



Financial Technology Solutions for Financial Inclusion: A review and future agenda

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Abstract

Objective- This research aims to review the extant literature and the contribution of digital technology (DT) in financial inclusion (FI). In this study, researchers attempted to suggest some directions to policymakers towards furthering the initiatives for financial inclusion. The objectives are to explore user behaviour for technology adaptation of financial transactions.

Design/ Methodology- A systematic literature review was conducted by using a method suggested by Cook and West (2012). The articles were selected between 2001 to 2020. Keywords such as ‘digital technology’ and Financial Inclusion (FI) were chosen for study. Full text articles in English language from SCOPUS, Web of Science and Google scholar were considered. A conceptual framework has been suggested based on the literature review, which can help future researchers to examine the current issues and challenges in the financial technology and digital technology field.

Findings/Conclusion- The overall review of existing literature available on the topic signifies that digital technology is the driver of FI and economic growth. However, there are some gaps noted on which future studies can focus.

Originality/Contribution/Value- In the literature review, research papers deal with problems, factors, and gaps in the use of digital technology. Thus, there is a need for more research on this topic. It is a unique study in the context of emerging economies.

Keywords: Digital technology, financial technology, financial inclusion, Digital payment, literature review, Mobile payment, financial literacy, conceptual framework.

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INTRODUCTION

'The test of our progress is not whether we add more to the abundance of those who have much; it is whether we provide enough for those who have too little.'

- Franklin D. Roosevelt

Financial technology plays a significant role in enabling the reachability of financial services to various strata of the society. Financial literacy helps in the usage of financial services, thereby contributing in financial inclusion and economic growth. Specially after the covid 19 lockdown, use of digital platforms for payment has increased exponentially. World is moving towards a cashless economy with even the people of lowest economic strata, such as vegetable vendors, tea stall vendors, auto-rickshaw drivers, in low income countries favoring cashless transactions. Digital technology is an important factor determining usage of financial services (Frost, et al,2019). Literature has enough evidences on how FI facilitated through usage of digital technology has resulted in economic development. The use of financial services is an important antecedent of financial inclusion (World Bank, 2018). In the last century, only the upper and upper middle income group people were using mobile phones in urban households in developing nations. In the last couple of decades, mobile phone has been adopted by both rural and urban households equally and large sections of the society are drawing financial benefits out of it (Aker and Mabit, 2010). Financial Inclusion (FI) considers the habit of saving, insurance, and usage of financial services by the common people.

Digital financial inclusion (DFI) means “Digital access and use of formal financial services by the excluded and undeserved population” (CGAP,2015). Financially included population is lowest in African countries (GSMA,2016). One of the reasons cited were low adaptability of digital finance (GSMA, 2016). The use of Digital Technology helps in the reduction of poverty (Gates foundation, 2017). Approximately 2.5 billion people do not have accounts (World Bank, 2017) which is one of the deterrents to use of digital services. Mobile payment is one of the most widely used among all the digital financial services. It is a medium for both digital use and communication. Despite it, there is low usage of digital payment (Buckley and Mas, 2016; Tarhini et al.,2016; Ashraf et al.,2017, Patil et al.,2017 Asongu and Nwachukwu, 2018; Sharma et al.,2018).

The Concept of Financial Inclusion

FI means the usage of financial services by underprivileged sections of society. It explains what portion of the population have bank accounts or use net banking accounts. With increased bank accounts financial transaction increases (Grohman et al., 2018). Financial Exclusion is one of the major challenges for the economy. FI can help increase the level of employment and decrease poverty. The challenge is to measure the proportion of people not using financial services and the ascertain the possible reasons behind this (Ford and Rowlingson, 1996, Kempson and Whiley, 1998).

“The process of ensuring access to financial services and timely and adequate credit where needed by vulnerable groups such as weaker sections and low-income groups at an affordable cost” (Rangarajan, 2008). Varghese & Viswanathan (2018) defined Financial

Inclusion as, “*Access to appropriate, low cost, fair and safe financial product and services from the mainstream service provider*”. Defining a Financial Inclusion, includes such services as savings, transactions, payment/transfer, credit at an affordable cost to the low section of society (Kopala, 2010).

The Definition of Financial Inclusion by the Rangarajan Committee, “*the process of ensuring access to financial services providing timely and adequate credit required by venerable groups such as weaker sections and low-income groups at an affordable cost*” (Bhaskar, 2013).

G-20 nations have started the Global Partnership for financial inclusion (GPFI) towards the goal of financial access to all (Tambunlertchai, 2017). To achieve sustainable development goals (SDGs) financial access can be one of the national strategies which will bring in socio-economic equity and improvement of standard of living. Studies have identified that individual inability to access financial services is a barrier to development for a country (Demirguc-Kent and Klapper, 2012; Ardic et al, 2011; Johnson and Nino-Zarazua, 2011; Ssonko, 2010). According to International Telecommunication Union, 53.6% of the population, or 4.1 billion people have been using the internet since the end of 2019 (ITU, 2019).

Mobile phones are contributing to the economic and social development of people (Aker and Mbiti,2010). Some studies have focused on the user’s acceptance of technology and its use of Fintech solution (Simanis and Hart 2009., Thompson 2017, Heeks, 2002). The research questions of the study have been mentioned below.

RQ1: How Financial technology is contributing to financial inclusion?

RQ2: What are the factors affecting the adoption of financial technology?

RQ3: What are the research gaps from selected literature studies?

RESEARCH METHODOLOGY

Cook and West suggested the systematic reviews in the year 2012. This search section combines the selection of articles through keyword basis, citation basis, yearly basis. After reviewing the title, abstract, and introduction articles were included and excluded. Finally, the literature review has been written up. Further added an electronic database web of science and google scholar was chosen for screening of data. The period was taken as 2000-2020 to identify the good quality article. The reason behind choosing two databases is to make consistency and clarity. The articles were searched defining Keyword as digital technology and financial inclusion. Some papers were found on a search string as digital technology and FI and others on mobile Technology and digital finance.

The Contribution of Technology in Financial Inclusion

Digital payment technology in form of credit/debit cards, internet banking, and mobile money is increasing day by day but the adoption rate is low. Use of mobile money has penetrated in more than 90 countries (Ligon et al., 2019). Ligon et al. (2019) mentioned four categories of Digital Payment: *Internet Banking platforms* through which transactions happen by having a mobile app on the phone or computer involving transaction fees, *Point of sale devices* which involves the transactions made by the swiping debit or credit card, *Mobile wallets*, which enables the customer to transfer money within a digital wallet within an app payment can be done by transferring money to scanning or code or manually and *Unified Payment Interface (UPI)*, which allows the customer to send money to other bank accounts using mobile app. A person should possess basic requirements such as banking facilities and an internet connection. A person should be literate and should have the ability to pay the fees.

Digital Literacy Ecosystem Model (DLEM) is a powerful tool for digital Inclusion. Digital technology enables people to save money, make transactions and access finance. Digital finance includes financial services products which lead to a habit of saving and credit by online mode. Thus, there is no need of physically going to banks (Ozili, 2018). The use of financial services through digital platform help in the reduction of poverty and achieving financial goals (Nations, U 2016). FI reduces the need of standing in long queues in banks, reduces the burden of heavy paperwork of bankers, and saves the cost of transportation and time involved in banks (Manyika et al,2016). Recent literature has been discussing on Mobile Technology for Financial Inclusion (Bachas et al.,2017., Della Peruta, 2018; Suri and Jack,2016). Mobile money reduces the risk of corruption, and lessens the transaction cost (Demirguc-Kunt et al.,2018., 2017). Prospera Digital is a pilot project enabled by RapidPro, a tool developed by UNICEF and provides direct and personalized communication to the beneficiaries under its Social Inclusion Program through SMS and educate them on financial services. Women are getting benefits through the assistance provided by Prospera. A Mobile technology is useful in the agricultural sector as it provides information about weather, transport, and agricultural technique (Aker,2011). The educated farmers are using the short service message (SMS)which helps in providing agricultural-related information (Murthy,2009). It also reduces the government cost of transactions at the time of delivery. The cost can be the key factor that hinders use and access to digital technology in rural areas in low income nations (Frempong et al.,2007). Financial technology based services provides efficiency in financial transaction and empowers the deprived section. Exchange of goods and services between buyers and sellers, via wireless devices such as mobile phones and tablets is called mobile commerce. The terms financial technology, digital finance, and Internet finance and mobile commerce are almost used interchangeably in the literature (Shen & Huang,2016., world bank group,2018., Xie, Zou. and Liv,2016). FI is a powerful medium for growth and development. Digital Finance helps in growth of Small and micro enterprises which generate employment (Shofawati,2019). Major constraints to financial inclusion and digitization are corruption, weak infrastructure, technological constrains (Bansal,2014). Digital financial services are mobile banking, e-wallet, internet banking, credit, and debit cards, and so on. Panos and Wilson (2020) have financial education and appropriate financial advise help in financial inclusion, well-being, empowerment and enhanced credit access (Bernards, 2019a and 2019b). Gabor and Brooks (2016) perceived a digital framework for financial inclusion which is a network of fintech companies, philanthropists and government.

More than 1,700 villages in China do not have banking facilities (Yeung, He, and Zhang,2017) and about 20% of Chinese people are not using bank accounts. (World bank's global Findex database,2017). China is considered the biggest economy in promoting inclusive finance through the help of digital payment in the world (world bank group, 2018). The two apps, 'chat pay' and 'Alipay' are important payment platforms in China. PayPal app was used in the United States before, but it was not as efficient as Alipay and chats pay. Transaction in cash is treated as a barrier to FI.

In a study in Narok county, Kenya it was found that women's power, choice, and security determines their financial inclusion and empowerment (Kirkwood, 2009). Barriers of FI suggested by Allen et al (2013) are location of banks, bank accessibility, and bank usage. Banks are providing their services to customers through technology such as ATMs, mobile banking, and internet banking. Due to digital banking, FI among women in Narok county Kenya has increased with reduced time and cost of travelling to banks (Barquin & Vinayak, 2015). Almost 80% of people of Indonesia have mobile phones based on a survey of Intermedia (2015), though financial inclusion is low. The success rate does not depend on the availability

of services but is based on the actual usage of the services (Oruc and Tatar, 2017). Most of the countries have adopted broadband plans. Amongst the low economies in Africa, in Nigeria and Kenya there is high rate of acceptance of mobile phone technology while in Uganda mobile phones users are less. The macroeconomic economic factors determining use of mobile finance technology in West African Economic and Monetary Union (WAEMU) are labour force participation, literacy, banking infrastructure (such as number of ATMs per 100000 population), though men, youths and financially richer are higher user. Suri and Jack (2016) has highlighted mobile banking has increased long term consumption and reduced the number of households in extreme poverty in Kenya. The use of mobile financial technology was found prevalent in Tanzania. Thulani et al. (2014) have found that in Zimbabwe though mobile banking penetration is very high, but it is not generally used for loan and savings purpose. Internet access in private and public life is playing an important role (Bakardjieva 2005, Wellman and Haythornthwaite, 2008). The Internet helps in building relationships among members and facilitates social interaction (Bargh & Mckenna 2004). More than two-thirds of Europeans have internet facility but still about 14% of people are not using the internet banking in European countries (Eurostat,2016). Reasons cited for non-use of internet are non-education and unemployment in Europe. Inability to use internet is high among older people and less educated people.

The Reserve Bank of India, introduced use of computers for financial administration in the mid-eighties to aid economic growth and financial inclusion (Gupta, 2011). Like other, developed and developing nations, India also has taken several important steps towards FI such as nationalization of banks, the establishment of organizations such as Regional Rural banks³ (RRBS), National Bank for Agriculture and Rural Development (NABARD)⁴, and schemes such as *Jeevan Jyoti Bima yojana*⁵, *Sukanya Samridhi Yojana*⁶ (SMY) and *Pradhan Mantri Jan Dhan Yojana*⁷ (PMJDY) *Atal Pension Yojana*⁸ and *Pradhan Mantri Mudra Yojana*⁹. However, rural population in India are not drawing substantial benefits from it due to inaccessibility of the financial institutes (Sharma et al., 2018) and illiteracy, specially, financial illiteracy of the masses (Bhattacharya and Gandhi, 2020). This has led majority of population to depend on informal sources for loans and other financial requirements (Mahadeva, 2008). The government of India has started the Digital India program, and Skill India scheme. An unified payment interface (UPI) was introduced. This payment interface has crossed transactions of USD 13460 million in December 2018 and mobile internet users, have reached at 520million in India (PWC,2019). Despite many efforts made by the government of India, low literacy rate, lack of awareness are the barriers to use of financial services. *Pradhan Mantri Grameen digital Saksharata Abhiyan*¹⁰ scheme launched by the government of India aims at 60 million people

³ Regional Rural Banks are government owned scheduled commercial banks of India that operate at regional level in different states of India.

⁴ National Bank for Agriculture and Rural Development is an apex regulatory body for overall regulation of regional rural banks and apex cooperative banks in India. It is under the jurisdiction of Ministry of Finance, Government of India

⁵ Pradhan Mantri Jeevan Jyoti Bima Yojana is a government-backed Life insurance scheme in India

⁶ Sukanya Samridhi Account is a Government of India backed saving scheme targeted at the parents of girl children. The scheme encourages parents to build a fund for the future education and marriage expenses for their female child

⁷ Pradhan Mantri Jan Dhan Yojana is a financial inclusion program of the Government of India open to Indian citizens, that aims to expand affordable access to financial services such as bank accounts,

⁸ Atal Pension Yojana, formerly known as Swavalamban Yojana is a government-backed pension scheme in India, primarily targeted at the unorganised sector.

⁹ Pradhan Mantri MUDRA Yojana (PMMY) is a scheme launched on April 8, 2015 for providing loans up to 10 lakh to the non-corporate, non-farm small/micro enterprises.

¹⁰ A scheme under which training centres have been set up for digital training of rural poor.

should be literate in rural India (Nedugandi et al., 2018). Dev (2006) opined that the socially and economically marginalized population such as farmers, women, self-employed, are more vulnerable to get excluded from use of banking services. Specially meant for rural farmers is the *Kisan* credit cards, through which small credit can be availed by farmers for agricultural or harvesting purpose. Though majority of rural population have now bank accounts, but 80% of these accounts are zero-balance accounts and are underutilized. Barik and Sharma (2019) have identified the reasons as: illiteracy, not being able to produce documents related to identity proof, low disposable income, long distance of residences from the closest bank. For the last decade, digital banking is growing. The cash driven economy has been converted into a cashless economy. The internet banking is expected to at least reduce the problem of distance for banking transaction. There is a new model Jan-Aadhar-Mobile (JAM)¹¹ in which people link their account with *Aadhar*¹² card number and mobile. Thus, they are directly benefited from government benefits.

Factors Affecting the Adoption of Financial Technology

Much of the customer behaviour on digital payment is explained by Technology Acceptance Model (Davis, 1989) or Modern portfolio theory (Venkatesh and Morris, 2000). Dahlberg et al (2008) explained the customer behaviour about acceptance and use of mobile technology based financial solution through Trust enhanced technology acceptance model and Technology acceptance model (TAM). The socio-technological framework of technology, based on unified theory of acceptance and use of technology (UTAUT) and its application in in the Information System research in emerging nation has been studied in detail by Venkatesh, The UTAUT aims to explain user intentions to use an information system and subsequent usage behavior. The theory consists four key constructs: 1) performance expectancy, 2) effort expectancy, 3) social influence, and 4) facilitating conditions.

Slightly more advanced is the UTAUT2, which takes into account performance expectancy, effort expectancy, social influence, hedonic motivation, price value, facilitating conditions on behavioral intention and use of M-technology (Thong, and Xu, 2016). Schuetz and Venkatesh (2020) stated block chain technology can resolve the barriers to FI such as illiteracy, high cost and inappropriate financial products in the context of rural India, but technology acceptance of inhabitants should be factored in. ICT can be capitalized efficiently IN developing nations if techno-organizational intervention takes into account social context (Avegerou, 2008). The government started a campaign for financial inclusion in the year 2006. Wójcik (2021) has discussed financial technology and governance should be studied on geographical context. Amoah et al. (2020) in context of Ghana found that amongst youths' phone credit recharge, education and income determine adoption of financial technology. Vázquez-López et al (2021) through their systematic literature review found that for ICT based governance to be successful e-content should be perceived to be useful by beneficiaries.

Research Gaps and Scope for Future Research

Through this review, we have found that Financial technology based services can lead to financial inclusion by reaching out to remote geographies where banks are unable to reach, reduces time and cost of financial transaction both from the perspectives of bankers and customers. The macro-economic deterrents are unavailability of banks, internet facilities, ATMs etc. At individual level the deterrents can be lack of awareness, lack of education, less disposable income, old age, social marginalization, physical or mental challenges, financial

¹¹ JAM trinity refers to the government of India initiative to link Jan Dhan accounts, mobile numbers and Aadhaar cards of Indians to plug the leakages of government subsidies

¹² Aadhar is the Unique Identity Card issued by Government of India

and/ or digital illiteracy. A collaborative effort is required from policy makers, financial institutions, NGOs to capitalize on use of financial technology for financial inclusion of lowest socio-economic strata. Governments and financial institutions are investing for digital training of socially and economically deprived sections of the society for their employment, empowerment and inclusion. But still use of financial inclusion through digital technology has not been to the expected level specially for saving or loan purpose, and it varies across geographies and socio-cultural environment. The poor people living in rural areas or urban slums generally prefer to take loans from village money lenders or other unorganized sources. Some of the digital services such as use of credit/debit card require opening of bank account. Opening of bank accounts is difficult due to large distance of the banks from residences, requirement of identity proof which they may not have etc. More over the financial products are not attractive enough or suitable enough for requirements of poor people. Either the financially excluded people are unaware of government financial schemes or instruments or communication about various policies are neither simplified nor detailed.

The consumers acceptance and use of technology based financial solution has largely been explained through Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT) and Modern Portfolio theory. Though there are several studies have been conducted relating financial inclusion rural poor through digitalization in emerging economies, not many studies were found relating to financial exclusion of urban poor people despite the availability of mobile technology, easy access to internet and banking as pull factors and present politico-economic condition, such as challenges thrown by covid 19, as push factors. Should these uses be looked from the perspective of social interdependence theoretical lens due to which the poorest section is relying on landlords, community leaders, local money lenders for arranging loans and insurance. The global differences in technology acceptance for financial solution can perhaps be explained by socio-cultural differences in cooperation, competition and individualism. But this needs further probing. A recent study by Okello et al. (2018) in Uganda for example found that social networking moderates the direct relationship between mobile money usage and financial inclusion.

Blockchain technology is expected to resolve some of the macro-economic barriers to financial inclusion through fintech solution. Will the Central Bank Digital Currency or Cryptocurrency that is going to be adopted by many governments in near future will widen the gaps between rich and poor or promote financial inclusion? Specifically, as most of the developing nations there exists a parallel informal economy where all transactions happen in cashes or coins. What will be the role of various stakeholders: the policy makers, block technology companies, bankers, non-government philanthropists and the end users. These are some of the research agendas for future studies.

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