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ACADEMIC PAPER

The Impact on Financial Inclusion in The Era of Covid-19: A Case of Developing Countries

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ABSTRACT

The world still has a large unbanked population, which regularly contributes to unbanked transactions. The problem is a lack of trust, financial insecurity, and knowledge about the products and services of financial inclusion. Financial inclusion provides timely and cost-effective access to financial products and services like loans and credit facilities to low-income vulnerable groups. COVID-19 has badly affected all the world's economies and caused them to suffer a great recession, which makes it essential to include the unbanked population in the net of financial inclusion. This study aims to measure the impact of COVID-19 on financial inclusion in developing countries by taking data from 2017 to 2020. The results concluded that increased fintech technology, such as mobile money services during COVID-19, increased financial technology. People started using mobile accounts during COVID-19 to avoid the risk of getting infected by this novel virus.

KEYBOARDS

Financial Inclusion, COVID-19, Pandemic, Developing Countries, Mobile Money Accounts, Financial Innovation.

INTRODUCTION

Central Banks and governments started paying attention to the study of financial inclusion at the beginning of the 2000s because of its importance and contribution to achieving economic development and financial goals (Arunachalam & Crentsil, 2020). As per the Report of the Committee on Financial Inclusion (2008), it is the process of providing cost-effective and timely access to financial offerings like loans and credit facilities to most disadvantaged people and low-income vulnerable groups. World Bank (2020) have also defined financial inclusion as one of the building blocks for the reduction of poverty in the world and to provide opportunities for the growth of economies by joining a new digitized economy with the availability of digital financial offerings (Neaime & Gaysset, 2018). Since 2010, for the reduction of poverty in developing and emerging countries, the G20 forum and World Bank have

taken several measures to encourage financial inclusion (Vo et al., 2021). Deprived parts of society can benefit more from financial inclusion-based systems by encouraging investment opportunities in creative activities like entrepreneurship, businesses and education (Honohan, 2008).

No one can underestimate the significance of financial inclusion and fintech innovation because of its beneficial outcomes and results. Beneficiaries of financial inclusion have managed their regular monetary transactions securely, diligently and effectively. Additionally, it helps to manage their financial pressure by protecting finances against fleeting variations in expenses and income through effectively dealing with unexpected financial distress and events and gaining benefits from long-term financial opportunities. Countries have given more importance to financial inclusion due to its positive potential to enhance economic activities and improve their citizens' quality and living standards. Financial institutions and policymakers are trying to support economies and communities by increasing the scope and extent of financial inclusion to enhance and stimulate countries' economic development and growth (Nizam et al., 2020).

As per the report of the Global Financial Index Database in 2011, the number of unbanked adults in developing countries was around 2.5 billion and around Half of the population of the developing countries doesn't have any bank account, compared to 10% of the unbanked population in developed countries. As per the latest data on financial inclusion, remarkable success has been achieved in increasing access to financial services. The unbanked adult population has decreased from 2 billion to 1.7 billion in just three years from 2014 to 2017 due to the launch of the "Universal Financial Access 2020" initiative by the World Bank. Countries should strengthen their financial inclusion to sustain the economy. Pradhan et al. (2021) stated that the increase in financial inclusion causes more entrepreneurs and companies to decrease unemployment and change the consumption order of the people living in the countries. Resultantly, all of these factors help to generate long-term and sustainable growth.

Indeed, technological innovation increases in mobile communication and transformation have increased access of individuals and businesses to financial services and products. As reported by the Global System of Mobile Communications and Association, a globally renowned mobile phone operators association, payment through mobiles is currently $1 billion in a single day, and this network is distributed across 90 countries along with 276 systems (Nkoa & Song, 2020). SARS-CoV-2 caused COVID-19, negatively influencing almost 7.2 million people globally and claimed around 408,240 lives worldwide (Arunachalam & Crentsil, 2020). Moreover, this is not just a pandemic because it's created an economic crisis globally. That crisis is just caused by the measures (i.e., lockdowns) taken by governments of the world to limit the propagation of COVID-19 (Khan, Nasir, & Saleem, 2021).

Most sectors, including transportation, petroleum, hospitality, restaurants, manufacturing, supply chain, oil and energy, are affected worldwide by the COVID-19 outbreak. Furthermore, most working people have also lost their employment due to businesses shutting down in compliance with the complete lockdown and social distancing policies (Shen et al., 2020). The overall expectation of effecting COVID-19 on the unbanked population of developing countries is more severe because of the weak system of health care, less financial development, and weakness of regularity. Governments around the globe were promoting cashless and contactless payments to stop the propagation of COVID-19. It could boost financial inclusion through the constructive utilization of digital technology (Gorshkov, 2022). Cash collections and payments were considered the carriers of the coronavirus and discouraged by the governments of many countries. Markets, shops, restaurants, shopping malls and all other businesses except essential ones remain shut during the COVID-19 (Khan, Niazi, et al., 2021). Many companies started working online to save them from the loss.

Furthermore, consumers also went digital along with businesses for purchasing goods and hiring services online. As a result, the contribution of e-commerce businesses in global retail trade rose to 17% in 2020 from 14% in 2019. Financial technologies have intensified during COVID-19, leading to new

opportunities for implementing financial services, which enhanced and accelerated financial inclusion worldwide (Telukdarie & Mungar, 2023). Furthermore, the technology of mobile money service also plays a significant role in providing convenient and easy access to payment and banking services, expanding the consumer base and identifying a new source of revenue for the service provider (Shaikh et al., 2023).

The financial industry traditionally plays its role through financial institutions and banks to facilitate access to financial services and products. However, due to technological advancements, telecommunication sectors are also playing their role in promoting access to financial offerings through mobile money services (Senyo & Osabutey, 2020). People are now empowered by having access to fintech innovation. One of the leading fintech innovations is mobile money services facilitating financial inclusion. Mobile money services have enabled individuals and businesses to access financial services and products through their mobile phones, mainly service providers, users, merchants, agents, regulators and banks. After fintech innovation, mobile money services through mobile phones enabled individuals to take on transactions like money transfers, bill payments, acquisition of loans, savings, and purchasing of goods and services (Adaba & Ayoung, 2017). Additionally, mobile money service offers remote access worldwide, so there is no need to visit branches of banks for financial transactions.

Furthermore, research on mobile money is new in terms of mobile money accounts. This research area has started receiving attention in the literature, and some great contributions have been made. Previous studies (Narteh et al., 2017; Osei-Assibey, 2015) focused on the intentions to utilize mobile money services and showed the reliance on technological acceptance theories (TAM). These mobile money studies focused on the perceived preferences for mobile money services. The status of financial inclusion was not evident during COVID-19. People are not sure whether financial inclusion increased or decreased during it, especially in the case of developing countries. Many people are still unbanked in this world and are not financially inclusive. They are more economically insecure than the others as they have no access to financial offerings (Telukdarie & Mungar, 2023).

Moreover, the impact of COVID-19 on this vast number of people is still unknown. Financial technologies have been intensified in financial inclusion during the pandemic of COVID-19, and this led to new opportunities for the use of financial services that enhanced and accelerated financial inclusion worldwide. The study identifies the impact of COVID-19 on financial inclusion in developing countries. This study's findings will help us understand the impact on financial inclusion during COVID-19 by providing results-based information on whether financial inclusion has changed in terms of increasing or decreasing during the pandemic. It also measured the effect of COVID-19 on the availability of ATMs and bank branches and the use of financial innovation like mobile money services. By examining the changes in the use of these services before and during COVID-19, this research provides valuable insight into the effect of the global crisis on financial behaviours and preferences during COVID-19.

LITERATURE REVIEW

Financial Inclusion

Financial inclusion's role in measuring economic and financial development is critical and significant. The World Bank defined financial inclusion as the accessibility of monetary offerings to individuals and businesses at affordable cost. Furthermore, Financial inclusion also fulfils their needs through providing access to accounts, which is one of the initial steps to expand financial inclusion. Chakrabarty (2011) also explained financial inclusion as the process in which we ensure the availability of the products and services of financial institutions to all sections of society, especially to those who fall within the category of low and lower-middle income group, at affordable rates fairly and transparently by the mainstream financial regulators.

Financial inclusion means the availability of financial offerings without obstacles and barriers to price. Furthermore, he concluded that financial inclusion aims to improve financial offerings and make them

available to individuals and businesses at a fair price. Countries achieve full financial inclusion when every household has easy access to financial offerings like savings, payments, loans, credit, and insurance, including education regarding financial inclusion, which helps them in decision-making. Allen et al. (2014) stated that financial inclusion helps to promote economic and financial development by encouraging people to save, invest and manage risks for companies and households.

The inclusiveness of financial systems benefits poor and underprivileged groups by encouraging them to save, pay and invest in productive activities like education, business and entrepreneurship (Honohan, 2008). On the other hand, the exclusiveness of financial systems encourages individuals and businesses to depend on limited growth opportunities through informal lending, resulting in prolonged, constrained economic development and inequality (Beck et al., 2007). It is one of the many reasons for having an inclusive financial system for prolonged sustainable financial growth and stability. Many past studies show negative and positive relations between peace and financial inclusion (Oanh et al., 2023). Han and Melecký (2013) show a positive significant relationship between financial stability and financial inclusion in upper-middle and high-income countries. They argued that the increase in financial inclusion increased deposits in the banks and resulted in the recovery of deposit levels at the time of crisis. The results of these papers suggest that we could have more extensive and optimized savings by promoting financial inclusion.

Financial inclusion has an indirect relationship with poverty reduction in around 79 countries, and additional support to improve financial inclusion could result in poverty reduction. Okpara (2011) also reported that we can have a bidirectional relationship between financial stability and inclusion. Their findings claimed to have long-run causalities between financial inclusion and resilience. Neaime and Gaysset (2018) also calculated the relationship of financial inclusion with poverty, financial inclusion and stability in Syria, Egypt, Tunisia, Yemen, and Libya. The reason for selecting these regions is that these countries have achieved high economic development with the association of stable financial systems, and their findings showed a positive relation between financial inclusion and financial stability but a negative relation between financial inclusion and income inequality.

Predictors of Financial Inclusion

There are many predictors of financial inclusion at different levels, i.e. firms, individuals and countries. In their study, Malik et al. (2022) measure the impact of governance quality in increasing financial inclusion and sustaining financial stability by using control variables like population growth, GDP growth and Broad money to GDP. Researchers also conducted a study on the region of Asia and African countries and used education, age, income, and gender at an individual level as predictors of financial inclusion. Léon and Zins (2020) have measured the impact of international banks on the financial inclusion of organizations and businesses. Lu et al. (2021) researched the role of individualism in affecting financial inclusion by taking multiple country-level variables. Financial inclusion calculated the effect of economic governance on it. Additionally, the bank's non-performing loans, deposit and lending spread, financial stability and bank competition as independent variables by comparing the financial inclusion of 217 countries with 48 Sub-Saharan countries to check the difference in the result of financial inclusion.

Moreover, the political instability of the MENA region has a diverse effect on financial sector growth, which results in a reduction of financial inclusion (Alhassan et al., 2021). According to Kodongo (2018), financial inclusion and financial regulations have a negative relation, as tightening these regulations in countries results in a decrease in financial inclusion. The same results were also suggested by (Aiyar et al., 2014). Scholars also studied the relationship of financial inclusion with the Bank lending deposit spread (BLDS) and non-performing loans of banks, which indicates that financial inclusion has a negative relation with these variables. Their study concluded that an increase in banks' non-performing loans results in a decrease in the profitability of banks and ultimately decreases financial inclusion.

Similarly, when the lending and deposit spread of banks widens, it deters people from obtaining

financial services as the bank's lending exceeds the limits of deposits. Leon (2015) also reported an adverse relationship between financial inclusion and Bank competition. He concluded that competition between the banks could increase the efficiency of banks through improving their financial product and services, increasing financial inclusion. Lu et al. (2021) also concluded a positive significant relationship between individualism and the financial inclusion of households.

COVID-19 and Financial Inclusion

At the end of 2019, a virus named COVID-19 originated in China and caused a global crisis in a jiffy (Hoffer, 2021; Yelin et al., 2021; Zhang et al., 2020). Above 37 million cases of COVID-19 were recorded as positive till October 10, 2020, around the world. The novel virus COVID-19 was quickly transferable from one living to another, due to which it spread quickly and caused an emergency in the countries (Salisu & Akanni, 2020). The COVID-19 pandemic badly influenced most sectors; unemployment and inflation increased among the nations, and businesses fell suddenly around the globe, which resulted in the decline of economic growth of countries (ILO, 2020). The outbreak of COVID-19 caused a significant recession in the economies, even more than that of SARS. Continuous financial and economic crises around the globe have provided an understanding of the changes in market returns and the effect of market dependence on each other during the recession period (Mensi et al., 2016). Shen et al. (2020) also explained that the COVID-19 Pandemic has caused stress on public health, administration and the world's economies, due to which countries have taken extraordinary measures to solve these potential and actual problems by adopting new approaches to this complex situation.

The pandemic has brought disruptions and uncertainties in different sectors, which include financial institutions and related markets. Even the stock prices of insurance, banking and financial firms fell due to the outbreak of COVID-19 (Wójcik & Ioannou, 2020). Non-performing loans from financial institutions also increased, and demand for more loans decreased in some sectors (Park & Shin, 2021). Non-banking financial institutions and microfinance institutions disbursed pre-crises volumes of loans over only three quarters. Despite all of these facts, a silver lining has appeared as these disruptions caused by COVID-19 created more opportunities, specifically in digital payments. Bui and Luong (2023) also measured the financial inclusion of Thailand by using the data of a financial access survey provided by the IMF. Additionally, researchers focused on the influence of the pandemic on financial inclusion within limited countries and regions around the world (Bui & Luong, 2023).

Supporting Theories

Prior mobile money studies have used two predominant technological theories, TAM and Diffusion of Innovation (DOI), to understand the adoption and use of modern technology like mobile money services (Narteh et al., 2017). The unified theory of acceptance and use of technology (UTAUT) was used to understand the use and acceptance of technology. This theory combines and synthesises different models such as TAM, DOI, social cognitive theory, theory of planned behaviour and other approaches. Later on, it was converted into UTAUT2 by adding a new construct (Senyo & Osabutey, 2020). UTAUT2 is widely used in the research of technology adoption and use (Chopdar et al., 2018). To understand the antecedent of financial technology, such as mobile money accounts, there is a need to combine this theory with other theories (Dhir et al., 2018), such as prospect theory (Senyo & Osabutey, 2020).

Prospect theory explains why people choose and accept alternatives in situations that involve risk. Prospect theory, as a cognitive psychological theory, explains that people's decision-making is affected by the different drivers, such as gain/loss and risk, which is the most critical driver in decision-making. Similarly, during COVID-19, there was a risk that COVID-19 could be spread through physical contact. So, people started to avoid physical contact and the exchange of goods with each other (Gorshkov, 2022). The people also avoided traditional methods of using monetary products and services, such as cash payments and receipts, to prevent the spread of COVID-19. Due to this risk, people started to promote cashless payments, such as mobile money accounts, during COVID-19. Using fintech

technology, such as mobile money services, increases financial inclusion (Senyo & Osabutey, 2020). This research used the multi-theory perspective by combining prospect theory and UTAUT2 following Senyo and Osabutey (2020) to study the impact of COVID-19 on financial inclusion, fintech technology such as mobile money services, ATMs and Bank Branches.

Hypothesis Development

According to Gallego-Losada et al. (2023), the demand for financial inclusion is increasing daily, especially during COVID-19, because of the desperate needs of individuals for the survival of their financial situation. Additionally, financial inclusion has captured more importance during COVID-19 and has shown rapid growth in literature during 2020-2021. They showed the impact of the pandemic on financial inclusion in the poor population of SMEs in Georgia and concluded that it has a stimulating effect on financial inclusion. They also concluded the negative impact of COVID-19 on the financial sector and inclusion, along with all the stakeholders of financial inclusion, i.e., microfinance institutions and poor financial institutions. Based on this, we can withdraw a hypothesis.

H_1: *COVID-19 has a significant influence on financial inclusion in developing countries.*

Telukdarie and Mungar (2023) reported that financial inclusion increased due to an increase in bank branch services, and it helped in the reduction of poverty during the Pandemic of COVID-19. Many previous studies also have included bank branches in their research to measure financial inclusion (Aiyar et al., 2014; Nkoa & Song, 2020) and concluded the positive impact on financial inclusion, which means several bank branches also increases during Covid-19 as financial inclusion increased (Grabowski et al., 2023; Senyo & Osabutey, 2020). Bank Branches contribute positively to advancing financial inclusion because of these financial institutions' primary functions. Moreover, banks play a vital role in providing essential services and products of financial inclusion, such as financial advice, loans and deposit accounts. Their financial offerings are physically accessible in areas with less use and literacy of fintech innovations (Nkoa & Song, 2020). So, we can conclude the following hypothesis.

H_{1a}: *COVID-19 has a significant influence on Bank Branches in developing countries.*

Arunachalam and Crentsil (2020) report that cash payments are one of the primary sources of spreading COVID-19, and people were reluctant to make or accept payments in cash to avoid COVID-19. Instead, they preferred to use contactless methods for their financial transactions. Beck et al. (2007) also used the number of ATMs as an independent variable for financial inclusion and concluded a positive relation between the two. ATMs play a significant role in providing physical access to cash and other online facilities, especially in those areas where people Do not have remote access to financial offerings through fintech innovations such as mobile money services. ATMs also played an essential role in boosting financial inclusion (Shaikh et al., 2023). We can withdraw cash, make online payments, pay utility bills and submit cheques using ATMs. During COVID-19, these ATMs can also be used for day-to-day transactions. We can conclude the following hypothesis from these studies.

H_{1b}: *COVID-19 significantly influences Vending Machines (ATMs) in developing countries.*

Digital technology is increasing in financial transactions, as most financial technologies offer more secure, more convenient and less expensive transactions to consumers and financial industries (Chen et al., 2019). More than $16.5 billion was invested in financial technology firms from 2010 to 2019 (Imerman & Fabozzi, 2020). Senyo and Osabutey (2020) also concluded that using financial innovation, such as mobile money services, leads to deepening financial inclusion. According to a previous study, the COVID-19 pandemic could be proved to be a game-changer for financial inclusion development because of the advantage of using mobile money and online transactions by small firms and low-income households.

Bui and Luong (2023) stated that the increase in mobile communication and technological innovation

have increased financial inclusion by increasing financial access for people without having any trouble physically visiting bank branches in Thailand. Mobile payments are about $1 billion a day, spread among 90 countries in 276 systems (Nkoa & Song, 2020). Many people consider mobile money services as a separate domain in the payment and banking sector, different from ATMs, POS banking, net banking, etc. But Shaikh et al. (2023), in a study, investigated whether mobile money is the crucial factor of digital financial inclusion and found a positive relationship with its proxies. Gallego-Losada et al. (2023) also concluded that the role of mobile money is very significant in promoting digital financial products and services of financial inclusion. From these studies, we can draw the following hypothesis:

H_{1c}: *COVID-19 has a significant influence on Mobile Money Accounts in developing countries.*

RESEARCH METHODOLOGY

Financial inclusion is a major issue in developing economies, so developing countries were targeted. The World Bank divides the world into 217 countries based on income. Of these 217 countries, 27 and 55 are low and lower-middle-income countries, respectively. Other 55 countries have upper-middle income, and 80 are considered high-income economies. There are 82 developing countries if we combine the low and lower-middle-income economies. The sample is selected based on available data through convenience sampling. When the subject is chosen based on the accessibility and availability of the data, this type of sampling is referred to as convenience sampling. Researchers focused on the sample of 36 out of 82 developing countries for the analysis based on the available data against our variables (See Table A in the Appendix for the list of countries selected as a sample). The IMF collected data from the WGI, GFD , WDI and FAS databases from 2017 to 2020. Due to the unavailability of the data for 2021, it was excluded and included the early period of COVID-19, which starts from the last part of the year 2019 to 2020.

Variables Measurements and Estimation Technique

As defined by the World Bank (2015), financial inclusion means the availability of useful financial products and services to individuals and businesses at an affordable cost so that they can fulfil their needs by having access to transactional accounts. Different authors conceptualized it in different ways due to this topic's vast context and scope. Beck et al. (2007) initially measured financial inclusion through the inclusiveness of systems by using the regulated data of banks. They constructed financial inclusion indicators through banking services, use, and access to financial products and services. Their data comprised 99 countries, and they included gross domestic product per capita, deposits on the average basis to (GDP), size of loans, deposits per capita, the number of loan accounts, bank branches per capita and number of ATMs as independent variables.

In the history of research, financial inclusion is well clarified based on its objective and measurement. As per the study of García (2016), financial inclusion aims to bank the unbanked population in the system, where individuals and businesses can easily access financial offerings like insurance, loans, credit, payment facilities and many others at affordable cost. Park and Shin (2021) measured financial inclusion by dividing it into the following groups: impact (contribution of financial offerings in the development of consumers' lives), quality (financial offerings availability as per the demand, choice, understanding and attitude of customer), access (ability of using and getting financial offerings of financial institutions) and usage (the permanence and depth of financial offerings). Furthermore, he stated that these indicators could help to ensure that all living people of a country are included in the growth process of the economy. They define financial inclusion as the sequence of activities in which we make sure access to financial services to people and then provide well-timed and ample credit facilities to those who demand it, including unbanked and disadvantaged people. Beck et al. (2007) and Chen et al. (2019) believe that it is the availability of affordable financial offerings to businesses and individuals. They further measured inclusion by the dimensions of usage, affordability, availability and usage of financial products and services provided by the banks. The importance of developed financial inclusion lies in micro and macro social factors.

Hu et al. (2021) divided financial inclusion into six indicators and then summarized these into three dimensions: usage, utility and access. The usage dimension measured that businesses and individuals can obtain loans, the utility dimension measured the value of the available services, and the accessibility dimension measured the extent of access to bank staff and branches. Vo et al. (2021) also divided financial inclusion into two dimensions. One dimension measured the financial demand, and the second measured the economic supply of financial inclusion using different proxies. The number of bank branches and ATMs was included in the monetary supply, and the number of debit/ credit cards was included in the economic demand dimension. For choosing proxies of financial inclusion, this study followed Nkoa and Song (2020). Three dimensions, financial services, accessibility and penetration, with three further indicators, are used to measure financial inclusion. This study used the number of active mobile money accounts per 1,000 inhabitants for the financial services dimension. For accessibility, this study has taken the number of ATMs per 1,000 inhabitants. The number of bank branches per 1000 inhabitants was used for the penetration dimension.

The reason for following Nkoa and Song (2020) is that this study has included active mobile money accounts as the proxy for financial inclusion. During the COVID-19 Pandemic, these proxies are more susceptible to being influenced. During the COVID-19 pandemic, governments have controlled the movement of people in their countries by implementing lockdown policies to prevent the spread of the virus (Shen et al., 2020). Senyo and Osabutey (2020) also concluded that using financial innovation such as Mobile Money Services leads to a deepening of financial inclusion using the UTAUT2 and prospect theory. They argue that effort and performance expectancy, as behavioural and habitual intentions, influence the use of mobile money services and result in increased financial inclusion. The individuals preferred cashless payments and receipts of money, and also promoted by the state governments. People have no choice other than that of online payment methods such as mobile phones, internet banking and ATMs to transfer payments for their regular transactions.

The researcher used six predictors of country level for financial inclusion as independent variables based on the use of these indicators in past literature. We have included GDP Per Capita growth, GDP Per capita, Population, Inflation, Bank asset concentration and Exchange Rate as the determinants of financial inclusion. Population growth is assumed to negatively affect financial inclusion because an increase in population reduces the services of financial offerings. Allen et al. (2014) show that an increase in population creates a demographic burden, reducing financial inclusion. Emenalo et al. (2018) and Kebede et al. (2021) used inflation as a proxy for macroeconomic stability and an independent variable for financial inclusion. BAC is proxied by the five banks' asset concentration, which measures the assets of the banking industry held by the large five banks. Literature shows the relationship between financial inclusion and bank concentration; (Sarma & Pais, 2011). ER also impacts financial inclusion due to the effect of domestic currency efficiency on the domestic credit of countries (Gozgor, 2014). GDP is included as an independent variable because it shows that the increase in income of the people positively affects access to financial services by individuals and businesses (Grohmann et al., 2018; Lu et al., 2021). GDPG is also used among the GDP per capita measure the standard of the people living in countries as one of the predictors of financial inclusion by Lu et al. (2021).

We have used the pooled least square method by following Kazemikhasragh and Buoni Pineda (2022). Equation 1 explains the effect of financial inclusion on COVID-19 in developing countries

$$FI_{DC} = \beta_0 + \beta_1 COV - 19_t + \beta_2 GDP_t + \beta_3 GDPG_t + \beta_4 INF_t + \beta_5 ER_t + \beta_6 P_t + \beta_7 BAC_t \quad (1)$$

Where FI_t represents financial inclusion, P_t represent population, INF_t represents inflation, BAC_t represents Bank Asset concentration, ER_t = Exchange Rate, GDP_t = Gross Domestic Products, and $GDPG_t$ = GDP Per Capita Growth.

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RESULTS

In this research, we calculated the impact of COVID-19 on financial inclusion and its indicators in developing countries using the pooled least square method. Data on all the variables is taken from the databases available on the World Bank website for four years, from 2017 to 2020. Table 1 details the descriptive statistics for the selected sample of 36 developing countries. We have measured financial inclusion based on the three dimensions: the use of financial services, penetration and accessibility. We have measured the use of financial services with the mobile money accounts, no. ATMs as the accessibility of financial inclusion dimension and no. bank branches as the dimension of penetration. Some high mean values are due to the use of highly segregated data globally, including lower middle-income and low-income countries in developing countries.

Table 1: Summary of Statistics.

Variables	No. of Countries	Observations	Mean	Std. Dev.	Median	Maximum	Minimum
PG	36	89	2.23	0.84	2.49	3.84	0.39
MM	36	89	5.42	3.09	5.55	19.59	-1.71
INF	36	89	7.11	26.99	3.35	255.31	-3.23
GDPG	36	89	2.14	3.06	2.72	7.29	-7.47
GDP	36	89	1462.32	1073.34	1201.56	4502.93	384.42
FIN	36	89	6.62	2.36	6.24	18.49	4.21
ER	36	89	1003.44	1832.68	555.45	9183.88	0.00
BB	36	89	6.20	0.84	6.22	8.85	4.43
BAC	36	89	59.60	36.45	74.85	100.00	0.00
ATM	36	89	6.56	0.98	6.35	9.28	4.64

Table 2 represents the positive correlation of mobile money accounts, bank branches and ATMs with financial inclusion. All other independent variables positively correlate with financial inclusion except population growth and exchange rate. Population growth is almost negatively related to all other variables except BAC and ER. A negative correlation of ER was also found with ATMs, BB, INF and MM.

Table 2: Correlation Matrix.

Variables	PG	MM	INF	GDPG	GDP	FIN	ER	BB	BAC	ATM
PG	1.00									
MM	-0.27	1.00								
INF	-0.12	0.05	1.00							
GDPG	-0.09	0.37	-0.34	1.00						
GDP	-0.51	0.09	0.01	0.14	1.00					
FIN	-0.45	0.89	0.00	0.34	0.30	1.00				
ER	0.16	-0.03	-0.03	0.27	-0.10	-0.12	1.00			
BB	-0.57	0.30	-0.02	0.30	0.77	0.47	-0.06	1.00		
BAC	0.21	0.09	0.08	0.43	0.01	0.07	0.24	0.13	1.00	
ATM	-0.63	0.24	0.01	0.16	0.83	0.40	-0.13	0.90	-0.06	1.00

The results of the pooled least square method model show that COVID-19 has a significant relationship with financial inclusion along with its two dimensions: use of financial services and accessibility. All of the hypotheses are accepted except the one which is H_{1a}, Table 3, the coefficient of COVID-19 with financial inclusion is 1.506, and the probability of error in this result is 0.19%, which shows that COVID-19 has significantly affected financial inclusion positively, resulting in the acceptance of H_1. Moreover, the probability of 7.8 % of the coefficient of COVID-19 on the bank branches is insignificant, which means that during COVID-19, there is less increase in bank branches across the developing countries. It seems possible that to control COVID-19, many countries have implemented lockdowns and forced people to stay at home (Shen et al., 2020).

In this situation, it was almost impossible for the banks to increase their branches. Moreover, Mobile

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phone technology and other related methods have enabled people to approach financial services without going to long-distance bank branches physically (Nkoa & Song, 2020). Due to this insignificant result, we reject H_{1a}. Results showed us that COVID-19 has also a significant effect on the accessibility dimension of financial inclusion which is measured by the number of vending machines (ATMs) per 1,000 adults. During the COVID-19 no. ATM increase in developing countries increases financial inclusion. Thu H_{1b} is also confirmed.

Table 3: Relation Between Dependent and Independent Variable.

Variables	Dependent Variables			
	FIN	**BB**	**ATM**	**MM**
C	8.27***	6.04***	6.71***	8.32***
	(0.00)	(0.00)	(0.00)	(0.00)
COV-19	1.51***	0.57*	0.98***	1.60**
	(0.00)	(0.08)	(0.00)	(0.02)
GDP	0.00***	0.00***	0.00***	0.00***
	(0.00)	(0.00)	(0.00)	(0.00)
GDPG	0.22***	0.27***	0.07*	0.24**
	(0.00)	(0.00)	(0.08)	(0.02)
INF	0.00	0.01**	0.00	0.00
	(0.35)	(0.03)	(0.22)	(0.23)
ER	-0.00	-6.40E-05	-2.52E-05	-0.00
	(0.28)	(0.48)	(0.76)	(0.57)
BAC	0.01	-0.00	0.00	0.01
	(0.11	(0.76)	(0.52)	(0.22)
PG	1.12***	1.44***	1.42***	0.93***
	(0.00)	(0.00)	(0.00)	(0.00)
R-Squared	0.29	0.62	0.74	0.18
Durbin-Watson stat	0.59	0.09	0.53	0.43

Notes: * p < 0.1; ** p < 0.05; *** p < 0.01

We have measured the dimension of the use of financial services with the number of active mobile money accounts per 1000 inhabitants by following Nkoa and Song (2020). Our Hypothesis H_{1c} is also confirmed, as the coefficient of COVID-19 on the no. of mobile money accounts is 1.5973 and has the least probability of error which means that the effect of COVID-19 on this dimension is significant. Kazemikhasragh and Buoni Pineda (2022), in their research on financial inclusion during the COVID-19 pandemic in the Caribbean and Latin America, found a positive relationship between number of mobile accounts and financial inclusion. Senyo and Osabutey (2020) also found a positive relationship between mobile money services and financial inclusion due to habit, behavioural intentions, effort, and performance expectancy.

According to the results of Table 3, GDP per capita (GDP) has a positive effect on financial inclusion and its penetration, accessibility and usage, along with a statistically significant relationship. Its positive impact on financial inclusion and penetration is consistent with Nkoa and Song (2020). Still, the other two positive effects of GDP per capita on financial inclusion's accessibility and usage dimension are inconsistent with Nkoa and Song (2020). According to Kim et al. (2018), and Nkoa and Song (2020), developing countries have a low level of GDP per capita, which results in the survival of actors of the economy and reduces their propensity for process and product innovation by the banks, therefore hinder the use and accessibility of financial services. But during the COVID-19 cashless payments are being promoted by the people and businesses of the emerging Markets for which the financial products and services should also be increased by the banks (Gorshkov, 2022), result in the increase in financial inclusion accessibility and use in developing countries. GDP per capita Growth (GDPG) also has a significant relationship with financial inclusion. Inflation Rate (INF), Exchange Rate (ER) and Bank Assets Concentration

(BAC) have the insignificant relationship with financial inclusion. Population growth (PG) has a significant relation with financial inclusion.

DISCUSSION

The study investigated the effect of COVID-19 on financial inclusion and its indicators in developing countries. Developing countries are more affected regarding financial inclusion in their economy due to significant unbanked transactions performed by their unbaked population, so we aim to target these countries in our research. The research also aims to identify whether the use of mobile money accounts and the number of ATMs and bank branches increased during this pandemic. Consistent with the previous studies, the significant findings reveal that COVID-19 positively impacts financial inclusion. It concluded that financial inclusion has increased during the COVID-19 pandemic. Mobile money services positively contribute to financial inclusion due to innovation in financial technology (Gallego-Losada et al., 2023). Governments have promoted cashless payments during the COVID-19 (Gorshkov, 2022), so people have certainly used some contactless banking for their day-to-day payments, which led us to question whether the use of financial technology like mobile money accounts services has increased during COVID-19 or not. Our results also concluded that COVID-19 significantly influences financial technology, such as the number of mobile money accounts, consistent with the previous studies (Nasir et al., 2021).

This research also concluded that COVID-19 significantly impacts the number of ATMs during COVID-19 in developing countries. COVID-19 increases the number of ATMs in these countries, ultimately increasing financial inclusion (Shaikh et al., 2023). But COVID-19 has an insignificant influence on bank branches because mobile accounts, internet banking and other technological advancements have allowed people to access financial services without physically visiting bank branches (Shaikh et al., 2023; Wójcik & Ioannou, 2020). No increase in bank branches shows that banks are working to improve contactless banking through the internet and mobile money accounts instead of focusing on expanding their branches to bank the unbanked population of the economy, accepted H_1, H_{1b}, H_{1c}. Hypothesis H_{1a}has been rejected. The other variables Gross Domestic Product (GDP), Gross domestic product growth and population growth (PG) also have the positive impact on the financial inclusion. On the other hand, remaining three variables inflation, exchange rate and bank assets concentration have insignificant relationship with financial inclusion in developing countries.

Implications of the Study

This study also offers several contributions to the theory. This research extends the applicability of the UTAUT2 and prospect theory consistent with Senyo and Osabutey (2020) to investigate the acceptance and use of mobile money services during COVID-19. Results showed that the use of financial technology like mobile money services increased during the crisis of COVID-19 and also resulted in an increase in financial inclusion. This study used a multi-theory perspective by combining UTAUT2 and perspective theory to enhance the understanding that the perceived risk due to COVID-19 influences the human behaviour to use financial technological products and services like mobile money services and hence results in the increase in mobile money accounts during COVID-19. It can also contribute positively to building financial resilience at the system and individual levels by identifying the impact of COVID-19 on financial inclusion. The practical implication is that financial inclusion can also be increased during crises like the COVID-19 pandemic. The use of financial innovation like mobile money accounts as use of financial services also contributes to the increase of financial inclusion. The findings can address regulatory bodies and policymakers about the opportunities and challenges to address during a pandemic like COVID-19. This study can help understand the development regarding the financial innovations that vulnerable economies require to enhance financial inclusion. It can inspire innovation or advancement in financial inclusion by adapting to the changing needs and behaviour of the end users of financial products and services.

CONCLUSION

The research sought to find the impact of COVID-19 on financial inclusion by measuring the number

of ATMs, the number of bank branches, and financial technology such as mobile money accounts. From the above results and discussion, we concluded that financial inclusion has increased due to using more financial products and services during the COVID-19 pandemic. This study highlights that the use of mobile money accounts during COVID-19 has experienced a significant increase. Additionally, it reveals that the number of ATMS has experienced a substantial impact during COVID-19. The effect on bank branches during COVID-19 remained insignificant, indicating that Banks focused on contactless modes of payment and receipt through financial innovation, like using mobile money services, instead of its branches.

Limitations and Future Directions

While conducting empirical research on developing countries, data availability is the main limitation of conducting this research. The availability of the data was limited to selected indicators of financial inclusion across the countries. Most of the indicator's data was limited to selected countries. The World Bank website mainly focuses on the macroeconomics factor of the economies. Data availability for the microeconomics factor was also limited across the database. The availability of the data is limited to the year 2020, due to which we were unable to measure the financial inclusion during the COVID-19 and post-COVID-19. In the future, when the data will be available, we can calculate the total impact on financial inclusion by COVID-19. Additionally, for future direction, developed countries can also consider finding the effect of COVID-19 on financial inclusion so that a comparison can be made to understand the financial inclusion situation due to COVID-19 between developing and developed countries.

REFERENCES

Adaba, G. B., & Ayoung, D. A. (2017). The development of a mobile money service: an exploratory actor-network study. *Information Technology for Development*, *23*(4), 668-686.

Aiyar, S., Calomiris, C. W., & Wieladek, T. (2014). Identifying channels of credit substitution when bank capital requirements are varied. *Economic Policy*, *29*(77), 45-77.

Alhassan, A., Li, L., Reddy, K., & Duppati, G. (2021). The relationship between political instability and financial inclusion: Evidence from Middle East and North Africa. *International Journal of Finance & Economics*, *26*(1), 353-374.

Allen, F., Carletti, E., Cull, R., Qian, J. Q., Senbet, L., & Valenzuela, P. (2014). The African Financial Development and Financial Inclusion Gaps. *Journal of African Economies*, *23*(5), 614-642.

Arunachalam, R. S., & Crentsil, G. L. K. (2020). The Financial Inclusion Advocacy Centre Financial Inclusion in the Era OF COVID-19 Financial Inclusion in the COVID-19 Era. *The Financial Inclusion Advocacy Centre*, *233*(26), 1-33.

Beck, T., Demirguc-Kunt, A., & Peria, M. S. M. (2007). Reaching out: Access to and use of banking services across countries. *Journal of Financial Economics*, *85*(1), 234-266.

Bui, M. T., & Luong, T. N. O. (2023). Financial inclusion for the elderly in Thailand and the role of information communication technology. *Borsa Istanbul Review*, *23*(4), 818-833.

Chakrabarty, K. C. (2011, November). *Financial Inclusion and Banks: Issues and Perspectives*. RBI Bulletin.

Chen, M. A., Wu, Q., & Yang, B. (2019). How valuable is FinTech innovation? *The Review of Financial Studies*, *32*(5), 2062-2106.

Chopdar, P. K., Korfiatis, N., Sivakumar, V., & Lytras, M. D. (2018). Mobile shopping apps adoption and perceived risks: A cross-country perspective utilizing the Unified Theory of Acceptance and Use of Technology. *Computers in Human Behavior*, *86*, 109-128.

Dhir, A., Kaur, P., & Rajala, R. (2018). Why do young people tag photos on social networking sites? Explaining user intentions. *International Journal of Information Management*, *38*(1), 117-127.

Emenalo, C. O., Gagliardi, F., & Hodgson, G. M. (2018). Historical institutional determinants of financial system development in Africa. *Journal of Institutional Economics*, *14*(2), 345-372.

Gallego-Losada, M.-J., Montero-Navarro, A., García-Abajo, E., & Gallego-Losada, R. (2023). Digital financial inclusion. Visualizing the academic literature. *Research in International Business and Finance*, *64*, 101862.

García, M. J. R. (2016). Can financial inclusion and financial stability go hand in hand. *Economic Issues*, *21*(2), 81-103.

Gorshkov, V. (2022). Cashless payment in emerging markets: the case of Russia. *Asia and the Global Economy, 2*(1), 100033.

Gozgor, G. (2014). Determinants of domestic credit levels in emerging markets: The role of external factors. *Emerging Markets Review, 18*, 1-18.

Grabowski, W., Janus, J., & Stawasz-Grabowska, E. (2023). The COVID-19 pandemic and financial markets in Central Europe: Macroeconomic measures and international policy spillovers. *Emerging Markets Review, 54*, 100991.

Grohmann, A., Klühs, T., & Menkhoff, L. (2018). Does financial literacy improve financial inclusion? Cross country evidence. *World Development, 111*, 84-96.

Han, R., & Melecký, M. (2013). *Financial inclusion for financial stability: access to bank deposits and the growth of deposits in the Global Financial Crisis* (No. 6577). The World Bank.

Hoffer, E. P. (2021). Long COVID: does it exist? what is it? we can we do for sufferers? *The American Journal of Medicine, 134*(11), 1310-1311.

Honohan, P. (2008). Cross-country variation in household access to financial services. *Journal of Banking & Finance, 32*(11), 2493-2500.

Hu, Y., Liu, C., & Peng, J. (2021). Financial inclusion and agricultural total factor productivity growth in China. *Economic Modelling, 96*, 68-82.

ILO. (2020, 8 April). *COVID-19: impact could cause equivalent of 195 million job losses, says ILO chief*. New York, NY: UN News. https://news.un.org/en/story/2020/04/1061322

Imerman, M. B., & Fabozzi, F. J. (2020). Cashing in on innovation: a taxonomy of FinTech. *Journal of Asset Management, 21*(3), 167-177.

Kazemikhasragh, A., & Buoni Pineda, M. V. (2022). Financial inclusion and education: An empirical study of financial inclusion in the face of the pandemic emergency due to Covid-19 in Latin America and the Caribbean. *Review of Development Economics, 26*(3), 1785-1797.

Kebede, J., Naranpanawa, A., & Selvanathan, S. (2021). Financial inclusion: Measures and applications to Africa. *Economic Analysis and Policy, 70*, 365-379.

Khan, K. I., Nasir, A., & Saleem, S. (2021). Bibliometric analysis of post covid-19 management strategies and policies in hospitality and tourism. *Frontiers in Psychology, 12*, 769760.

Khan, K. I., Niazi, A., Nasir, A., Hussain, M., & Khan, M. I. (2021). The effect of COVID-19 on the hospitality industry: The implication for open innovation. *Journal of Open Innovation: Technology, Market, and Complexity, 7*(1), 30.

Kim, D.-W., Yu, J.-S., & Hassan, M. K. (2018). Financial inclusion and economic growth in OIC countries. *Research in International Business and Finance, 43*, 1-14.

Kodongo, O. (2018). Financial regulations, financial literacy, and financial inclusion: Insights from Kenya. *Emerging Markets Finance and Trade, 54*(12), 2851-2873.

Leon, F. (2015). Does bank competition alleviate credit constraints in developing countries? *Journal of Banking & Finance, 57*, 130-142.

Léon, F., & Zins, A. (2020). Regional foreign banks and financial inclusion: Evidence from Africa. *Economic Modelling, 84*, 102-116.

Lu, W., Niu, G., & Zhou, Y. (2021). Individualism and financial inclusion. *Journal of Economic Behavior & Organization, 183*, 268-288.

Malik, A. H., bin Md Isa, A. H., bin Jais, M., Rehman, A. U., & Khan, M. A. (2022). Financial stability of Asian Nations: Governance quality and financial inclusion. *Borsa Istanbul Review, 22*(2), 377-387.

Mensi, W., Hammoudeh, S., Nguyen, D. K., & Kang, S. H. (2016). Global financial crisis and spillover effects among the US and BRICS stock markets. *International Review of Economics & Finance, 42*, 257-276.

Narteh, B., Mahmoud, M. A., & Amoh, S. (2017). Customer behavioural intentions towards mobile money services adoption in Ghana. *The Service Industries Journal, 37*(7-8), 426-447.

Nasir, A., Shaukat, K., Iqbal Khan, K., A. Hameed, I., Alam, T. M., & Luo, S. (2021). Trends and directions of financial technology (Fintech) in society and environment: A bibliometric study. *Applied Sciences, 11*(21), 10353.

Neaime, S., & Gaysset, I. (2018). Financial inclusion and stability in MENA: Evidence from poverty and inequality. *Finance Research Letters, 24*, 230-237.

Nizam, R., Karim, Z. A., Rahman, A. A., & Sarmidi, T. (2020). Financial inclusiveness and economic growth: New evidence using a threshold regression analysis. *Economic research-Ekonomska istraživanja, 33*(1), 1465-1484.

Nkoa, B. E. O., & Song, J. S. (2020). Does institutional quality affect financial inclusion in Africa? A panel data analysis. *Economic Systems, 44*(4), 100836.

Oanh, T. T. K., Van, L. T. T., & Dinh, L. Q. (2023). Relationship between financial inclusion, monetary policy and financial stability: An analysis in high financial development and low financial development countries. *Heliyon, 9*(6), e16647.

Okpara, J. O. (2011). Factors constraining the growth and survival of SMEs in Nigeria: Implications for poverty alleviation. *Management Research Review, 34*(2), 156-171.

Osei-Assibey, E. (2015). What drives behavioral intention of mobile money adoption? The case of ancient susu saving operations in Ghana. *International Journal of Social Economics, 42*(11), 962-979.

Park, C.-Y., & Shin, K. (2021). COVID-19, nonperforming loans, and cross-border bank lending. *Journal of Banking & Finance, 133*, 106233.

Pradhan, R. P., Arvin, M. B., Nair, M. S., Hall, J. H., & Bennett, S. E. (2021). Sustainable economic development in India: The dynamics between financial inclusion, ICT development, and economic growth. *Technological Forecasting and Social Change, 169*, 120758.

Salisu, A. A., & Akanni, L. O. (2020). Constructing a global fear index for the COVID-19 pandemic. *Emerging Markets Finance and Trade, 56*(10), 2310-2331.

Sarma, M., & Pais, J. (2011). Financial inclusion and development. *Journal of International Development, 23*(5), 613-628.

Senyo, P. K., & Osabutey, E. L. (2020). Unearthing antecedents to financial inclusion through FinTech innovations. *Technovation, 98*, 102155.

Shaikh, A. A., Glavee-Geo, R., Karjaluoto, H., & Hinson, R. E. (2023). Mobile money as a driver of digital financial inclusion. *Technological Forecasting and Social Change, 186*, 122158.

Shen, H., Fu, M., Pan, H., Yu, Z., & Chen, Y. (2020). The impact of the COVID-19 pandemic on firm performance. *Emerging Markets Finance and Trade, 56*(10), 2213-2230.

Telukdarie, A., & Mungar, A. (2023). The Impact of Digital Financial Technology on Accelerating Financial Inclusion in Developing Economies. *Procedia Computer Science, 217*, 670-678.

Vo, D. H., Nguyen, N. T., & Van, L. T.-H. (2021). Financial inclusion and stability in the Asian region using bank-level data. *Borsa Istanbul Review, 21*(1), 36-43.

Wójcik, D., & Ioannou, S. (2020). COVID-19 and finance: market developments so far and potential impacts on the financial sector and centres. *Tijdschrift Voor Economische en Sociale Geografie, 111*(3), 387-400.

World Bank. (2015). *Global Financial Development Report 2015/2016: Long-Term Finance*. Global Financial Development Report.

World Bank. (2020). *UFA2020 Overview: Universal Financial Access by 2020*. The World Bank Group. https://www.worldbank.org/en/topic/financialinclusion/brief/achieving-universal-financial-access-by-2020

Yelin, D., Margalit, I., Yahav, D., Runold, M., & Bruchfeld, J. (2021). Long COVID-19—it's not over until? *Clinical Microbiology and Infection, 27*(4), 506-508.

Zhang, T., Wu, Q., & Zhang, Z. (2020). Probable pangolin origin of SARS-CoV-2 associated with the COVID-19 outbreak. *Current Biology, 30*(7), 1346-1351. e1342.

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APPENDIX

Table A

Sr. #	Countries	Sr. #	Countries
1	Afghanistan	19	Mali
2	Angola	20	Myanmar
3	Benin	21	Mongolia
4	Burkina Faso	22	Malawi
5	Bangladesh	23	Niger
6	Cote d'Ivoire	24	Nicaragua
7	Cameroon	25	Nepal
8	Comoros	26	Pakistan
9	Egypt, Arab Rep.	27	Philippines
10	Ghana	28	Rwanda
11	Guinea	29	Senegal
12	Gambia	30	Solomon Islands
13	Guinea-Bissau	31	Chad
14	India	32	Togo
15	Cambodia	33	Uganda
16	Liberia	34	Samoa
17	Lesotho	35	Zambia
18	Madagascar	36	Zimbabwe