OPEN ACCESS

Saudi Journal of Business and Management Studies
Abbreviated Key Title: Saudi J Bus Manag Stud
ISSN 2415-6663 (Print) |ISSN 2415-6671 (Online)
Scholars Middle East Publishers, Dubai, United Arab Emirates
Journal homepage: https://saudijournals.com

Original Research Article

Impact of Digital Financial Inclusion on Poverty Reduction in North-Western Nigeria

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DOI: https://doi.org/10.36348/sjbms.2025.v10i06.003 | **Received:** 15.05.2025 | **Accepted:** 20.06.2025 | **Published:** 07.07.2025

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Abstract

This paper examines the impact of digital financial inclusion on poverty reduction in Nigeria. The study is motivated by the report on the financial Inclusion Insights (FII), (2017) and (2022) which revealed that about 65.0% of the adult populace was financially excluded without any form of access to financial services. Data collection techniques employed was self-administered questionnaire. The questionnaire were administered to a total of 538 household that are financially included in rural area from the North-West region of Nigeria, by using convenient and simple random sampling techniques to select the sample. In analyzing the relationship among the variables, a Partial Least Square (PLS)-Structural Equation Modeling (SEM) technique was adopted. The findings of the study revealed that there is a positive and strong significant relationship between the digital financial inclusion and poverty reduction. The paper recommends the digital financial inclusion to be more robust in the rural areas, provide services at any time and any place through mobile terminals such as mobile phones and provide internet services across localities.

Keywords: Financial Inclusion, Digital Financial Inclusion, Mobile Money, Internet Banking, Point of sale, Poverty Reduction.

INTRODUCTION

Poverty, which could be defined as the state in which individuals or people do not have enough financial resources to ensure a minimum standard of living (Orji1 *et al.,* 2024), It continues to be a major challenge and one requiring urgent attention among African countries especially Nigeria that fall within the low financial inclusion country in the region (Ofori-Abebrese *et al.,* 2020). Poverty is defined by the World Bank Group (2021) as surviving on less than US$1.9 a day.

Individuals or people engulfed in poverty are often characterized by low income and consumption levels, and also, often live without better education, proper medical attention, proper housing, clean water, healthy food among others (Koomson *et al.,* 2020). The poverty rate in sub-Saharan Africa has been on the increased, for instance, average poverty rate in sub-Saharan Africa (SSA) region has increased from 278 million in 1990 to 413 million in 2015 (Nirav, 2018). Choudhury and Bagchi (2016) indicated that the persistent state of poverty and financial hardship in developing countries is partly due to financial exclusion. Therefore, financial inclusion is one of the panaceas for eradicating poverty globally (Bateman *et al.,* 2019). This is supported by Nsiah *et al.,* (2021); Koomson et al. (2020) who revealed that financial inclusion is essential in bettering the livelihood of people and as such reduces poverty.

Financial inclusion is one of the social concepts that is considered inclusivity in financial services as an important means to tackle poverty and inequality (Chibba, 2008). Hence, a key element to ending social exclusion is financial inclusion, which presents an opportunity for people to benefit from financial services and as such contribute to the processes of economic and social advancement of the beneficiaries (Mubiru, 2012).

Having access to financial services empowers poor people to save and to borrow for setting up businesses that would enable them improve their

standards of living, invest in education and help them to acquire assets (Sahay *et al.,* 2015). Indeed, financial inclusion is beneficial to less privileged people in rural areas of society, young people and women (Nsiah *et al.,* 2021). It is also now broadly recognized as an instrumental means of reducing income inequality, and poverty (Neaime & Gaysset, 2018).

Thus, the lack of access to formal financial services for the general population reduces the level of citizens' welfare and social protection, which leads to increased social tension in society, and poverty and ultimately slows the development of the country's economy as a whole. Globally, its reported that over1.4 billion adults are still unbanked globally (equivalent to 21.9% of the world adult population) and lack access to formal financial services which makes financial inclusion a complex matter across different nations (Demirgüç-Kunt *et al.,* 2022).

In recent years, numerous efforts have been made to expand financial inclusion by world leaders, key international organizations and multilateral agencies around the globe (e.g., The World Bank, the International Monetary Fund, the United Nations, and the G20 Global Partnership for Financial Inclusion) have repeatedly highlighted the benefits of universal access to financial services and emphasized the global commitment to expanding financial inclusion as a means to improve economic and social welfare worldwide (Huang & Zhang, 2019).

Thus, digital financial inclusion has in recent decades received much attention from researchers and policymakers (Ozili, 2022). The concept of digital financial inclusion is the proportion of individuals and firms that access and use formal financial services through digital platforms. Hence, it is viewed as a change agent that can result in a revolutionary development in the global financial sector. Digital financial services such as mobile money accounts, Internet services, mobile banking applications, Point of sale (POS) and USSD let users safely and inexpensively save funds and transfer them quickly across long distances, which leads to higher domestic remittances and consumption. Therefore enhancing digital financial inclusion can have significant positive effects on many individuals, organizations' and nations of those countries that can be affected by economic downturns, especially in developing countries like Nigeria.

Previous studies have focused on the impact of digital inclusive finance on household economic activities. Most of them suggest that digital inclusive finance can promote the consumption structure, increase residents' consumption, improve the convenience of household consumption and investment and reduce poverty (Ozili, 2024b; Sun & Zhang, 2024).

However, in the provision of financial services in Africa, Nigeria was left behind its peer countries in Africa. For instance, a survey conducted in Nigeria in 2016 by Financial Inclusion Insights (FII), (2017) revealed that about 65.0% of the adult populace was financially excluded without any form of access to financial services. In another survey conducted by Demirgüç-Kunt *et al.,* (2022) in 2021 only 45% of the country's adult population was served by formal financial services compared to Kenya with 79% and South Africa with 85% in 2021. The report further revealed that Nigeria was among the top five countries that are home to more than half of the world's unbanked population.

A recent study conducted by Enhancing Financial Innovation and Access (EFInA, (2022) revealed that 38 million equivalent to (35.9%) of Nigerian adults are financially excluded, and 81% of them live in rural areas. Of these, 43% live in the North-West. Analysis of this result showed that regions such as the North-west had the highest exclusion rates of 68%, this is more than double the percentage of South-West and South-East with 17% and 26% respectively (EFInA, 2022). Further analysis of the study showed that 40% of the women in Nigeria are financially excluded, 32% of Men in Nigeria are financially excluded, 55% were below 35 years (productive age) (EFInA, 2022).

Nigeria has become the number one country with the highest number of people living in extreme poverty, the research conducted by World Bank Group, (2023) revealed an estimate of 87 million Nigerians, or around half of the country's population (50%), are thought to be living on less than $1.90 a day, this figure surpassed India. It is believed that one of the basic causes of poverty is an inadequate flow of income. Consequently, having access to savings and credit have a crucial role in improving the economic conditions of poor people since they can enhance an economy's investment efficiency (Kumra & Sharma, 2018). As part of its reforms, the Central Bank of Nigeria (CBN) and other development partners introduced reforms aimed at reducing the financial exclusion rate to 20% by the year 2020, these reforms include: the implementation of the Micro Small and Medium Enterprises Development Fund (MSMEDF), linkage banking, agent banking tiered Know-Your-Customer (KYC) requirements, credit enhancement programmes, consumer protection, and financial literacy (EFInA, 2012).

Accordingly, relevant empirical studies measured the degree of financial inclusion using conventional indicators, such as the number of bank branches and automated teller machines (ATMs), bank accounts opened, and borrowers from and depositors with financial intermediaries. Most of these studies have found that financial inclusion has a statistically significant on poverty reduction in developing countries (Andrianaivo & Kpodar., 2009; Burgess *et al.,* 2005; Honohan, 2008; Inoue, 2024; Park & Mercado, 2018).

Despite advances in the measurement of financial inclusion, most of the extant studies have mainly conceptualized financial inclusion as ownership of a bank account rather than as a multidimensional construct. Such advances include usage of financial products such as insurance, remittance receipts, access to credit, and mobile money which is a key driver of the Fintech revolution (Allen *et al.,* 2016; Demirgüç-Kunt *et al.,* 2018; Demirgüç-Kunt & Klapper, 2013, 2012).

Considering the importance of this new phenomenon, this study empirically analyzes the impact of digital financial inclusion on poverty reduction in Nigeria. The current research differs from relevant previous studies. Firstly, unlike previous studies using conventional indicators of financial inclusion, this study applies digital financial inclusion such as internet services, mobile banking applications, Point of sale (POS) and USSD as proxies to measure the degree of digital financial inclusion. This indicator was chosen because the other relevant data on digital financial inclusion provided by international organizations are not sufficiently accumulated for empirical analysis. Secondly, the majority of the studies focused on financial inclusion alone. Hence, the nature and extent of the impact of digital financial inclusion on poverty reduction remained untouched in the existing literature. Thus, to the best of the author's knowledge, no other studies have examined how these variables proxied digital financial inclusion affect poverty reduction in sub-Saharan African countries Nigeria inclusive.

The remainder of this paper is organized as follows. Section 2 briefly reviews the relevant literature. Section 3 describes the methodology used to collect and analyze the data on the effects of digital financial inclusion on poverty reduction. Section 4 provides the empirical results. Section 5 summarizes the main findings. Section 6 conclusion and recommendation for future research.

LITERATURE REVIEW

With the advancement of digital transformation, unbanked people can conduct financial transactions more easily using digital devices such as Point of Sales (POS), Mobile banking, Mobile banking applications, internet banking and USSD. Several international organizations have collected and provided data related to digital financial inclusion to capture these developments. For example, in 2009, the International Monetary Fund launched the Financial Access Survey based on information collected by financial regulators and central including mobile money agents, mobile money transactions, number of mobile accounts, outstanding balances on mobile money accounts, and the value of mobile money transactions.

Financial Inclusion and Poverty reduction

Financial development/Inclusion is essential for growth and poverty reduction. Previous research note that financial inclusion efforts and programs should be extended to vulnerable groups/people who suffer the most from financial exclusion, and it considers poor people as a vulnerable group as well as women (Olaoye & Zerihun, 2023). The theory proposes that if vulnerable groups are financially included in this case poor people they will have access to useful financial services that they can use to improve their welfare and rise above poverty (Ozili, 2020). In the opinion of Kingsley, (2013) financial inclusion holds a promise of addressing income inequality, underdevelopment, universal poverty, and welfare for the less privileged segments of the society.

Previous research such as Chibba (2009) and Choudhury, 2014) have widely recognized that financial inclusion can reduce poverty and vulnerability. Aghion and Bolton (1997) note that financial constraints such as asymmetric information can severely restrict the poor from accessing finance and that removing these constraints would help the poor to access finance, particularly to those with investment ideas that could generate profits.

Iwedi, (2020) revealed that the provision of essential financial services, including access to credit, payment mechanisms, and savings, can yield positive outcomes for individuals, potentially foster the growth of micro, small, and medium enterprises and enhance the well-being of impoverished populations. Similarly, Neaime and Gaysset (2018) highlight the importance of access to finance to entrepreneurs who will be encouraged to invest more and take risk, which positively will contribute to growth. There is a realization that lack of access to finance adversely affects economic growth and poverty alleviation, as the poor find it difficult to accumulate savings, build assets to protect against risks, as well as invest in income generating projects.

Park and Mercado (2018) investigated the impact of an inclusive financial sector on poverty reduction and income inequality in several countries. They concluded that significant increases in financial inclusion in high- and middle-income countries are associated with reduced.

Digital Financial Inclusion and Poverty Reduction

The development of financial inclusion has reached another stage: digital financial inclusion, which stresses the importance of information and communicatio technology (ICT) in expanding the scale and deepening the reach of financial services. Previous Studies have begun to define financial inclusion in terms of "digital" financial inclusion and mobile money specifically investigating its impacts on various poverty and welfare-related measures (Gomber *et al.,* 2017; Lyons *et al.,* 2020). Existing literature such as Apiors and Suzuki (2018); Suri and Jack (2016); Yiming and Joint (2020) emphasize the role of digital money transfers (i.e., remittances) as the channel by which mobile money

leads to risk-sharing and improvements in households' financial welfare.

The development of digital financial inclusion decreases the degree of financial exclusion, provides various financial services, such as savings, insurance, credit, and payment, for the poor, expands the availability and payment convenience of financial services for the low-income groups, and enhances the ability of poor groups to resist risks (Zhou, 2021). Hence, the digital inclusive finance makes the poor people, who are separated from finance, avail the opportunity to enjoy the appropriate financial products and services.

In addition, Digital finance means the provision of financing, investment, payment, and other financial services and products by traditional financial institutions and enterprises using digital technology (Li *et al.,* 2020). It may boost consumer spending, raise business operation, and support technological innovation in the physical business model by enhancing the quality of financial infrastructures, including payment and settlement systems (Azeez *et al.,* 2024). Hence, it can facilitate more people to enjoy financial services, especially in remote rural areas, accumulate funds through savings and invest in poor areas, promote economic growth, create more employment opportunities, and improve the income level of people in poor areas.

Digital financial services greatly reduce transaction costs in rural areas because of their lower marginal cost (Wang & Fu, 2022). Digital financial inclusion plays an important role in improving agricultural sector by enabling farmers to transform and expand their farming activities (Wang & Fu, 2022). Also, as the Emara and Mohieldin (2020) reported, digital finance is a critical factor in advancing the expansion of e-commerce, which creates more opportunities and changes occupational choices. It allows farmers to diversify their business from agriculture other businesses and thereby obtains sustainable income growth. The increase in the level of income among people will lead to an increase in consumption, which will further promote the expansion of the local economy.

Previous studies also provide some evidence of positive (Beck *et al.,* 2018; Suri & Jack, 2016) or negative (Van Hove & Dubus, 2019) correlations between this payment tool and economic activity. For instance, Munyegera and Matsumoto (2016) found a positive impact of mobile money services on the welfare of rural households in Uganda, mainly due to the facilitation of remittances. It has been recognized as a new financial format, which includes three basic businesses: digital payments, digital investments, and digital financing. (Wang & Fu, 2022).

In another perspective by Riley (2018) examined the potential spillover effects of remittances received via mobile money to village communities in Tanzania after a rainfall shock. In the absence of the shock, there were spillover effects to the village, where users of mobile money shared remittances with the village. In the presence of the negative shock, only users of mobile money were able to prevent a drop in their consumption. There were no spillover effects on other members of the village.

In another study, Aker *et al.,* (2016) used data from a randomized experiment of a mobile money cash transfer program in Niger and found that providing social assistance via mobile phones led to significant time and cost savings for recipients, as well as better nutritional outcomes.

Furthermore, few other studies have considered geographical heterogeneities and found that mobile money usage improves the livelihoods of households even in very poor and remote areas (Munyegera and Matsumoto, 2016; Wieser *et al.,* (2019). Munyegera and Matsumoto (2016) found that mobile money services had a positive impact on the welfare of rural households in Uganda, through the facilitation of remittances. Wieser *et al.,* (2019) studied the effect of rolling out mobile money agents in rural Northern Uganda and found that the rollout reduced the percentage of poor rural households with low food security. The results showed that mobile money can improve the livelihoods of the poor, especially in remote areas far away from traditional bank branches.

Lee *et al.,* (2018) showed that actively using mobile money to send urban-to-rural remittances in Bangladesh increased rural consumption and reduced extreme poverty. While Song and Guo, (2017) revealed that fintech had a positive effect on household income, especially for rural households, suggesting that digital financial inclusion helps narrow the income gap between urban and rural residents.

Yin *et al.,* (2021) indicate that internet bankingh is a key to poverty alleviation in China's rural ethnic minority areas. Other scholars believe that digital financial inclusion offers more opportunities and rights for low-income disadvantaged groups to obtain modern financial services with the help of digital technology, making it more likely to lead to income and consumption growth and thus alleviating poverty in general (Huang & Zhang, 2019; Suri & Jack, 2016).

In summary, digital financial inclusion is considered a great method for alleviating financial constraints faced by farmers, especially those who are vulnerable. The digital financial inclusion movement has made inroads around the world in the past decade. For instance, Grameen Bank, the best-known microfinance institution, has broadly developed an online business model to automate its operation (Wang & Fu, 2022).

Research Framework

The research framework has three variables namely the independent variable as financial inclusion, and digital financial inclusion; the dependent variable is poverty reduction. Finally, after an extensive review of previous literature, the conceptual research framework fig 2.1 below is fine-tuned to fill the research gap.

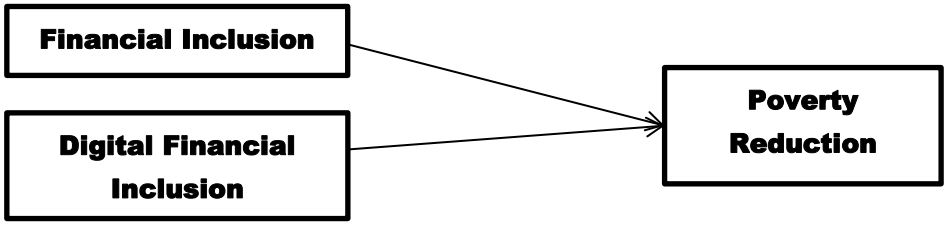

Fig. 2.1: Research framework

Theoretical View

This section highlights the different theories on the relationship between financial inclusion, digital financial inclusion and poverty reduction. On the theoretical front, there are three main theoretical views. Firstly, is theory of trickle-down that financial inclusion is essential for growth and poverty reduction. The proponents of this view Aghion and Bolton (1997) note that financial constraints such as asymmetric information can severely restrict the poor from accessing finance and that removing these constraints would help the poor to access finance, particularly to those with investment ideas that could generate profits. This is consistent with the extensive margin theory, which states that financial development could enhance the poor's capacity to access and use financial services via both direct and indirect channels (such as ICT) (Olaoye & Zerihun, 2023).

Secondly, there is also the vulnerable group theory of financial inclusion. This theory argues that financial inclusion efforts and programs should be extended to vulnerable groups/people who suffer the most from financial exclusion, and it considers poor people as a vulnerable group as well as women. The theory proposes that if vulnerable groups are financially included, poor people will have access to useful financial services that they can use to improve their welfare and rise above poverty (Ozili, 2021).

Lastly, the digital agency theory of financial inclusion developed by (Ozili, 2024a) is a set of principles that explain and resolve the issues in the relationship between the financial inclusion principal and the digital agent that accelerate financial inclusion using appropriate digital technologies. The theory states that the financial inclusion principal will employ the digital agent services who will use appropriate digital technologies to achieve the financial inclusion outcome specified by the principal (Ozili, 2024a).

METHODOLOGY

This study adopted a quantitative approach to determine the impact of digital financial inclusion on poverty reduction in Nigeria. The scope of the study will cover the entire North-West region of Nigeria which comprises seven states Jigawa, Kaduna, Kano, Katsina, Kebbi, Sokoto, and Zamfara. For this study, the researcher adopted a survey method in assessing thoughts, feelings, and options about a given situation by collecting primary data from the respondents (Fisher, 2010) to determine the variables under review and to explain the resultant effect(s) of the relationship.

Approximately Nigeria has a total population of 233,139,587 with 63% (139 million people) who are multidimensional poor in Nigeria (NBS 2022). To arrive at a sample for this study, Krejcie and Morgan (1970) recommend the use of 384 as a maximum sample if the population is 1,000,000 and above. The sample size for this study was increased by 40% to arrive at a sample of 538 to be consistent with the view of Salkind, (2012) for adjusting sample size by 40% to 50% to avoid nonresponse problems and sample size error (Bartlett *et al.,* 2001; Salkind, 2012). Therefore, total samples of 538 poor households (respondents) from the seven North-Western States of Nigeria are selected for this study.

The present study adopts a multi-sampling method by applying convenient sampling technique and simple random sampling methods to select the sample. In addition, Sekaran and Bougie, (2016) emphasize the use of a stratified random sampling method respondents are from different strata and will have an equal chance of being selected as the sample objects.

A survey method using a structured questionnaire as the instrument for data collection was found to be the most appropriate technique for collecting primary data because it is a widely used method adopted by organizational researchers who are interested in collecting information about a very large population that cannot be observed directly (Keeter, 2005). In addition, it is considered as one of the best methods of obtaining information on social, and personal facts, and beliefs (Babbie, 2008).

The administration of these questionnaires was done directly to the respondents (financially excluded). Data will be collected from the questionnaire within the same period at the same point in time using the cross-sectional method of data collection. The reason for using cross-sectional data is because all the data for measuring

all variables will be sourced from the field at the same time as noted in studies by Abiola (2009), Dominic and Lanoe (2015), and Halbouni *et al.,* (2016).

Based on the previous literature, financial inclusion was measured by adapting indicators (number of banks, bank branches, bank accounts, formal financial access and informal financial access) suggested by (Inoue, 2019; Kodongo, 2018). Digital Financial Inclusion measures such as ATM, POS, Mobile banking, Mobile banking Apps, internet banking and USSD were adapted from (Taiwo, 2012; Wachuku & Amadi, 2024). Meanwhile, poverty reduction indicators were adapted from (Lal, 2018). All the items developed were anchored onto a five-point Likert scale as recommended by DeVellis, (2003). The study hypotheses below:

$H0_1$: There is no significant relationship between financial inclusion and Poverty reduction in North western region of Nigeria.

$H0_2$: There is no significant relationship between digital financial inclusion and Poverty reduction in North western region of Nigeria.

Data Analysis

Response Rate of the Questionnaires

The research used five state (Jigawa, Kaduna, Kano, Kebbi and Sokoto) out of the 7 seven of North western Niugeria due to security issues in some part of the state 108 household were randomly selected to participate in the study each from the 5 state. Therefore, 540 questionnaires were randomly distributed to the respondents, but 437 responded back representing 80.93% of the questionnaire distributed. Out of 437 respondents, 40 questionnaires were rejected because of either incomplete responses or the problem of outliers, so the final sample size came to 397 respondents. The effective response rate came out to be 90.84%. Table 4.1 below shows the summary of questionnaire response.

Table 4.1: Summary of Questionnaire Response

S/N	Response	Frequency	Percentag (%)
1	No. of distributed questionnaires	540	100
2	Completed and returned questionnaires	437	80.93
3	Unusable questionnaires:	40	9.38
4	Incompleteness and non-eligibility	13	2.97
5	Univariate and multivariate outliers	27	6.17
6	Returned and usable questionnaires	397	90.84

Respondent profile

Respondents in this study consist of financial inclusion households of the five selected state for the study. All respondent represented financial inclusion of Jigawa, Kaduna, Kano, Kebbi and Sokoto state. Table 4.2 shows the demographic profile of the respondents.

Table 4.2: Demographics

	Frequency	Percentage %
Gender		
Male	353	88.9
Female	44	11.1
Age of the Respondents		
26-35	36	9.0
36-45	269	67.8
Above 45 Years	92	23.2
Income Level Monthly		
Below 50,000	249	62.7
51,000-100,000	148	37.3
Occupation of the respondents		
Farming	224	56.4
Petty Trader	65	16.4
Fishing	24	6.0
Retired	35	8.8
Trader	49	12.3
Highest Educational Qualification		
Primary	97	24.4
SSCE	219	55.2
ND/NCE	41	10.3
HND/B.SC	37	8.56
Residence of respondent		
Rural	89	22.2
Semi-Rural	308	77.8

RESULTS AND DISCUSSION

A two-stage analytical procedure was used to analyze the data. Firstly, the measurement model was assessed, and secondly, the structural model was examined. Specifically, SmartPLS 3.0 was used to conduct the analysis (Hair *et al.,* 2010). Bootstrapping with 396 cases and 500 re-samples was used to assess the path significance.

Assessment of the measurement model

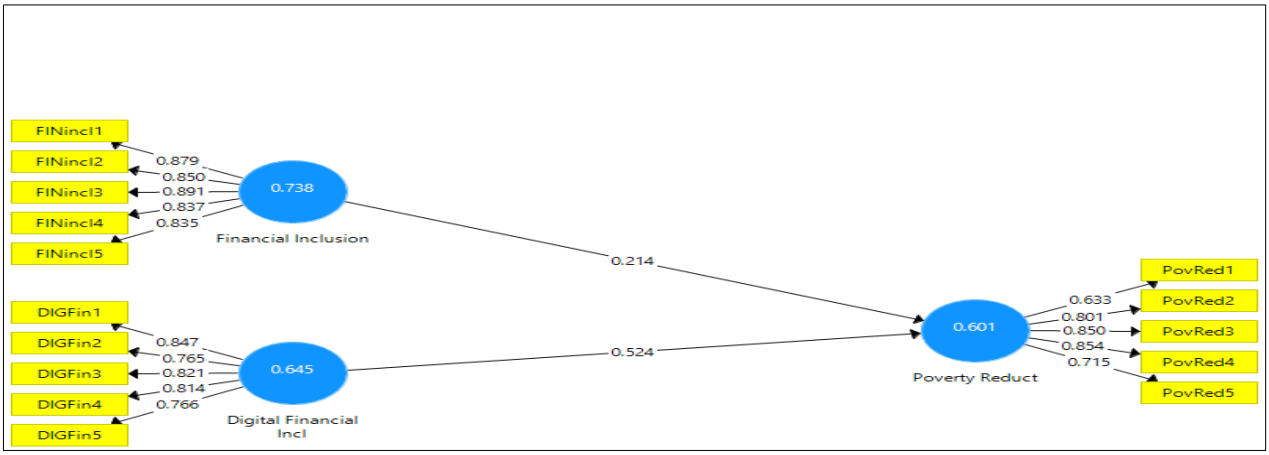

Fig. 2: Measurement Model

This survey examines the reliability and validity of our constructs (see fig.2). Convergent validity exists if a group of indicators measures one common factor. Composite reliability and average variance extracted were calculated using the procedures suggested by (Ab Hamid, Sami, & Mohmad Sidek, 2017; Fornell & Larcker, 1981). The reliability of the construct can be measured in two ways Cronbach's alpha (α) and composite reliability (CR). The rule of thumb for both reliability criteria is they need to be above 0.70. In this study Cronbach's alpha and Composite reliability (CR) values of all factors are all above 0.70. The individual item loading varied from 0.633 to 0.891, and Convergent validity can be measured by the Average Variance Extracted (AVE). The criterion for AVE is the value should be 0.5 (50%) or higher (Hair *et al.,* 2020), in this study average variance extracted is at least 0.60.

Additionally, discriminant validity was tested by comparing the relationship between the values of AVEs and the shared variances among constructs as Hair, Black, Babin, and Anderson (2010) suggested (own loading are greater than cross-loadings). As shown in Table 4.4, none of the squares of correlations between constructs was higher than the value of the related AVE, which supported the discriminant validity. Besides, the square root of each construct's AVE is greater than its highest correlation with any other construct, thus ensuring discriminant validity (Chin, 1998; Fornell & Larcker, 1981). Therefore, the measurement model was considered acceptable with the proof of adequate reliability, convergent validity and discriminant validity. Tables 4.3 and 4.4 provide all these values and suggest sufficient convergent validity and reliability.

Table 4.3: Convergent validity and reliability

Construct	Construct Standardized loading	Cronbach's Alpha	Composite reliability	Average Variance Extracted (AVE)
Financial Inclusion		**0.911**	**0.934**	**0.738**
FiNIncl1	0.879			
FiNIncl2	0.850			
FiNIncl3	0.891			
FiNIncl4	0.837			
FiNIncl5	0.835			
Digital Financial Inclusion		**0.862**	**0.901**	**0.645**
DIGFin1	0.847			
DIGFin2	0.765			
DIGFin3	0.821			
DIGFin4	0.814			
DIGFin5	0.766			
Poverty Reduction		**0.832**	**0.881**	**0.601**
PovRed1	0.633			
PovRed3	0.801			

PovRed4	0.850			
PovRed5	0.854			

Table 4.4: Discriminant validity / Fornell-Larcker Criterion

	Digital Fin Inclusion	Fin Inclusion	Poverty Reduction
Digital Fin Inclusion	**0.803**		
Financial Inclusion	0.695	**0.859**	
Poverty Reduction	0.673	0.578	**0.775**

Note: Diagonal entries (in bold) are AVE; entries below the diagonal are correlations, and the entries above the diagonal represent the squared correlations.

Assessment of the structural model

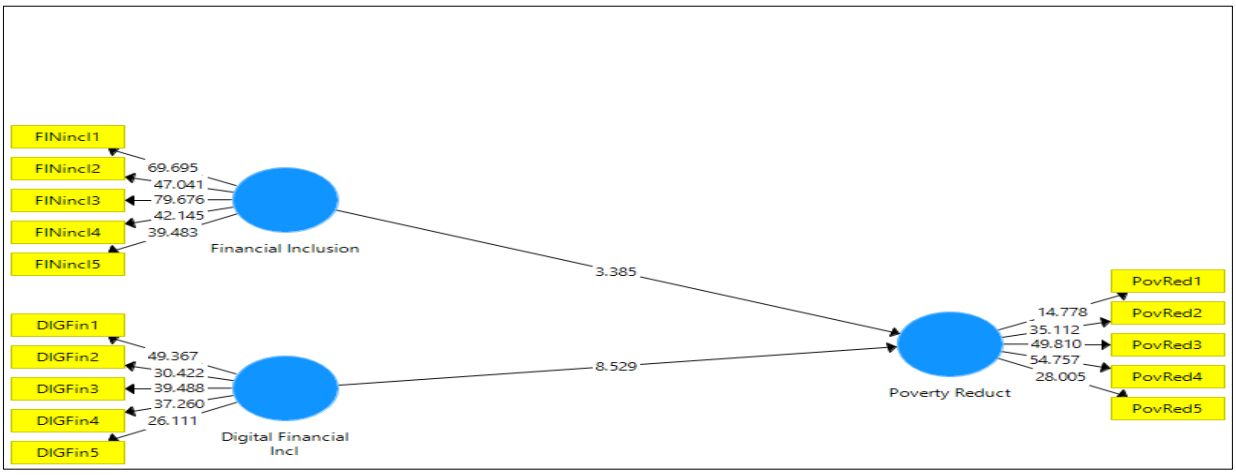

Fig. 3: Structural Model

To assess the structural model (i.e Fig 3), the path coefficients, including an assessment of their significance, the Stone-Geisser Q^2 and the coefficient of determination R^2 were examined (Chin, 1998; Geisser, 1974; Hair, Sarstedt, Ringle, & Mena, 2012; Stone, 1974). Results show that financial inclusion is positively significant to poverty reduction ($\beta = 0.214$, T= 3.385, $p < 0.001$), supporting H_1. Digital Financial inclusion is strongly and positively significant to poverty reduction ($\beta = 0.524$, T= 8.529, $p < 0.000$), supporting H_2. Overall satisfaction of the model is revealed in the coefficient of determination R^2 of the endogenous latent variables, a common indicator in multiple regression analysis.

The result of the model shows an R^2 of 0.474 for poverty reduction. Blindfolding procedure (omission distance = 7) to evaluate Stone-Geisser criterion revealed Q^2 (0.402) a value greater than 0 for poverty reduction, thus providing support for the model's predictive relevance (Joseph. Hair, Ringle, Sarstedt, & Vinzi, 2013).

Table 4.5: Path Coefficients

Hypothesis	β	Std Dev	T-Value	P Values
Financial Inclusion -> Poverty Reduction	0.214	0.063	3.385	0.001
Digital Financial Inclusion -> Poverty Reduction	0.524	0.061	8.529	0.000

CONCLUSION

The objective of the study was to evaluate the effects of financial inclusion and digital financial inclusion on poverty reduction in Nigeria. The model was tested to verify the hypotheses with respect to financial inclusion and digital financial inclusion. Concerning the academic contribution of this study, the researcher have to highlight that there are studies in the literature about the proposed model with regard to the influence of financial inclusion and digital financial inclusion on poverty reduction. However, this study is pioneering research in the field of empirical analyses regarding the effect of financial inclusion and digital financial inclusion on poverty reduction.

The novelty of this research lies in the study of financial inclusion and digital financial inclusion with their effects on poverty reduction with regard to a port of call in the West African region where there is still little research on poverty reduction. The study is relevant as it contributes in the financial inclusion, digital financial inclusion and poverty reduction context. In addition, the main methodological contribution is the use of PLS-SEM to examine the relationship between financial

inclusion, digital financial inclusion and poverty reduction.

Results of the analysis revealed that financial inclusion positively and significantly impacts on poverty reduction. Furthermore, it revealed that digital financial inclusion is positively and strongly significant on poverty reduction The finding of this research is consistent with previous research suggesting that when there is financial inclusion in the rural areas, poor households are likely to use the opportunity of having financial services available to invest and seek for financial services that will increase their level of standard. (e.g., Jaiswal & Bhasin, 2015; Mondal, 2015). Also, the results are also consistent with the finding of Ogunleye (2017) that financial inclusion of the excluded poor adult population in Nigeria could unlock their productive potentials by helping them to be involved in productive activities.

Also, The finding of this research is consistent with previous research suggesting that when there is digital financial inclusion (mobile phones, POS, internet banking, mobile banking application, and USSD), financially excluded households are likely to use the opportunity of having financial services available to invest and seek for financial services that will increase their level of standard (e.g., Jaiswal & Bhasin, 2015; Mondal, 2015). Also, the results is consistent with the finding of Ogunleye (2017) that financial inclusion of the excluded poor adult population in Nigeria could unlock their productive potentials by helping them to be involved in productive activities.

Future research should study other factors that may influence the variables in the proposed model, for instance future researchers should consider the effect of bank policy, interest rate, cyber security and risk management in their study. It would also be useful to analyze potential moderators, such as microfinance, bank size, and culture. Finally, this study considered only North-western region of Nigeria in future studies; it would be of great value to study other regions in Nigeria.

RECOMMENDATIONS

To accelerate the role of digital financial inclusion in promoting poverty alleviation, it is necessary to provide mobile and internet services across localities, create conditions for the development of digital financial inclusion and enhance the synergy between financial services and poverty alleviation efforts. To promote the deep penetration of digital financial inclusion for poor households, it is necessary to provide services at any time and any place through mobile terminals such as mobile phones, to promote financial services to be embedded in various types of farmer's transactions, and to provide settlement, financing and other ancillary services to enable the complementary coordination of relevant operations such as credit, insurance, financing guarantees, and other related businesses to jointly serve the development of rural area and agriculture, and cooperate with various service industries related to agricultural production, rural development, and farmers' lives, to provide support for the procurement of agricultural materials, processing and sales of agricultural products and the development of rural tertiary industry.

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