintech, and the use of other technologies such as the Fourth Industrial Revolution (4IR) technologies are new phenomena and currently hot topics in the development agenda, the literature review gives a contextual background of industry 4.0 and unpacks the concepts of DFSs and DFI. 4IR technologies include cloud computing, the internet of things, artificial intelligence (AI), machine learning, blockchain, and big data among others. The review focuses on the roles of DFSs in advancing DFI in developing countries, and the opportunities and challenges that affect DFI delivery and access, which explain its effectiveness or ineffectiveness in developing economies.

3.1. Definition of Important Terms

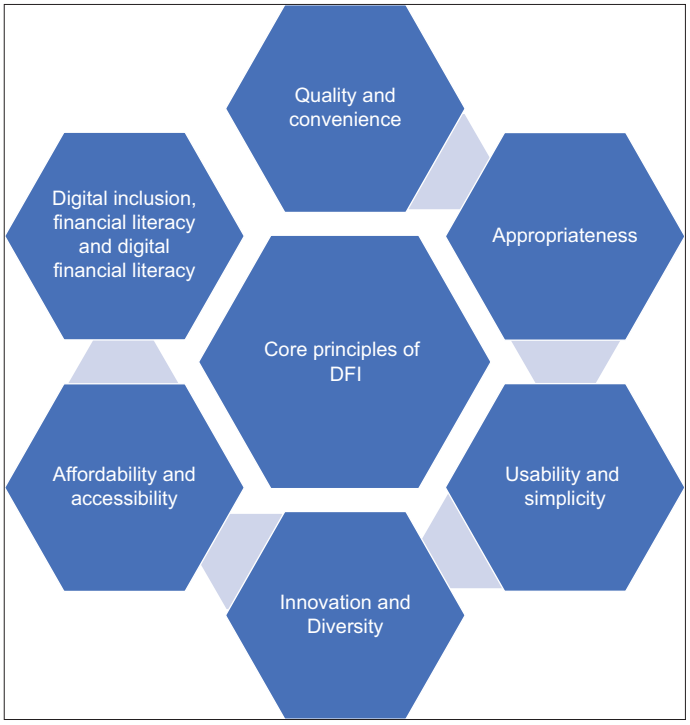
3.1.1. Digital financial services (DFSs)

DFSs have been described differently by various researchers, but these researchers converge on the fact that the supply and access to DFSs is dependent on digital and mobile technologies and platforms (Shipalana, 2019; Ozili, 2022). Mishar and Kumar (2018: 90) portend that DFSs are "financial services that rely on digital technologies for their delivery and use by consumers". Malladi et al. (2021) and Srivastava (2015) refer to DFSs as financial services delivered and accessed through digital devices, mobile technologies, and digital platforms. DFSs include mobile money, digital banking, electronic money, cryptocurrencies, transfers, payments, access to credit, digital investments, and insurance. Digital platforms include mobile applications, digital banking applications, electronically supported cards, biometric devices, and chips, among others.

3.1.2. Digital financial inclusion

DFI refers to the situation in which previously financially excluded and underserved segments of the population have access to reliable, safe, and affordable digital financial services and use these formal DFS. DFSs were developed and adopted to address the challenges of financial inclusion, such as costs (affordability), distance barriers, access challenges, and other stringent regulatory requirements. By utilizing digital and mobile technologies and platforms, DFS providers are expected to deliver financial services more cost-effectively and efficiently. DFSs differs from DFI in that, while DFSs can be available on offer and at affordable costs and accessible to citizens, others might not use them for several reasons such as culture, religion, illiteracy, and fear, inclusion of DFI speaks to accessibility, affordability, and usage (Tay et al., 2022; Mhlanga, 2022). To promote DFI and address the obstacle to financial inclusion, DFSs must address the critical principles of DFI. Figure 1 presents schematically these core principles of DFI.

Figure 1: Critical principles of digital financial inclusion



Source: Author's compilation from Shipalana (2019) and Tay et al. (2022)

3.1.3. Fintech and industry 4.0

Fintech describes "digital technologies that contain the potential to transform the provision of financial services-spurring the development-of new-modified existing business models, application processes and products (Mishar and Kumar, 2018)." Financial technologies include machine learning, blockchain, digital identification, biometric technologies, mobile money, and cloud services, among others. Fintech describes the ongoing development of novel DFSs.

The Fourth Industrial Revolution technologies have greatly improved service provisioning in the financial industry and enhanced the supply of and access to financial services by the people that generally excluded. Examples of industry 4.0 technologies such as AI have been deployed in the automation of certain tasks. Automation has helped in reducing operational and transaction costs, thus making service provision and access cheaper in the financial services industry (Mpofu, 2023). Another example of the 4IR technological tools include robotics that can be employed to facilitate the provision of financial services in rural areas where there is inadequate digital infrastructure. Lastly, just to discuss a few of these technologies, the Internet of Things has been used for fraud prevention and enhancing the security of financial data by tracking financial transactions. Blockchain has increased transparency in financial contracts (Mhlanga, 2023). In summary, industry 4.0 technologies have increased trust in the use of DFSs, are critical in building more interconnected, and open financial ecosystems. The technologies have also been pivotal in driving development and innovation in the financial sector and expanding digital financial inclusion.

Fintech and 4IR technologies have helped developing countries rollout DFSs such Ecocash in Zimbabwe, M-Pesa in Kenya, Pradhan Mantri Jan Dhan Yojana (PMJDY) in India and Pix in Brazil, among other financial services (Mpofu, 2022a). These DFSs among others have helped accelerate digital financial inclusion.

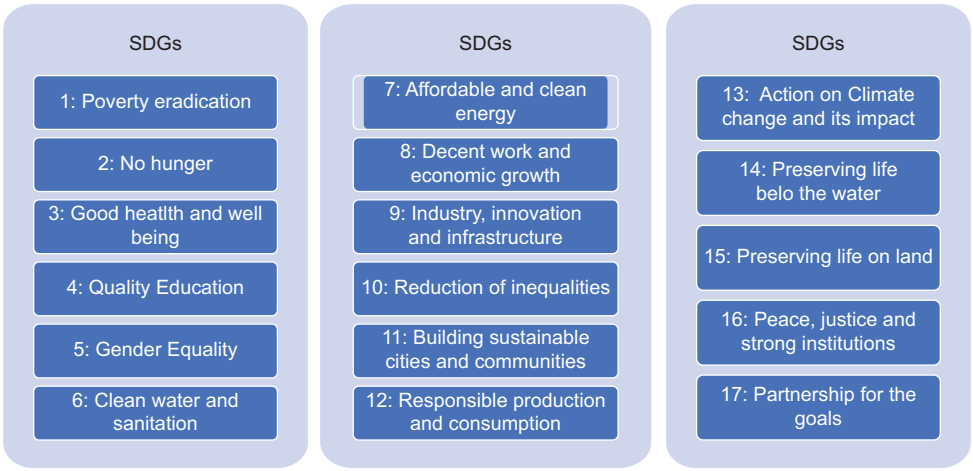
3.1.4. Sustainable development and sustainable development goals (SDGs)

The term sustainable development refers to the combination of two terms, sustainable, which refers to durability or long-term plans or objectives, and "development," which refers to facilitating growth and prosperity. Therefore, sustainable development speaks to the development and use of resources that have a long-term orientation, the idea is that while the current generation uses resources to improve the social, economic, and environmental dimensions they take into cognizance of the needs of the future generation (Duran et al., 2015; Dasgupta, 2007). Sustainable development leaves resources and builds a future for the next generation. The term sustainable development comes from sustainability. Fintech and DFS contribute to the achievement of the 2030 Sustainable Development Goals (SDGs). Fintech can contribute to sustainability and sustainable development in developing countries by improving financial inclusion and access to funding at affordable cost (Ebong and George, 2021; Chueca Vergara and Ferruz Agudo, 2021; Makina, 2019; Piliyanti, 2019).

The SDGs were developed under the United Nations (UN) in 2015 under the discussion theme "Leave no one behind." The member state agreed to the goals aiming to eradicate poverty, improve the lives of the people, and preserve the planet. The goals focused on three facets, people, planet and prosperity. The countries agreed that to achieve sustainable development, there is a need to strike an equilibrium is needed between economic, social, and economic sustainability. Developing countries are currently struggling to balance these dimensions. Figure 2 shows a snapshot of the 17 SDGs agreed on in the 2030 Agenda of the UN.

Although none of these SDGs directly refers to finance or financial services, it is important to emphasize that it is impossible to achieve them without adequate financial resources or a properly functioning financial system. Therefore, it will be inadequate to discuss the opportunities emerging from the use of DFSs and possible DFIs without alluding to the critical role these concepts play in the achievement of the SDGs in developing countries (Ferrata, 2019). According to Emara and Mohieldin (2021), DFI can reduce extreme poverty in Middle and East African countries. Shipalana (2019) argues that financial inclusion is essential for the achievement of nine of the 17 SDGs. These nine SDGs achieved through DFI include SDGs 1, 2, 3, 5, 8, 9, 10, 12, and 17. Tay et al. (2022) argue that financial inclusion lubricates the whole economic system in economies. The researchers argue that DFI is a ladder to accomplish 13 SDGs out of the 17 and encompasses SDGs 1 to 11, 13, and 16. Arguing that financial inclusion facilitates resilience and growth, Vasile et al. (2021) link financial inclusion with the achievement of seven SDGs (SDGs 1, 4, 5, 8, 9, 10, and 12). According to Ferrata (2019), issues related to financial

Figure 2: Summary of the 17 sustainable development goals



Source: Author's compilation

and financial services feature in the target goals of nine of the SDGs. These include the target 1.4 of SDG 1 (on the reduction of poverty), the target 2.3 of SDG 2 (elimination of hunger), the target 3.8 of SDG 3 (Promotion of good health and well-being), and the target 5.A of SDG 5 (addressing gender inequality). The other cover target goals 8.3 and 8.10 of SDG 8 (decent work and economic growth), target goal 9.1 of SDG 9 (industry, innovation, and strong infrastructure), target goal 10.5 of SDG 10 (minimizing inequalities), target goals 16.4 and 16.5 of SDG 16 (peace, justice, and building strong institutions) and the target goal 17.1 and 17.3 in SDG 17 (in partnership for attainable goals).

From the aggregate summarization of the SDGs identified by Ferrata (2019), Shipalana (2019), Tay et al. (2022), and Vasile et al. (2021), it is evident that the completion only two of the SDGs (SDGs) are not related to DFI. Mpofu (2022c) argues that the 17 SDGs are linked to access to reliable finance in the economy. The researcher argues that the SDGs are interlinked and not divisible. These can be grouped into the three dimensions of sustainable development, which encompass environmental, social, and economic angles. Therefore, using DFS countries can improve economic growth and development, create employment, improve revenue mobilization, reduce corruption, and create strong institutions, thus covering SDGs 8, 11, 12, and 16. With improved government, government revenues can spend more on citizen welfare, education and health, reduce inequalities, and ensure environmental preservation initiatives such as green investments, green financing, and others, thus addressing SDGs 1, 2, 3, 4,5, 6, 7, 9, 10, 13, 15 and 17. Puschmann et al. (2020) state that through green fintech DFSs, can contribute to the alleviation of climate change impact, thus addressing SDGs 7, 13, 14, and 15. While acknowledging the favorable influence of the supply and demand of financial inclusion in developing economies, it is imperative to make a balanced evaluative assessment of DFSs and the attainment of the SDGs.

Tay et al. (2022) caution that while DFI is arguably a propeller for the achievement of the SDGs, it will be improper to draw such a blanket conclusion. This is linked to the argument that the relationship between DFI and the delivery of the SDGs in development is controversial and contested. The controversy in developing countries is associated with the contextual environments in these countries (political, economic, social, and legal). Developing countries encompass fragile states depicting economic, political, and social fragility. Fragile countries are generally areas where the digital divide is high, accompanied by low literacy levels, digital financial illiteracy, high levels of poverty, inequality, and gender disparities, as well as discrimination. Fintech can help lower poverty in developing countries, increase GDP in these countries, and create more jobs (McKinsey Global Institute), but it is critical to acknowledge that it brings hidden costs, especially more for the digitally illiterate (Matthews, 2019). In affirmation, Ghosh (2022a) articulates that even though fintech has widened digital and the utilization of DFSs, evidence supporting the argument that DFSs improve the economic empowerment of women is not fully convincing. This is because digital exclusion, social exclusion, and digital financial illiteracy, low education levels, as well as socioeconomic and cultural factors that affect women, remain fundamental constraints. The researcher adds that evidence on the role of DFSs and DFIs in the achievement of the SDGs is less persuasive and mixed; this requires investigation.

3.2. The Provision and Uptake of DFSs in Developing Countries

The levels of financial exclusion are high in developing and emerging economies, with most of the 1.7 billion financially excluded globally observed to be in these countries. Fintech is slowly increasing the adoption of DFSs in developing countries. According to Fang and Zhang (2021), Wang and He (2020), and Chikalipah (2020), most rural areas in developing countries are financially excluded, yet DFI can contribute significantly to the access of funding for agriculture. Mishar and Kumar (2018) claim that the potential of financial services and fintech is untapped and underexploited in emerging economies with disadvantaged groups not accessing lines of credit, insurance, mortgage loans, investment services, and other financial services. In most Latin American and African countries, mobile money has gained ground as the cornerstone of DFI, with more people having mobile money accounts than those with bank accounts. More people are

accessing, receiving, sending, receiving, and withdrawing money, as well as accessing insurance and loans through mobile money accounts (Mishar and Kumar, 2018). Mader et al. (2022) proclaim that mobile money is the backbone of fintech in Africa, especially in sub-Saharan Africa. Development bodies, policymakers, fintech firms, and academics have celebrated mobile money services as a driver for financial inclusion, economic development, and social inclusion (Clifford, 2020; Mpofu, 2022a; Pushkareva, 2021; Khera et al., 2022). In Zimbabwe, Siwela and Njaya (2021) allude to the transformative power of mobile money technology to financially include previously excluded groups, especially women and the informal sector. Furthermore, the researchers explain that the financial inclusion of the informal sector was critical because employment opportunities continue to decline in the formal sector, exposing more than 2 million of the country's population to hunger and extreme poverty. DFSs are considered to have the potential to reduce poverty and drive entrepreneurial growth and women's empowerment.

According to Khsetri (2021), more than 200 million small and medium enterprises (SMEs) do not have access to financial services in developing countries. Most adults and women in developing countries are financially excluded. In South Sudan, only 9% of adults were financially excluded (without a bank account). In Latin America, 70% of the population was financially excluded, either underbanked or unbanked (Rojas-Torres et al., 2021). Rashid (2020) states that 35 million MSMEs in South Asia are financially excluded or underserved, with an estimated credit gap of $170 billion. Developing countries are characterized by low levels of development, poverty, inequalities, corruption, and poor standards of living. Therefore, the widening of DFI is considered key to improving the quality of life and standards of living and well-being of the financially excluded and disadvantaged population. Access to digital finance is essential for short- and long-term goals for both individuals and businesses (World Bank, 2018). Menyelim et al. (2021) state that DFSs are important for promoting digital finance development in developing countries. DFSs facilitate inclusive finance to drive sustainable economic growth driven by financial inclusion and inclusive growth efforts. In developing countries, DFSs can expand financial inclusion. Financial inclusion can reduce income disparity and gender divide, create opportunities for job creation, drive economic stability, and ultimately lead to the achievement of sustainable economic growth (Babajide et al., 2015). By reducing poverty and inequality, DFSs can foster inclusive growth. Inequalities are observed to be responsible for selective economic growth and empowerment. Poverty, unemployment, inequalities, and gender-based violence are the biggest challenges facing developing countries.

3.3. Opportunities Emanating from the Provision and Use of Digital Financial Services in Development Countries

The DFSs markets present an array of opportunities to different stakeholders such as consumers, service providers, the government, and the economy at large. Along with the possible benefits, DFSs also have several challenges that impede the advancement of DFI and the achievement of the SDGs. Klapper and Singer (2017) posit that DFSs provide an opportunity for governments to digitize payments, encourage society to use DFSs, ensure the development of a comprehensive and functional digital financial ecosystem, and drive economic growth. With DFSs, developing country governments can move from cash to electronic government to person (G2P) transactions. DFSs and payments ensure convenience and confidentiality in financial transactions. Digitizing social grants and wages payments from cash to formal bank or mobile money accounts, the government cannot only be exemplary in embracing DFSs, but encourage consumers to do so as well. Additionally, DFSs could potentially reduce transaction and cash handling costs and increase transparency and efficiency. Indirectly, these governments can catalyze DFI, especially among women and girls, the youth, the informal sector, the unemployed, and the elderly. Government payments are normally in the form of social benefits, pensions, child support grants, benefits for the elderly, as well as unemployment grants. To bolster the likely advantages of DFSs in developing countries, Klapper and Singer (2017) et al. (2017) state that "While it is estimated that 90% of high-income countries make their G2P, "most electronically," more than half of developing countries make their payment in the form of cash or paper payments, such as checks." Using DFSs reduces fraud, corruption, and other leakages. In India and Argentina, Klapper and Singer (2017) provide evidence that fraud and leakage associated with cash were vastly reduced when governments paid social benefits through DFS. In South Africa, Shipalana (2019) affirms the reduction of problems related to cash payments when social grants were paid through bank accounts. The volume of payments from governments (salaries, social benefits, pensions, and other payments) has the potential to add considerable volumes of transactions to DFSs platforms if these payments are digitized. Therefore, it contributes to the financial viability of commercial infrastructure in rural areas or digital finance infrastructure that can be constructed in remote and rural areas. This infrastructure can then serve those previously financially excluded and underserved in rural areas. This could lead to the expansion of the digital finance infrastructure in remote areas, which could drive the development of infrastructure in the economy.

Demirguc-Kunt et al. (2018b) emphasize that through digital and mobile money services, DFI improves transparency and reduces corruption, and by bringing the unbanked population into the formal financial, it increases their resilience against small negative shocks and promotes savings.

In Pakistan, Manzoor et al. (2021) argue that DFI leads to better economic stability and reduces income inequality. Researchers further portend that the DFSs market has the likelihood of growing to more than US$ 36 billion in 2025, growing GDP by 7%, and creating approximately 4 million additional jobs. Rashid (2020) states that DFSs propel the digital economy and this economy contributes more than 15.5% of the GDP globally, 10% to the GDP of developing economies, and approximately more than 18.4% in developed nations.

In Bangladesh, Mujeri and Azam (2018) argue that DFSs and mobile money technologies are critical in expanding access to financial services and promoting the DFI of vulnerable groups in developing countries. Researchers further observed

that 'being both pro-growth and pro-poor, digital financial services will contribute to financial growth and stability on the one hand and promote rapid and inclusive growth to reduce poverty and inequality and promote shared prosperity and social cohesion on the other' (Mujeri and Azam, 2018). According to the researchers, the advantages of DFI include the closure of the financial inclusion gap, increased transparency and accountability, improved service delivery, reduced operational costs and improved efficiency.

Furthermore, the fact that with DFS, funds can be accessed through point-of-sale terminals (POS), mobile money agents, mobile banking, automated teller machines (ATM) and mobile phones ensures convenience and flexibility (Chamboko, 2022; Tay et al., 2022). Pal et al. (2020a) state that, while DFSs promote socioeconomic development, they bring convenience. The researchers divide convenience into four dimensions. Transaction convenience (quick transactions and settlements), benefit convenience (reducing the usage of cash and its accompanying challenges, the improved access and affordability gains and diversity of services), information convenience (reduced information asymmetry) and social convenience (social inclusion and the ease of transacting with friends, business partners, relatives, suppliers and customers). Yang and Zhang (2020) emphasized the role of DFS in the reduction of information asymmetry.

The COVID-19 pandemic proved the importance of DFS for individuals, businesses, governments, and the economy in general. Without a functional financial system, the economy would have collapsed, but despite the lockdown measures and the failure to access cash, as well as the discouragement of its users based on being a possible spreader of the virus, DFSs kept economies functioning. Domestic and international remittances were transferred and accessed through digital financial services platforms. Digitalizing government payments is crucial, as the government plays a pivotal role in building a digital financial ecosystem with adequate digital finance infrastructure.

3.3.1. DFS and the empowerment of women

DFSs increase financial inclusion through improved access, reduced costs, increased transparency, and convenience (Shipalana, 2019). Broadened financial inclusion is associated with economic empowerment of women. DFSs promote greater confidentiality, privacy, and control over payments and other financial resources. Social cultural values and norms in most developing countries disadvantage women and girls, depriving them of the right to control their money, their own bank accounts, or accumulate assets. This is prone in countries such as Nigeria, India, Korea, and others. Therefore, if through DFSs, women have their bank accounts or mobile money accounts through which they receive their social payments. Aker et al. (2016) argue that they tend to have more privacy and control over their finances. The researchers give evidence of these financial independence and autonomy advantages of mobile money over cash in Nigeria. Women spend more on household needs such as accommodation, healthcare, food, education of children and family development, as well as savings compared to men (Ojo, 2022a, b; Ghosh, 2022a, b; Kulkarni and Ghosh, 2021). Therefore, by empowering women through DFS, there is an indirect contribution to the achievement of SDG 1 to SDG 12.

3.4. Challenges Faced in the Provision and Use of Digital Financial Services in Developing Countries

According to Klapper and Singer (2017), 2 billion adults are unbanked globally and more than half of these are in developing countries. Their financial exclusion is related to factors such as costs, accessibility, distance, documentation requirements, collateral (in the case of loans), and other constraints. Klapper and Singer (2017) further assert that to understand the challenges of DFI better; researchers need to appreciate context-specific and country-specific constraints such as those linked to economic policy environments and political, demographic, legal, and regulatory settings. The low uptake of DFSs in developing countries is also related to low literacy levels and low levels of trust in DFSs (Aziz and Naima, 2021). Concerning the importance of trust in DFI, Ogawa et al. (2021) declare that in those regions and countries where there is awareness, knowledge of, and trust in financial services, the demand, and usage of DFSs is high. To affirm how the lack of trust in DFS affects DFI and digital finance, Klapper and Singer (2017) portend that even though citizens have access to financial services; they only use them to receive funds and quickly withdraw all the funds. The researchers alluded to the need for education on how funds can be stored and invested digitally and that value can still be stored safely in digital finance. Lack of trust can be linked to inconsistent policies relating to the financial services sector, high inflation rates, currency changes, and bank failures (Simatele, 2021; Siwela and Njaya, 2021). Mpofu (2022 a, b, d) alludes to the newly introduced digital services tax (direct and indirect) and mobile money taxes as some of the hindrances to DFI, as these taxes heighten the costs of transacting, the prices of digital devices and mobile devices as well as the costs of data and internet connectivity. In Bangladesh, Mujeri and Azam (2018) portend that some of the hindrances to DFI include stringent and ever-evolving regulatory frameworks, ineffective coordination, risks, and fraud, lack of comprehensive national strategies on DFI, inadequate regulatory frameworks, weak penetration of DFSs. The researchers also refer to weak digital capacities, lack of information and understanding of DFS, and consumer needs.

Pal et al. (2020b) and Kusumawati et al. (2022) outline the hindrances to DFI in developing countries. These include the lack of access to DFS (due to costs, the digital divide, and digital and financial exclusion), literacy challenges (digital literacy, financial literacy, and digital financial literacy, which exposes consumers to financial fraud and cybercrimes leading to mistrust toward DFSs reducing digital penetration and DFI) and the lack of digital infrastructure as well as risks. Pal et al. (2020b) group the risks into privacy risks, security risks, and performance risks. Privacy risks are related to personal data handled by DFS providers, such as names, identity documents, and numbers, addresses, and other identifying information. Confidentiality and privacy can be violated if information is mishandled, not adequately protected, or shared without the consent of the consumers. Privacy is compromised. Security risks concern malware and cyberattacks and crimes (Ozili, 2022; Shipalana, 2019). Despite the security

measures such as passwords, constant updates, support systems, and notifications concerning security for DFSs, the services are prone to fraud and cyberattacks. Security measures are still inadequate to protect consumers, compromising the convenience, safety, and reliability principles of DFI. The more consumers feel insecure and unsafe when using DFs, the more digitally and financially excluded they will become.

Performance risk relates to user errors and security breaches that lead to fraud and theft. Furthermore, DFSs can malfunction, leading to financial losses or fear and anxiety in customers. Systems and platforms may fail to function as expected, resulting in unintended consequences. All these risks become constraints to DFI.

Mishar and Kumar (2018) state that challenges to financial inclusion have been linked to a lack of diversity in product choices, access, and affordability problems, as well as the remoteness of some areas and travel costs. Researchers point out that while DFSs have been rolled out to address these, services have not eliminated these problems completely and, in addition, financial services have introduced their complexities and challenges that impede DFI.

4. DISCUSSION OF FINDINGS

The review revealed the importance of DFS in developing countries, as well as the challenges affecting the delivery and uptake of the services. The findings are presented in the following subsections.

4.1. Provision and Usage of DFSs in Developing Countries

The review established that DFI is still in its infancy, but is gaining momentum in developing countries. According to World Bank (2021), the figure of adults possessing bank accounts in developing economies rose from 51% in 2011 to around 71% in 2021. The use of digital payments has also increased, with more than two thirds of adults in developing countries utilizing DFSs to receive or make digital payments. Kenya, India and Bangladesh are observed as some of the developing countries with high levels of financial inclusion. While the levels of financial exclusion are still high for the DFS, especially mobile money addresses the financial inclusion gap in these developing countries (Clifford, 2020; Pushkareva, 2021). In Africa 62% of adults own mobile money accounts and 42% use these accounts to transact (Mpofu and Mhlanga, 2022). In Asia, 59% of the adult population has mobile money accounts and only 35% of these adults use the mobile money accounts (World Bank, 2021). The usage gap is evident in the presented statistics. The provision and uptake of DFSs was affected by several challenges identified in the literature such as costs, illiteracy problems, and lack of trust, risks, and taxes. These challenges must be overcome to improve the delivery and use of DFSs in developing economies.

4.2. Opportunities Related to DFSs in Developing Countries

The opportunities for DFI were found to vary from one stakeholder to another, and Figure 3 highlights the discussion on these various benefits for consumers, DFS providers, government, and economy.

4.2.1. Financial inclusion

DFI can enable long-term provision and access to affordable DFSs to allow the poor and other financially disadvantaged groups to enter and use formal financial services. Through DFI citizens can make financial decisions, access their funds, bank their funds, borrow funds, save funds, use funds, grow funds, move funds, have mobile money accounts and bank accounts, and reduce the risks linked to the use of cash. With DFSs, there is reduced paperwork, increased convenience, reduced face-to-face interactions, and settlement times, as well as the costs of providing and accessing financial services. The role of DFI in promoting financial inclusion was alluded to in the literature by Mhlanga (2020); Ndimbwa and Qutieshat (2022); Ogawa et al. (2021); Rauniyar et al. (2021) and Ozili (2018). As citizens continue to access DFSs such as credit, savings, and insurance, they become familiar, and confident, and gain trust in these services and platforms, this will not only expand DFI, but also increase the customer base and profits for DFSs providers and contribute to lowering the operational cost and improving the return on investment (ROI). DFSs allow low-income earners to process smaller transactions more frequently to manage their erratic incomes and expenses. With DFSs, financial products and services can be customized to meet the financial circumstances and needs of customers using data gathered from the financial activities of customers such as transfers, investments, savings, and credit history.

Statistics show an increase in digital financial inclusion in developing countries. For example the digital financial inclusion gender gap is observed to have narrowed with 67% of women having bank accounts in 2021 when compared to 75% ownership by men. Additionally, the usage of digital financial services for payments by adults in developing countries rose from 24% in 2014 to 43% in 2021. In Africa account ownership by adults increased from 23% in 2011 to 63% in 2021, while in Asia and the Pacific adult account ownership increases from 40% in 2011 to 76% in 2021 (World Bank, 2021).

4.2.2. Promotion of e-commerce, entrepreneurship, and digital entrepreneurship

DFSs are important in driving e-commerce especially now that the digital economy is expanding rapidly globally. Technology connects buyers and sellers from different countries together through social media platforms such as Facebook and Google and digital giants. Businesses can market and sell their products online. DFSs are essential to ensure that these players in the e-commerce ecosystem can transact smoothly. E-Commerce drives the digital economy, economic growth, and employment creation. E-commerce is also critical in boosting exports from emerging economies, thus contributing to the achievement of SDGs such as SDG 17 and providing funds to finance the other SDGs. Fintech opens new markets, increases the customer base of companies, and increases market share. Fintech supports entrepreneurialism by improving the financial interaction between buyers and sellers, in addition to enabling access to funds that are needed to improve entrepreneurial performance and growth. In terms of digital entrepreneurship, fintech provides opportunities for digital entrepreneurship in most developing countries, considering that poverty, unemployment, and inequalities are high in developing

Figure 3: Opportunities or benefits of digital financial inclusion for different stakeholders

Source: Author's compilation

and emerging economies. Unemployed people and especially the youth could engage in online sales and purchases, which promotes digital entrepreneurship, which does not require a lot of physical infrastructure and investment. Zimbabwe is a good example where the use of DFSs for e-commerce by youths was found to be high (Chamboko, 2022).

4.2.3. Opportunities to reduce financial inclusion and digital inclusion gender divide

The literature points to gender disparity in financial inclusion, pointing to men generally being more financially included than women in developing countries due to socioeconomic and cultural factors that limit their ability to access financial services. Information, communication and technology play a fundamental role in the implementation of the 2030 SDGs; improving efforts toward the achievement of the 17 SDGs. Digital technologies and e-commerce are facilitating the empowerment of women financially and through entrepreneurial activities. This empowerment of women and enabling them to access finance for their business leads to poverty reduction, reduced income inequalities, creation of decent work, increased innovation, and enables women to access education and health. World Bank (2021) adduces that the financial inclusion gender gap declined by 9% in 2021 when compared to the 2014 statistics. DFI enhances economic empowerment for women, allowing greater financial autonomy and asset accumulation, thus ameliorating women's economic welfare decision-making and participation in the economy.

4.2.4. The achievement of the SDGs

Whether DFI yields benefits or is a challenge to achieving sustainable development is a convoluted topic surrounded by controversy. The literature presents conflicting arguments showing, on the one hand, that DFI can lead to the implementation of the SDGs in developing countries. For example, with access to DFSs, citizens can conveniently pay the school fees of their children and their own (this improves access to education and promotes lifelong learning) and with improved literacy and digital literacy levels, the uptake of DFSs can improve among youth as well as financial literacy, thus promoting financial inclusion. These gains would help reduce inequalities (SDGs 5 and 10). Furthermore, DFI promotes access to credit and improves financial decision-making, shares savings, and investments in the economy, and drives productivity and economic growth. All these advantages lead to the realization of SDGs such as poverty reduction, employment generation, economic growth, reducing hunger, access to education, health, water and sanitation, infrastructural development, innovation and industry growth, as well as strengthening institutions and communities, among others. From the reviewed literature, it was evident that DFI can contribute to the SDGs in their totality due to the linkages and the casual relationship that exists between the SDGs. What is important is to highlight some aspects of DFS that can compromise the attainment of the SDGs. These include the increase in risks associated with FS, possible financial losses, complexities linked to DFSs, charges, and taxes associated with FS, possible exploitation of consumers, and the likelihood of citizens becoming over-indebted or engaging

in irresponsible activities such as gambling and betting. The controversial arguments were evident among researchers such as Chamboko (2022), Mpofu (2022a), and Mader et al. (2022), among others.

4.2.5. Enhanced economic growth and sustainable development

DFSs can improve gross government expenditure, improve customer spending, increase savings and investments in the economy, bring stability to the financial sector, and boost economic growth. During the COVID-19 pandemic, digital finance was driving economic growth though slowly, but economies were functioning otherwise without DFSs the economies would slowly stop. Domestic and international remittances were still made. Post COVID-19 pandemic, digital finance continues to boost economic recovery through improved revenue mobilization, provision, distribution, and access to financial resources and DFI. Digital finance reduces the amount of money that circulates in the economy, thus minimizing inflation levels (which is a big challenge in developing economies such as Zimbabwe, Nigeria, Malawi, and others).

4.2.6. Risk reduction and improved risk management

With the use of DFSs, transparency is heightened and there is a minimization of leakages associated with anonymity and fungibility of cash payments, such as the payment of ghost workers. There is also a reduction in risks such as theft and financial crimes and those risks linked to informal service providers such as high interest, exploitation, and aggressive treatments. The traceability and stringent documentation or digital identification requirements associated with DFSs lead to a reduction in bribes, corruption, and ghost recipients.

4.2.7. Improved profitability and market share of companies

Using DFSs, large and small businesses can improve their market share and profitability. DFSs lower the usage of cash and significantly minimize operational costs for financial service providers, consumers, other businesses in general, and the government. Lowering the costs of transactions increases the affordability of financial services, thereby widening the user for DFSs, and this increases the market share of financial services providers as well as the competitiveness. Minimization of operational costs ensures that despite the frequency and volume of small transactions from low-income earners, they can be processed quickly, profitably and at affordable costs. For businesses in general, fintech is a key driver for e-Commerce and the growth of the digital economy.

4.2.8. Increased domestic revenue mobilization

Through DFSs, payments such as utility bills, school fees, private sector salaries, and wages, and payments for agricultural products can all be done digitally. Furthermore, by digitalizing government payments, the costs of transactions (travel costs, time costs, and cash challenges, as well as the labor costs for cash distribution and security) are minimized for both governments and recipients. Domestic revenue mobilization can improve through DFI in three ways. Firstly, through DFSs citizens can easily have control of their funds and have the convenience to pay their bills such as water, electricity, licenses, and insurance. Secondly, through access to finance, businesses can be able to upgrade their infrastructure (property, plant, and equipment), procure raw materials, and reinvest in their businesses, therefore increasing productivity, savings, and investments in the economy. As businesses grow and the economy expands, the government can increase tax revenue mobilization from the different tax heads such as income tax, VAT, withholding taxes, property taxes, and capital gains taxes among others. Thirdly, taxing DFSs through taxes such as mobile money, intermediate monetary tax on transfers (IMTT), and taxes on swipe transactions are easy to collect and with fewer costs involved. In Zimbabwe, the IMTT is one of the top performing tax heads (ZIMRA, 2022). Additionally, DFSs can make it easy for residents to receive international remittances and donor aid, thus injecting inflows into the economy. The relationship between domestic revenue mobilization, taxation of DFs, and the impact on DFI is contradictory and mixed, thus it requires further exploration as affirmed by researchers such as Mpofu and Moloi (2022), Mpofu (2022a), and Mader et al. (2022).

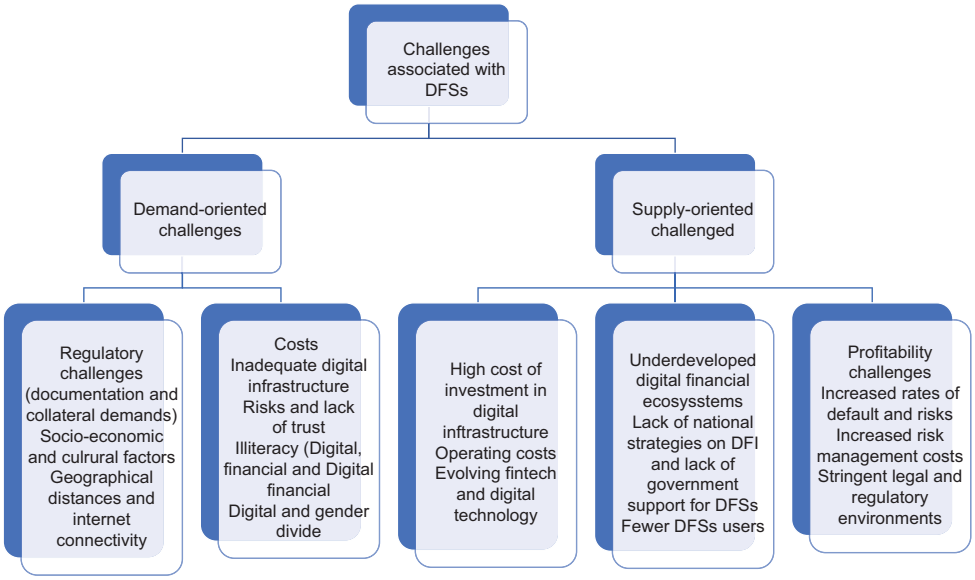
4.3. Challenges Associated with DFSs

The findings of the possible challenges to DFI in developing countries are summarized in Figure. These changes are presented schematically and they are broken down into demand-focused and supply-linked challenges in Figure 4. The demand-oriented concerns the customers or those that impede access or usage by consumers, while the supply-associated deal with the challenges affecting the provisioning of DFSs. Some of these constraints, such as risks, costs, digital infrastructure, stringent regulations, and taxes, affect both consumers and suppliers.

4.3.1. Inadequate infrastructure

The challenge of inadequate digital infrastructure to support the supply and usage of DFSs affects financial services providers and consumers, respectively. Significant initial investment is required for the development of infrastructure. This includes the purchase of hardware and software to support the provision of DFSs. Constant technological changes, the increase, and evolvement of risks and cyberattacks require the constant and continuous upgrade of not only the digital equipment, devices, and infrastructure, but also investment in research and development as well as technical training. Capital, technological, and continuous skill development require funds, yet there are limited financial resources in developing countries, and underdeveloped infrastructure, and in some countries, the limited infrastructure is confined to urban areas. The availability of infrastructure only in urban areas constrains DFI, yet the objective is financial inclusion of all members of society, including the vulnerable groups of citizens, which includes the rural population. For DFSs to be supplied in a secure, affordable, and safe way there is a need to invest in software that improves consumer protection measures, such as biometric identification or other means of digital identification for transacting financially. Regarding consumers, DFSs users and potential users in developing countries face a lack of digital devices and mobile phones. Considering that these developing countries have large informal economies, low incomes, economic challenges such as high inflation, epidemic poverty, unemployment and retrenchments, high inequality, and large numbers of rural dwellers, most citizens cannot afford to

Figure 4: Challenges affecting digital financial inclusion in developing counties



Source: Author's compilation

purchase the necessary digital gadgets for accessing DFSs. Even in a situation where they purchase them, they fail to maintain or replace them. The insufficiency of digital infrastructure continues to be a challenge for DFI in developing countries. This is compounded by low income and high degrees of poverty in developing countries.

4.3.2. Internet connectivity and the cost of data

DFSs such as mobile banking and digital banking require internet connectivity and the affordability of internet data. Without Internet or Internet data, it is difficult and at times impossible for one to log in for mobile banking. In most developing countries, the costs of internet data are very high, connectivity is poor and unevenly distributed, and most rural areas have no access to mobile networks or the Internet.

4.3.3. Transaction costs and other hidden costs

While DFSs increase access and affordability, they do not eliminate transaction costs. Users of DFSs still face costs of maintaining bank accounts, bank charges linked to swipe transactions and transfers, as well as withdrawals. In some countries such as Zimbabwe, DFSs consumers face taxes on digital transactions such as swipe transactions and bank transfers. These taxes include 4% IMTT on foreign currency transactions and 2% IMTT on local transactions (Mpofu, 2022a; Pushkareva, 2021; Simatele, 2021). In most African countries, mobile money transactions face taxes for withdrawals and transfers. Additionally, there are also excise taxes and VAT on data and digital devices, which affects the affordability of DFSs in the hands of consumers. For companies, costs such as DTSs and VAT on digital services taxes increase the costs of investing in DFSs, hence discouraging investments and reducing the profitability of DFSs. The controversy of costs and hidden costs affecting DFI is discussed by Ozili (2018; 2020b) and Shipalana (2019), while the impact of taxes on DFI is discussed by Mpofu (2022a, b, d), Pushkareva (2021) and Mhlanga and Mpofu (2022a). Hidden costs, such as data costs and debt costs, are some of the costs affecting DFI.

4.3.4. Digital exclusion (digital divide), digital financial literacy, and financial literacy

Developing countries are associated with high levels of illiteracy and inequalities among the poor due to colonial history, poor government expenditure, and corruption, thus not properly funding policy initiatives on addressing SDGs 4, 5, and 10 (on the provision of quality education, addressing gender inequalities and reducing inequalities). Low education levels increase the levels of financial illiteracy in developing countries, as well as digital illiteracy and digital financial illiteracy. Digital illiteracy leads to digital exclusion and social exclusion, but digital inclusion and social inclusion are important drivers for DFI. Financial illiteracy leads to mistakes and bad choices in financial decisions leading to costly errors, overspending, and over-indebtedness, while digital financial illiteracy can lead to digital financial exclusion due to fear of using digital devices and platforms and compounds the lack of trust in DFSs, thus leading low levels of usage. Unterhalter (2019) emphasizes the importance of SDG4 (quality education) for other SDGs. Lastly, low education levels mean that many people in developing countries, especially women and girls, cannot read or write or have moderate levels of education. This is worsened by the fact that DFSs need one to comprehend instructions and generally these instructions are in English and no local language guidance accompanies them. This makes these instructions complicated and subject to misinterpretation or miscommunication by consumers. There is a need to increase financial education and awareness of digital financial services, as well as the types and usage of digital devices, technologies, and platforms. These measures might enable the use and improve access to DFSs in a convenient, safe and reliable way.

4.3.5. Gender divide

In most developing countries, gender inequality and discrimination are high as deduced from the literature review. Researchers such as Ojo (2022a, b); Ghosh, 2022; Ghosh and Kulkarni (2017) and Mhlanga (2022), among others, allude to the gender divide in developing countries and argue that gender inequalities lead

to a gender gap or disparity in DFI and financial inclusion in developing countries. With women discriminated against in terms of access to education, job opportunities, property ownership, and making economic decisions, women tend to be digitally and financially excluded. In some cultures, women are not allowed to own or use digital devices such as mobile phones. They are also sometimes prohibited by their mothers-in-law or because of religious beliefs. Most women do not have bank accounts or mobile accounts. In some cases, even in situations where they have these, they do not know how to use them due to a lack of education and digital knowledge. The literacy and digital literacy gaps force women to rely on men when using DFS; therefore, this leads to a lack of confidentiality and privacy of financial exploitation that discourages women from using DFS. Lack of digital knowledge breeds fear of technology resulting in digital financial exclusion. The DFI divide in developing countries worsens gender inequalities, poverty, hunger, and lack of access to education and health, as well as increasing inequality. This shows that the interlinkages between DFI, the gender divide, and the realization of the SDGs are intricate and need to be thoroughly investigated in the context of developing countries.

4.3.6. Risks

The provision and utilization of DFSs is linked to an increase in risks for financial service providers, customers, and the government. These risks reduce DFI. These risks come in various forms, and they encompass regulatory risks, exchange rate risks, business risks, financial risks, risks attached to the lack of familiarity with DFSs, the use of agents in the provision of financial services, and risks associated with the use of digital technology. These risks negatively affect DFI in developing countries. The lack of familiarity risk can be referred to as novelty risk. This risk describes risks due to lack of exposure and knowledge of financial services and products, service providers, and consequently vulnerabilities that lead to exploitation, abuse, and falling for aggressive marketing of service providers, high debt, and lack of comprehensive risk assessment. The agent-associated risk is linked to the exploitation of consumers by agents through overcharging, as some of the agents are individuals, and small enterprises are not subject to consumer protection regulations that apply to banks and other formal financial institutions. The risks associated with digital technology include risks such as service disruptions, security and privacy, breaches, a stolen identity, financial and loss of data, system failures, and complex and confusing digital forms. Regulatory risks include over-regulation and under-regulation possibilities. Business risks and financial risks have to do with risks associated with the DFS industry, and financial risks are linked to financial fraud and losses. Furthermore, there is the risk of interdependence, considering that the delivery of DFSs depends on various stakeholders such as mobile network companies, internet providers and consultants, and that DFS providers have no control over. DFSs have no input or control over t privacy and data protection internal controls used by service providers. Mujeri and Azam emphasized the impact of DFI. (2018) and Pal et al. (2020b) among other scholars in the reviewed literature.

4.3.7. Taxation of DFSs

The literature reveals that the growth of DFSs in developing countries, especially mobile money services, has become a focus of tax authorities who view the DFS industry as a possible fountain for tax revenues. Taxation of DFS is a controversial, complicated, and contested issue among researchers, governments, revenue authorities, and development bodies, therefore, whether it is a challenge or benefit of financial inclusion is debatable as well (Clifford, 2020; Mader et al., 2022; Mpofu a, b, d; Mpofu and Mhlanga, 2022). Even though the impact is mixed, the literature showed that those raising arguments against taxing DFSs have pointed to the negative impacts. These encompass the likely impediment of financial inclusion, the increased costs of providing and accessing DFSs, the possible reduction in investment in the DFSs due to a reduction in the return on investments, and reduction in profits due to increase in operational costs and possible reduction in usage. Other arguments on the negative implication concerning taxation of DFSs had to do with revenue mobilization. Although researchers agreed with the possibility of increased domestic revenue mobilization and the need to ensure equity by taxing digital services, they also raised that DFSs also made it easier for governments to collect other revenues other than taxes such as the payments of local authority fees, utilities, and fees. Therefore, taxing DFSs would result in a reduction in revenue mobilization and possibly lead to a reduction in economic growth and DFI. The taxation of DFSs can then adversely affect the completion of the SDGs in developing countries.

4.3.8. The negative effect of DFSs on the realization of the SDGs

The possible negative effects of DFS on the achievement of the SDGs in developing countries could discourage the adoption and use of DFS. While DFS increases the affordability, access and use of financial services, this convenience could lead to easy access to funds and promote irresponsible behavior such as gambling, overdrinking, overspending, and over-borrowing. This negatively affects the implementation of the SDGs as it can lead to increased poverty levels, declining welfare and living standards, and the inability to save or fund health and education. Over-indebtedness can lead to a poor credit reputation, the sale of property used as collateral, and high default risks affecting financial service providers. The cycle will then continue, with poverty increasing and financial exclusion expanding as citizens fail to procure digital devices or even afford to pay for internet data. Some consumers can fail to pay for basic services such as education and health due to over-indebtedness, lack of education leads to increased digital exclusion, thus increasing digital financial exclusion. This discussion was based on the works of Chamboko (2022), Mpofu (2023), Tay et al. (2022), and Shipalana (2019), among others. The use of DFSs requires technology from digital devices or mobile devices, digital knowledge, education, and internet connectivity. The lack of prerequisites for DFI restricts the usage of DFSs.

5. CONCLUSIONS, LIMITATIONS, AREAS OF FURTHER RESEARCH, AND RECOMMENDATIONS

DFSs are critical to enabling the success of relevant and reliable financial services and products at affordable costs as well as to

Figure 5: Summary of recommendations to improve digital financial inclusion in developing countries

Source: Author's compilation

be delivered and accessed in a safe, transparent and fair manner. DFSs can significantly contribute to expanding the scope, depth, intensity, and access to financial services. Using DFSs, financial activities such as investments, savings, making payments, e-commerce, accessing credit, health savings, and insurance, as well as making transfers, and domestic and international remittances can be done with ease, convenience, and at affordable costs. DFSs can lower transaction costs and eliminate access

barriers such as remoteness, distance, inefficiencies, and the lack of competitiveness in financial service provision, especially for vulnerable groups and small transactions. The review concluded that while DFI heralds a new dawn for developing economies, with several advantages it is associated with challenges or barriers. Advantages include possibilities to minimize the risk of poverty and improve prosperity, drive financial digitization and household development, increase savings and investment at the individual, household and business levels, access to finance for small businesses, reduce information asymmetry, and create more jobs. Additional opportunities include promoting entrepreneurship through adequate financing and building economic resilience for small businesses and households. Broadening domestic revenue mobilization, reducing money laundering, corruption, and illicit financial flows, innovation, increasing risk reduction, reduction of operational costs, increasing financial inclusion, and strengthening the performance and profitability of financial services sector companies and institutions and ultimately the realization of SDGs are some of the likely benefits of financial inclusion in developing and emerging nations. These advantages were found to be some of the reasons driving the expansion of digital financial inclusion as reflected in the literature statistics on Africa, Asia and the Pacific. In Kenya, M-Pesa was observed to have reduced poverty by 2%, in India PMJDY was argued to lead to 1.5% reduction in poverty while in Brazil Pix contributed to reducing poverty by 1%. Poverty reduction is a matter that touches on economic growth, development and the SDGs.

Despite the range of benefits of DFSs and DFI, the achievement of these advantages is impeded by the various challenges that affect the supply and use of DFSs in developing countries, thus restricting the inclusion of DFI. The challenges deduced from the review include the high informal sector, high levels of illiteracy due to challenges in accessing education and gender discrimination (gender divide), high unemployment levels, regional and geographical divide, rural and urban divide, digital divide, high rates of poverty and inequality, and digital financial illiteracy. Some of the challenges include a lack of trust in financial services and, particularly, DFSs, poor internet access, and connectivity, lack of digital infrastructure and digital equipment, costs of acquiring and maintaining digital equipment, and taxation of DFSs. Furthermore, the constraints include risks of cyber-attacks, fraud, and financial losses, lack of knowledge and awareness of DFSs, as well as the lack of appropriate government support for DFSs. Therefore, to achieve DFI, reap the benefits of DFS, and mobilize the funds required to achieve the SDGs, certain policy responses are critical in developing countries, and these are discussed in the recommendations. DFI and financial inclusion cannot be overemphasized in the realization of the SDGs in developing countries. The inclusion of DFI alone is not enough; effective and efficient management of financial resources, good investment and capital management decisions, financial risk management, and adequate credit assessments and choices are critical at both micro- and macroeconomic levels. It is necessary to maximize the possible benefits of DFI and minimize the impact of the challenges faced in the adoption and use of DFSs in developing countries through appropriate policy responses. Proper implementation, adequate oversight, and appropriate education to address the gaps in financial and digital financial literacy are some of the very crucial policy responses for DFI in developing countries.

6. POLICY SUGGESTIONS

Policy recommendations to improve the provision, access and use of DFS (DFI) in developing economies should take a holistic approach. Arguing for the reduction in provision and access costs (ensuring affordability and access) alone as efforts to improve DFI would be naïve and overlooking other important dimensions toward achieving DFI. There is a need for unified efforts among stakeholders to improve the provision, access and use of DFSs. This ensure that DFSs effectively contribute productively to the achievement of the SDGs. Figure 5 summarizes the discussion of policy responses to improve DFI in developing countries. The recommendations try to address the challenges to DFI inclusion identified in the literature, and accordingly, the suggestions speak to digital infrastructure, consumer protection and risk management, building customer trust, improving education and awareness towards DFSs, and encouraging digital and social inclusion. Furthermore, the recommendations focus on stakeholder cooperation, increased government support and commitment, as well as suggestions on balance the needs for domestic revenue mobilization through taxation and the urgency to promote DFI.

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