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Digital Financial Inclusion and Poverty Alleviation in Nigeria

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Abstract—The main objective of this study is to analyze the impact of digital financial inclusion on poverty alleviation in Rivers State, Nigeria. The study focused on residents of Rivers State as the target population. Using a combination of multistage and purposive sampling methods, a sample size of 223 participants was selected. Data collection involved the administration of a structured questionnaire, with steps taken to ensure the validity and reliability of the research instrument. The collected data was analyzed using basic descriptive statistics, including tables, frequencies, graphs, and percentages. Hypotheses were tested using simple regression models through SPSS version 25.0 software. Findings showed a significant and positive correlation between mobile money accounts, presence of point-of-sale (POS) machines, frequency of mobile payments, and consumption expenditure in Rivers State. Based on these results, it is concluded that digital financial inclusion plays an important role in poverty alleviation, especially in developing countries like Nigeria. The recommendation is for the Central Bank of Nigeria to enact effective monetary policies to promote financial inclusion and poverty alleviation. In addition, expanding digital financial services in both urban and rural areas and implementing comprehensive financial literacy programs for low-income individuals, especially in rural areas, are suggested to address financial exclusion and reduce poverty levels.

Keywords: Digital financial inclusion, Mobile Payment, poverty alleviation, point of sales machines (POS) mobile payments

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1. INTRODUCTION.

The most difficult challenge facing Nigeria as an economy is the issue of poverty alleviation with average majority of the population of the country been poor and miserable. The global poverty rates have witnessed a significant reduction of over 50 percent, as evidenced by the data indicating that 36 percent of the world's population lived below the poverty line in 1990. By 2015, this figure further decreased to 10 percent, reflecting a remarkable advancement in poverty alleviation efforts (Noha & Mahmoud, 2020). Although Nigeria has made frantic and remarkable efforts in terms of poverty alleviation since 1980. However, despite the notable decline in poverty rates, the country continues to grapple with the challenge of effectively translating economic progress into tangible development outcomes which is an indication that all poverty alleviation programs remain completely nonresponsive to bringing 82.9 million (40.1 percent) Nigerians from poverty. Nations exhibiting attributes of small size, fragility, and conflict tend to demonstrate higher poverty rates.

The idea of financial inclusion was first introduced by the governor of Bank of India during their financial summit in 2005; the concept was later adopted by many within and outside India and the world over (World Bank Financial Report, 2012). The overarching goal of financial inclusion policies on a global scale is to eliminate the obstacles stemming from factors such as education, gender, age, irregular income, regulatory constraints, and geographical location. These barriers collectively impede

billions of adults worldwide from accessing financial services (IMF Spring Meeting Report, 2013). Financial progress influences the increase in citizens' income and the advancement of digital financial inclusion through digitization holds greater significance in augmenting the earnings of impoverished individuals. Digital financial inclusion integrates digital finance with inclusive finance, thereby enhancing the well-being and effectiveness of the economy and serving as a catalyst for mitigating poverty. On a global scale, approximately 1.7 billion individuals still lack access to financial services, with a considerable portion of the unbanked population comprising women, impoverished households residing in rural regions, or individuals not actively participating in the workforce (Findax, 2017).

Digital financial inclusion has a broader scope compared to traditional finance and covers a wider demographic through the integration of digital technology and the internet. Unlike traditional finance which is limited to restricted activities such as savings, loans, and payments, digital financial inclusion utilizes digital technologies to achieve network effects without marginal costs, thus facilitating rapid and inclusive development even in remote areas. With the threshold effect enabled by the internet, digital financial inclusion promotes economic growth (Liu et al, 2021).

Moreover, digital financial inclusion bridges the gap between the unbanked and underbanked populations, facilitating their access to financial services across physical, digital, and psychological domains (Mas, 2012). In the contemporary digital era, a considerable number of individuals who were previously excluded or underserved by traditional financial systems are transitioning from cash-based transactions to digital financial platforms. This shift is facilitated by the utilization of various digital financial tools, including mobile remittances leveraging blockchain technology. Additionally, psychological tools such as financial education play a crucial role in empowering the financially underserved population to access a diverse array of financial products and services. Consequently, this multifaceted approach holds the potential to break the cycle of poverty (Pande et al., 2012).

Numerous empirical studies have consistently demonstrated that the provision of essential financial services, including savings, payment mechanisms, and access to credit, can yield positive outcomes for individuals, potentially enhancing the well-being of impoverished populations and fostering the growth of micro, small, and medium enterprises (Iwedi, 2020). As an emerging paradigm in financial development, digital financial inclusion not only addresses the financial needs of individuals but also broadens the spectrum of financial utilization among low-income populations. This expansion can effectively mitigate instances of financial exclusion. On the one hand, credit assistance facilitated by digital financial inclusion helps overcome capital constraints for the poor, thereby promoting rural economic and industrial development (Cheng & Qu, 2020; Lee & Shin, 2018).

The issue of extreme poverty remains prevalent in Nigeria, and one could attribute it to factors like non inclusive or sluggish growth, low human capital, labour market weakness and exposure to shocks among others. According to the Nigeria Bureau of Statistics (NBS) in 2020, the incidence of poverty in Nigeria experienced a notable increase from 27.2 percent in 1980 to 69.0 percent, before settling at 40.1 percent (equivalent to 82.9 million individuals) in 2020. Despite this concerning trend, mobile money wallets have emerged as an affordable and efficient alternative, facilitating the financial inclusion of millions of impoverished Nigerians. Notably, formal financial services remain limited in accessibility within Nigeria, with only 4.3 commercial bank branches per 100,000 adults and 16.93 ATMs per 100,000 adults, as reported by the World Bank in 2018. This dearth of banking infrastructure disproportionately affects

the sizable rural population, leaving them without access to formal financial services and hampering their ability to benefit from cross-border e-commerce opportunities. Poverty alleviation problem in Nigeria has attracted numerous attentions in the academia with scholars from the field of Finance and Banking (Zameer, Shahbaz & Vo, 2020), Economics (Lia et al, 2020) and Sociology (Fu et al, 2021) supporting increased digital financial inclusion as one of the main methods of effectively alleviating poverty in Nigeria. Thus, this growing level of poverty and hardship in Nigeria can be attributed to lack of expansion of digital financial inclusion. It is in view of the foregoing that we tend to carry out the study on the effect of digital financial inclusion on poverty alleviation in Rivers State of Nigeria.

2. LITERATURE REVIEW

2.1 Theoretical Framework

2.1.1 Technology Acceptance Model (TAM)

TAM was introduced by Fred Davis in 1989 in the realm of information systems theory. The model aims to explain the reasons behind an individual's decision to adopt a particular technology with the aim of improving their quality of life. In accordance with the principles of the Technology Acceptance Model, there are two important factors that determine the likelihood of a new technology being adopted by its users: (i) Perceived usefulness and (ii) perceived ease of use are two crucial factors in technology adoption. Perceived usefulness refers to the extent to which potential users believe that utilizing a specific technology or application will enhance their individual performance or productivity. In essence, perceived usefulness serves as a metric to gauge the utility of a technology or application to its users.

The second factor of perceived ease of use centers on the degree to which the users expect the target technology to be free of effort. Conversely, it is a factor to show how easy for the user to use the technology. TAM primarily emphasizes individuals' perceptions and beliefs about a technology rather than the intrinsic characteristics of the technology itself. Whether a technology is perceived as useful or easy to use depends on an individual's perception and not on the inherent qualities of the technology. These perceptions are subject to change and may vary depending on factors such as level of experience, age, gender, and other personal characteristics. For example, perceptions of a particular technology, such as a mobile device or tablet computer, may differ among individuals, not because the technology itself changes, but because individuals have diverse perspectives and backgrounds. Therefore, TAM underscores the importance of understanding user perceptions and beliefs in determining the adoption and acceptance of a technology. Therefore, this model was adopted in this paper because mobile technology satisfies the two factors of usefulness and ease of use, which implies that every financially excluded Nigerians could be onboard on the financial ecosystem by mobile banking technology.

2.1.2 Financial Literacy Theory

According to this theory, financial literacy plays a crucial role in encouraging financially excluded individuals to participate in the formal financial sector. This implies that promoting financial inclusion can be accomplished through educational initiatives aimed at enhancing the financial literacy of citizens (Ozili, 2020). As financially excluded individuals become more financially literate, they are more likely to actively seek out and utilize financial products and services wherever they are available.

2.1.3 Power Theory of Poverty

The power theory of poverty has similarities with the Marxist ideology of poverty. This perspective sees power through the lens of control over the political and economic structures in society. Here, the distribution of political and economic power determines the prevalence of poverty among people. Essentially, this reflects the Marxian concept of historical materialism, which states that the division of society into rich and poor, or property owners and non-property owners, is shaped by the system of poverty. This perspective underlies the basic aspects of government, religion and culture in society (Mayoux, 2001).

Furthermore, proponents of this theory argue that society is dominated by a property-owning ruling class that exploits those without property, facilitated by their control over the means of production. According to this perspective, a person's social standing depends on whether they own the means of production or are employed by others. Religion, according to this theorist, perpetuates this power structure by deterring the poor from challenging their circumstances and striving for improvement (Montgomery et al., 1996). Therefore, an effective strategy to reduce poverty must address and dismantle exploitative property ownership structures.

2.2 Empirical Review

Several studies have investigated the relationship between financial inclusion and the probability of entering or moving out of poverty. Many recent studies have investigated the relationship between access to financial services and poverty alleviation among the most vulnerable segments of the population. Suri and Jack (2016) used household panel data to investigate the long-run impact of mobile money on the economic welfare of individuals in Kenya. Their findings show that the use of Kenya's mobile money system, M-PESA, results in an increase in per capita consumption levels, thereby improving the efficiency of consumption allocation over time. In addition, their study estimates that about 2.0% of Kenyans are lifted out of extreme poverty, defined as individuals living on less than $1.25 per day. However, access to panel data that used by Suri and Jack (2016) is limited.

In a distinct investigation, Aker et al. (2016) executed a randomized experiment assessing the impact of a mobile money cash transfer program in Niger. Their results demonstrate that delivering social assistance via mobile money led to notable time and cost savings for beneficiaries, along with improved nutritional outcomes. Notably, households receiving assistance through mobile phones experienced a 9%-16% augmentation in dietary diversity, while children consumed one-third more food per day. Similarly, 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.

Lal (2018) examined the impact of financial inclusion through cooperative banks on poverty alleviation in India. Through data collected from 540 people who use cooperative banks, the study concluded that financial inclusion, especially facilitated through cooperative banks, can effectively combat poverty. Access to financial products and services, such as loans, insurance, and savings, was identified as crucial in enabling poor individuals to make informed economic decisions, thereby influencing income generation and management and ultimately reducing poverty. Park and Mercado Jr (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

poverty rates. They also observed that high- and upper-middle-income countries with high levels of financial inclusion exhibit lower poverty rates. However, no such relationship was found in lower-middle-income countries.

Wieser et al. (2019) conducted a study on the impact of the introduction of mobile money agents in rural Northern Uganda. Their findings showed a decrease in the percentage of poor rural households experiencing low food security after the rollout of the program. This suggests that mobile money initiatives can improve the livelihoods of the poor, especially in remote areas where access to traditional banking services is limited. However, the study did not find any significant impact on savings or overall poverty outcomes. Chinoda and Kwenda (2019) examined data from 49 countries covering the period 2004 to 2016 and identified a unidirectional causal relationship between financial inclusion and mobile phones. Similarly, Mushtaq and Bruneau (2019) use a panel dataset of 61 low- and middle-income countries, and conclude that mobile phone penetration can indeed drive financial inclusion.

Lyons et al. (2020) conducted a study examining the correlation between poverty and both financial inclusion and digital inclusion across seven developing countries in South Asia and Sub-Saharan Africa. Their research findings indicate that enhancements in various indicators of financial and digital inclusion are linked with substantial reductions in poverty, including alleviation of food insecurity. Ownership and use of traditional bank accounts emerged as the most influential factor in poverty reduction, alongside access to and use of non-bank financial institutions and mobile money accounts. However, the study revealed some spatial heterogeneity, especially between rural and urban populations.

In another study, David et al. (2020) investigated the impact of financial inclusion on poverty alleviation among smallholder farmers in Zimbabwe. They argue that financial inclusion can contribute to the achievement of several sustainable development goals, including poverty alleviation, hunger alleviation, and promoting sustainable agriculture. Using simple regression methods, the study found a strong correlation between financial inclusion and poverty reduction among smallholder farmers. The authors emphasize the importance of government policies that encourage farmers' participation in the financial sector through savings, loans, and insurance services. They also highlight the need for financial education programs targeted at farmers to improve their understanding and utilization of financial services.

Kelikume (2021) used the systematic generalized moment method to investigate the relationship between Internet usage and the impact of financial inclusion on poverty alleviation efficiency. Their findings show that as Internet usage increases, financial inclusion significantly improves poverty reduction efficiency. Bayar et al. (2021) explored the relationship between the level of Internet usage and access to financial institutions and financial markets in 11 post-communist countries in the European Union from 1996 to 2017. Their study revealed both positive and negative relationships, suggesting that increased Internet usage may increase access to financial institutions in certain countries such as Bulgaria, Croatia, Czech Republic, Hungary, and Poland, while increasing financial market access in Latvia and Slovenia.

Li et al. (2022) examined the impact of digital financial inclusion on farmers' income growth using sample data from 30 provinces in mainland China from 2011 to 2019. Using a spatial Durbin model and a panel threshold model, they found that digital financial inclusion significantly boosts farmers' income growth, with positive spatial spillover effects. Additionally, they identify a double threshold phenomenon, whereby the growth of farmers' income escalates in correlation with the progression of digital

financial inclusion. Moreover, they note that the influence of this dynamic varies according to the level of economic development within provincial areas.

Giulia et al. (2022) estimate the impact of financial inclusion on the probability of transition in and out of poverty using longitudinal data from Italian households between 2002 and 2016. Their findings show that financial inclusion effectively reduces the probability of falling into poverty and helps the poor to move out of poverty. Access to savings accounts was found to reduce the risk of falling below the poverty line and increase the chances of moving out of poverty. Sakyi-Nyarko et al. (2022) conducted a study examining the gender-specific effects of financial inclusion on household financial resilience, drawing from extensive survey data collected from households in Ghana. Their findings indicate that financial inclusion plays a substantial role in enhancing household financial resilience, particularly through increased savings and ownership of formal accounts. Additionally, the study highlights the significant impact of mobile money remittances on financial resilience, particularly in rural regions and among women.

3. METHODS

This study uses survey methodology to investigate the relationship between digital financial inclusion and poverty alleviation in Rivers State, Nigeria. According to Kothari (2004), survey research designs are excellent in exploring cause-and-effect relationships between variables. The research approach chosen is determined by the objectives of the study, which serve as guiding principles in selecting the appropriate methodology.

2.1 Research Design (Heading 2 – bold, title case, 12pt, left aligned)

This study focused on a population of individuals living in Rivers State, Nigeria, at the time of the study. Using a stratified sampling technique, both site and respondent selection was conducted. This technique involved a stepwise selection process. Initially, ten local government areas were randomly drawn from a total of 23 areas in Rivers State, Nigeria. The selected local government areas included Ahoada, Andoni, Eleme, Port Harcourt, Okrika, Obio/Akpor, Ikwerre, Etche, Emohua and Oyigbo. From these selected communities, 223 respondents with an understanding of digital financial inclusion were purposively selected and included in the study. This purposive sampling method was inclusive, to ensure representation of diverse perspectives. In addition, a preliminary study was conducted to identify respondents and their locations in the selected regions.

2.2 Instrument

In this study, a structured questionnaire was utilized as the primary tool for data collection. The questionnaire was meticulously designed to encompass both open-ended inquiries and 5-point Likert scale ratings. Great care was taken during the construction phase to ensure that all relevant aspects of the study variables were adequately addressed. The survey included sections designed to collect data on the socio-economic profiles of the participants, covering aspects such as age, gender, marital status, and educational attainment. This information was crucial in assessing the competencies of the respondents. Additionally, the questionnaire included queries related to the dimensions of digital financial inclusion and consumption expenditure, which were devised to address the research questions and hypotheses of the study. These questions were structured using a five-point Likert scale for both measurement and hypothesis testing.

Importantly, all items within the questionnaire were operationalized based on existing literature in the field.

Researchers such as Wrenn et al. (2002) emphasize the importance of carefully measuring and designing questionnaires. It is vital that researchers take care in the creation, writing, and reviewing of questionnaire items, ensuring that the content and layout are appropriate. In addition, pilot testing is essential to verify that the developed questionnaire accurately captures the desired measurements, the format is appropriate, and participants can easily understand the topics and questions (Wrenn et al., 2002). Saunders et al. (2012) state that a well-designed questionnaire not only increases the response rate but also enhances the credibility and reliability of the data collected. Given the use of pre-existing scales in this study, efforts have been focused on making significant adjustments to accommodate the context and language in which the researchers operate. All factors were constructed using a 1-5 Likert scale format, with responses ranging from 1 (strongly disagree) to 5 (strongly agree). This rating scale is very important as it facilitates the aggregation of positive and negative opinions for statistical analysis.

The data for this study were primarily sourced from primary sources, mainly through surveys. The survey process involved the administration of questionnaires to gather information from respondents residing in Rivers State, Nigeria. These questionnaires served as the main instrument for data collection in the study. To ensure the validity of the research instrument, the researcher employed content validity, which involved expert reviews by individuals knowledgeable in the field, including the research supervisor and a statistician. This process aimed to confirm that the set questions were adequate for collecting the intended responses. Additionally, the scales utilized in this study were adapted from established measures that had been previously applied and validated in other studies.

In addressing reliability issues, this study conducted a retest of the research instruments, followed by an internal reliability assessment using Cronbach's alpha coefficient. This involved internal consistency analysis to evaluate reliability. The collected pre-test data were then entered into SPSS version 25.0 for analysis. A Cronbach's alpha value exceeding 0.7 is considered satisfactory and indicates reliability, in accordance with the guidelines of Gliem and Gliem (2003). This study found that all constructs had high reliability based on the results from the pilot study. The corrected item-total correlations were in the range of 0.33 to 0.91, indicating no redundancy among the items and therefore no need for deletion. The pilot study proved instrumental in identifying and addressing potential issues prior to the final survey, with no significant issues identified in this study.

Table 1. Centre the Caption above the Table

S/N	Name	*N*	Cronbach's Alpha
1	Mobile money account	5	.792
2	POS Machine	5	.804
3	Mobile Payment	4	.868
4	Consumption Expenditure	6	.956

2.2 Data Analysis

Data collected from the field survey was initially analyzed using simple descriptive statistics, including tables, frequencies, graphs and percentages. These methods were used to provide a clear overview and summary of the information collected.

Subsequently, all hypotheses formulated in this study were tested using simple regression models, which were conducted using SPSS version 25.0 software. Regression analysis makes it possible to examine the relationship between variables and test hypothesized associations. This analytical approach facilitates data interpretation and provides insight into the factors under study.

The relationship between digital financial inclusion and poverty alleviation in Nigeria can be modeled in the functional equation below

$$\text{Poverty} = f(\text{Digital Financial Inclusion}) \quad (1)$$

$$CEX_t = f(NMA_t, POS_t, MOP) \quad (2)$$

Equation 3 presents the estimable version of equation (2)

$$CEX_t = \alpha_0 + \beta_1 NMA_t + \beta_2 POS_t + \beta_3 MOP_t + \mu \quad (3)$$

$$= \alpha_0 + \sum_{i=0}^{n} \beta_{1,} + E_{it;}\ \beta_i \geq 0 \quad (4)$$

3. RESULTS

3.1 Descriptive Analysis

The presentation and analyses of data were based on the 223 copies of the questionnaire administered to the respondents. In Table 2, 136 studied respondents in Rivers State of Nigeria (61.0%) were between 20 and 35 years of age, 62 of them (27.8%) were between 36 and 45 years of age, 24 of them (10.8%) were between 46 and 55 years of age, while only one of them (0.8%) was between 56 and 65 years of age. Table 3 revealed the gender of the studied respondents in Rivers State of Nigeria. From the table, 121 studied respondents in Rivers State of Nigeria (54.3) were males, while the remaining 102 respondents representing 45.7% were female respondents in Rivers State of Nigeria. In Table 5, 136 studied respondents in Rivers State of Nigeria (61.0) were single, while the remaining 87 respondents in Rivers State of Nigeria (39.0%) were married.

Table 2. Frequency distribution showing the age bracket of the studied respondents.

Age of respondents				
	Frequency	%	Valid (%)	Cumulative (%)
20-35	136	61.0	61.0	61.0
36-45	62	27.8	27.8	88.8
46-55	24	10.8	10.8	99.6
56-65	1	0.4	0.4	100.0
Total	223	100.0	100.0	

Table 3. Frequency distribution showing the gender of respondents.

Gender of respondents				
	Frequency	%	Valid (%)	Cumulative (%)
Male	121	54.3	54.3	54.3
Female	102	45.7	45.7	100.0
Total	223	100.0	100.0	

Table 4. Frequency distribution showing the marital status.

Marital status of respondents				
	Frequency	%	Valid (%)	Cumulative (%)
Single	136	61.0	61.0	61.0
Married	87	39.0	39.0	100.0
Total	223	100.0	100.0	

From Table 4.4, 1 of the studied respondents in Rivers State of Nigeria (0.4%) had primary education, 16 of them (7.2%) had secondary education, 9 of them (4.0%) had OND/NCE, 106 of them (47.5%) had HND/B.Sc, while the remaining 91 (40.8%) had M.Sc/Ph.D. This implies that majority of the studied respondents in Rivers State of Nigeria had formal education and were qualified to participate in the study.

Table 5. Frequency distribution showing the studied respondents

Education Background				
	Frequency	%	Valid (%)	Cumulative (%)
Primary	1	.4	.4	.4
Secondary	16	7.2	7.2	7.6
OND/NCE	9	4.0	4.0	11.7
HND/B.Sc	106	47.5	47.5	59.2
M.Sc/Ph.D	91	40.8	40.8	100.0
Total	223	100.0	100.0	

Table 6. Frequency distribution on mobile money account

Descriptive Statistics					
	Item	N	Mean	Std. D	Remark
MMA1	You have a mobile money account	223	4.00	1.388	Accepted
MMA2	It is easy to operate a mobile money account	223	4.57	1.015	Accepted
MMA3	You possess a mobile phone that facilitates the use of a mobile money account	223	4.40	.967	Accepted
MMA4	You find it cheap to operate a mobile money account than physical cash transactions	223	4.30	1.029	Accepted
MMA5	Customers grow more familiar with the different digital payment systems available and encourage more transactions	223	4.27	.955	Accepted

Table 6 shows the mean scores and standard deviation of the responses on mobile money account as it relates to digital financial inclusion in Rivers State of Nigeria. The criterion for mean score acceptance is 3.0. The table above showed that the statement "You have a mobile money account" was at the mean score of 4.00, and "It is easy to operate a mobile money account" was at the mean score of 4.57. Also, "You possess a mobile phone that facilitates the use of a mobile money account" was at the mean score

of 4.40, and "You find it cheap to operate a mobile money account than physical cash transactions" was at the mean score of 4.30. Furthermore, the statement item "customerss grow more familiar with the different digital payment systems available and encourage more transactions" was at the mean score of 4.27. Based on the criteria for mean score acceptance, the above statement items were positively correlated to mobile money account as it relates to digital financial inclusion in Rivers State of Nigeria.

Table 7. Frequency distribution showing responses on the use of POS machines

Descriptive Statistics					
	Items	N	Mean	Std. D	Remark
POS1	You find it easy to make transactions using a point of sales (POS) machine	223	4.28	1.093	Accepted
POS2	POS machines are readily available for use	223	4.20	1.072	Accepted
POS3	You find it easy to send and receive money via a POS machine	223	4.14	1.085	Accepted
POS4	The use of POS machines for financial transactions has increased over the last decade	223	4.74	.652	Accepted
POS5	POS machines have become a favourite means of making financial transactions	223	4.40	.914	Accepted

Table 7 shows the mean scores and standard deviation of the responses on the use of POS machines by the studied respondents in Rivers State of Nigeria. The criterion for mean score acceptance was 3.0. The table above showed that "You find it easy to make transactions through the use of a point of sales (POS) machine" was at the mean score of 4.28, "POS machines are readily available for use" was at the mean score of 4.20. Also, "You find it easy to send and receive money via a POS machine" was at the mean score of 4.14, and "The use of POS machines for financial transactions has increased over the last decade" was at the mean score of 4.74. Furthermore, the statement item "POS machines have become a favourite means of making financial transactions" was at the mean score of 4.40. Based on the criteria for mean score acceptance, the above statement items were positively correlated to the use of POS machines by the studied respondents in Rivers State of Nigeria.

Table 8. Frequency distribution showing responses on mobile payment

Descriptive Statistics					
	Item	N	Mean	Std. D	Remark
MP1	You find it more convenient using online payments platforms	223	4.37	.939	Accepted
MP2	You find it easy to make payments for services through digital payment platforms	223	4.40	.900	Accepted
MP3	You find it easy to transfer money via your mobile phone	223	4.70	.712	Accepted

MP4	There is reduced risks of loss and other financial crimes through digital-based transactions	223	3.69	1.238	Accepted

Table 8 shows the mean scores and standard deviation of the responses on mobile payment by the studied respondents in Rivers State of Nigeria. The criterion for mean score acceptance was 3.0. The table above showed that "You find it more convenient using online payments platforms" was at the mean score of 4.37, "You find it easy to make payments for services through digital payment platforms" was at the mean score of 4.40. Also, "You find it easy to transfer money via your mobile phone" was at the mean score of 4.70, and "There is reduced risks of loss and other financial crimes through digital-based transactions" was at the mean score of 3.69. Based on the criteria for mean score acceptance, the above statement items were positively correlated to mobile payment by the studied respondents in Rivers State of Nigeria.

Table 9. Frequency distribution showing responses on consumption expenditure

Descriptive Statistics					
	Item	N	Mean	Std. D	Remark
CE1	Use of digital money platforms increases your household expenditure	223	3.51	1.368	Accepted
CE2	Digital financial platforms have reduced your household expenditure	223	2.74	1.386	*Rejected*
CE3	Financial access has increased profitability for your business	223	4.00	1.051	Accepted
CE4	Digital financial services have a positive effect on the standard of living of your family	223	4.11	.994	Accepted
CE5	Most of your household expenditures are made through digital financial platforms	223	3.97	1.137	Accepted
CE6	You have access to many sources of finance through numerous digital platforms	223	4.01	1.084	Accepted

Table 9 shows the mean scores and standard deviations of the responses on consumption expenditure by the studied respondents in Rivers State of Nigeria. The criterion for mean score acceptance was 3.0. The table above showed that the statement item "Use of digital money platforms increases your household expenditure" was at the mean score of 3.51, "Financial access has increased profitability for your business" was at the mean score of 4.00, and "Digital financial services have a positive effect on the standard of living of your family" was at the mean score of 4.11. Furthermore, the statement item that "Most of your household expenditures are made through digital financial platforms" was at the mean score of 3.97, while "You have access to many sources of finance through numerous digital platforms" was at the mean score of 4.01.

Based on the criteria for mean score acceptance, majority of the above statement items were positively correlated to consumption expenditure by the studied respondents in Rivers State of Nigeria.

3.2 Hypothesis test

The regression results in Table 10 shows that mobile money account was positive and a significant factor that affects consumption expenditure in Rivers State of Nigeria. Mobile money account was significant at 1% probability level and positively related to consumption expenditure in Rivers State of Nigeria. This implies consumption expenditure in Rivers State of Nigeria is affected by mobile money account. The increase in mobile money accounts is associated with a rise in consumption expenditure in Rivers State, Nigeria. The F-statistic of 45.157 obtained from the regression analysis indicates that the model specification is correct at the 1% significance level. The estimated regression equation suggests that consumption expenditure in Rivers State is directly influenced by the number of mobile money accounts. The coefficient of determination (r2) value of 0.454 indicates that approximately 45% of the variability in consumption expenditure can be explained by the number of mobile money accounts. This finding holds with 99% confidence. Consequently, the null hypothesis, which posits no significant effect of mobile money account numbers on consumption expenditure, is rejected in favor of the alternative hypothesis. Thus, it can be inferred that there is a statistically significant and positive impact of mobile money account numbers on consumption expenditure**.**

Table 10. Simple regression on the effect of number of mobile money account on consumption expenditure

Variable		Coefficient	Std. Error	t-value	p-value
Constant)		2.788	0.341	8.173	0.000
Mobile Money Account		0.276	0.078	3.548	0.000
R		0.532			
R^2		0.454			
Adjusted R^2		0.405			
F-Statistic	45.157				

Table 11. Simple regression on the effect of number of sales machines on consumption expenditure

Variable		Coefficient	Std. Error	t-value	p-value
Constant)		2.310	0.339	6.819	0.000
Mobile Money Account		0.387	0.075	5.133	0.000
R		0.426			
R^2		0.407			
Adjusted R^2		0.402			
F-Statistic	35.825				

The regression results in Table 4.11 shows that the number of POS machines was a positive and significant factor affecting consumption expenditure in Rivers State of Nigeria. POS machine was significant at 1% probability level and positively related to consumption expenditure in Rivers State of Nigeria. This indicates that consumption

expenditure of the studied respondents in Rivers State of Nigeria is greatly affected by POS machines. Thus, as the number of POS machines increases, consumption expenditure in Rivers State of Nigeria also increases and vice versa. The F-statistic in the regression above was 35.825 and significant at the 1% probability level indicating that the model specification was correct. The estimated regression equation shows that consumption expenditure in Rivers State of Nigeria is a linear function of number of POS machines in the state. The r^2 value of 0.407 indicates that 40% of the variation in consumption expenditure in Rivers State of Nigeria was explained by number of POS machines. This assertion is at the 99% confidence level. With this result, the null hypothesis which states that there is no significant effect of the number of POS machines on consumption expenditure in Rivers State, Nigeria is rejected and the alternative hypothesis accepted. It can therefore be concluded that there is significant effect of the number of POS machines on consumption expenditure in Rivers State, Nigeria.

Table 11. Simple regression on the effect of number of mobile payments made on consumption expenditure

Variable		Coefficient	Std. Error	t-value	p-value
Constant)		3.320	0.224	14.840	0.000
Mobile Money Account		0.188	0.058	3.267	0.001
R		0.495			
R^2		0.446			
Adjusted R^2		0.374			
F-Statistic	28.440				

The regression result in Table 11 shows that number of mobile payments was positively and significantly related to consumption expenditure of the studied respondents in Rivers State of Nigeria. The number of mobile payments was significant at 5% probability level and positively affects consumption expenditure of the studied respondents in Rivers State of Nigeria. This implies that consumption expenditure of the studied respondents in Rivers State of Nigeria is greatly dependent on the number of mobile payments made by the studied respondents. As the number of mobile payments made increases, consumption expenditure of the studied respondents in Rivers State of Nigeria also increases and vice versa. The F-statistic in the regression above was 28.440 and significant at the 5% probability level indicating that the model specification was correct. The estimated regression equation shows that consumption expenditure of the studied respondents in Rivers State of Nigeria is a linear function of number of mobile payments. The r^2 value of 0.446 indicates that 45% of the variation observed in consumption expenditure of the studied respondents in Rivers State of Nigeria was caused by number of mobile payments. This assertion is at the 95% confidence level. With this result, the null hypothesis which states that there is no significant effect of the number of mobile payments on consumption expenditure in Rivers State, Nigeria is rejected and the alternative hypothesis accepted. It can therefore be concluded that there is significant and positive effect of the number of mobile payments on consumption expenditure in Rivers State, Nigeria.

4. DISCUSSION

This study examined the effect of digital financial inclusion on poverty alleviation in Rivers State of Nigeria. The first finding revealed that mobile money account positively affects consumption expenditure in Rivers State of Nigeria. This implies consumption expenditure in Rivers State of Nigeria is affected by mobile money account. The result indicates that mobile money account increases household consumption expenditure. This supports the findings of Perera and Lee (2013), Iniquez-Montiel (2014), and Dollar and Kraay (2002), who all found a positive relationship between money account and poverty reduction. This result further agrees with Demir et al., (2020) and Mushtaq and Bruneau (2019) by suggesting that mobile money account is important to decrease poverty and inequality, as well as to enhance the effects of financial inclusion.

The The second finding of this study shows that the presence of POS machines has a positive and significant impact on consumption expenditure in Rivers State, Nigeria. This suggests that the consumption pattern of respondents in Rivers State is strongly influenced by the availability and use of POS machines. This finding is in line with previous studies conducted by Burgess and Pande (2005), Oluyombo (2013), Ene and Inemesit (2015), and Fadun (2014), who all concluded that POS machines have a positive effect on consumption expenditure. However, this contradicts the findings of Park and Mercado (2015). In addition, this empirical evidence is consistent with studies conducted by Onaolapo (2015), Musyaffi et al., (2022) and Bruce et al. (2011), who found that an increase in the number of financial facilities such as POS machines in rural areas led to higher consumption levels and significant poverty reduction over the observed period. Choudhury (2014) also found that financial inclusion increases access to financial services, thereby improving individuals' ability to respond to risk and reducing vulnerability to poverty.

Finally, regression result in the study revealed that number of mobile payments was positively and significantly related to consumption expenditure of the studied respondents in Rivers State of Nigeria. This implies that consumption expenditure of the studied respondents in Rivers State of Nigeria is greatly dependent on the number of mobile payments made by the studied respondents. The result aligns with previous literature (Demir et al., 2020; Fouejieu et al., 2020; Koomson et al., 2020; N'Dri & Kakinaka, 2020; Omar & Inaba, 2020) as they found significant and positive effects of mobile payments on household consumption. For instance, a person who has access to financial services that facilitate the number of mobile payments will experience poverty reduction (Fouejieu et al., 2020). In short, financial inclusion has a positive impact on reducing the poverty index, improving living standards, and boosting economic activity, which in turn drives economic growth.

5. CONCLUSION

Ensuring access to financial services, their management, and the mobilization of financial resources are critical to poverty alleviation in Nigeria, particularly in Rivers State. This study has empirically investigated the effect of digital financial inclusion on poverty alleviation in Rivers State, Nigeria. The findings of this study unequivocally show that financial inclusion significantly affects poverty levels and improves living standards. Specifically, the results show that mobile money accounts have a positive and significant impact on consumption expenditure in Rivers State. Also, the number of POS machines was a positive and significant factor affecting consumption expenditure in Rivers State of Nigeria, implying that consumption expenditure of the studied respondents in Rivers State of Nigeria is greatly affected by POS machines. Additionally,

the number of mobile payments positively and significantly affects consumption expenditure of the studied respondents in Rivers State of Nigeria. In conclusion, these findings underscore the importance of digital financial inclusion as a critical tool in mitigating poverty, especially in developing countries like Nigeria. Based on the insights gained from this study, the following recommendations are proposed:

1. The Central Bank of Nigeria should devise effective monetary policies aimed at promoting financial inclusion and reducing poverty. In addition, efforts should be made to expand the availability of digital financial solutions in urban and rural areas. This will facilitate easier access to financial services at affordable prices, thereby aiding poverty alleviation.
2. To further combat poverty, it is imperative to implement a more targeted digital finance strategy that aims to educate low-income people, especially those living in rural areas, on the utilization of financial services and products. This will help address the issue of financial exclusion and empower individuals to make informed financial decisions.
3. Steps should be taken to improve accessibility to financial infrastructure such as POS terminals, ATMs, and other financial products in rural communities. This should be coupled with comprehensive education and advocacy initiatives to familiarize people with the functions and benefits of these financial tools. In addition, efforts should be made to ensure that non-smartphone users can also utilize digital financial products and services.

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