

Awareness and Use of Digital Payment Channels by Livestock Farmers in Oron Agricultural Zone, Akwa Ibom State, Nigeria

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Abstract

This study examined the awareness and extent of use of digital payment channels among livestock farmers in the Oron Agricultural Zone, Akwa Ibom State, Nigeria. Data were collected from 140 randomly selected livestock farmers using a multi-stage sampling procedure and analyzed using descriptive statistics, the Likert scale rating technique and multiple linear regression analysis. Findings showed that most livestock farmers (52.1%) were male and married (81.4%), with low access to credit (5.7%) and extension services (25%). The mean household size, age, farming experience, years of education and number of livestock kept were 6 persons, 40 years, 9 years, 8 years and 201 herds, respectively. The results further revealed awareness rates of 100%, 90.7%, 82.1% and 60% for point of sale, mobile banking, automated teller machines and internet banking, respectively, with a mean rate and extent of use of 58.6% and 2.67. The most frequently used digital payment channels were point of sale, followed by automated teller machines and mobile banking. Additionally, the use of digital payment was significantly influenced by group membership, information intensity, educational attainment, access to digital payment facilities, financial literacy and the age of the farmer. Constraints to digital payment use included poor network connectivity, low information technology/computer literacy, government policies, security concerns, technological setbacks and poor infrastructure to support e-banking. Therefore, adequate security measures should be implemented to curb incidences of online banking fraud, and a regulatory framework should be established to compel network providers, financial institutions and payment agents to upgrade their facilities.

Categories: Banking and financial services, Social systems (economies, governments, industry), Fintech and Cryptocurrencies

Keywords: digital payment, awareness, payment channels, livestock farmers, akwa ibom state

JEL Classifications: Q14, Q16, Q10, Q11, G21, D14, Q17

Introduction

Since its inception, the Central Bank of Nigeria has been designing policies aimed at promoting economic stability. One such policy is the introduction of a cashless policy. As part of its economic reforms, the Central Bank of Nigeria introduced the cashless policy in June 1, 2012, with a view to discouraging huge bulk transactions in the economy. Cashless economies entail a situation where bulks of financial transactions are settled digitally without cash. To achieve this objective, the Central Bank of Nigeria announced a cumulative cash withdrawal and deposit limits of ₦500,000 and ₦3,000,000 for individuals and corporate organizations with a penalty fee of 3% and 5% for withdrawal for every ₦1,000.00 in excess of approved limits. According to (Agu and Agu, 2020), the apex bank listed crime rate reduction, minimizing risk associated with carrying large volume of cash, slicing down of bank operating cost, improvement in monetary policy management such as inflation as well as the overall growth of the economy as part of benefits associated with the adoption of cashless policy.

However, one major attribute of a cashless policy is digital payment. A study by (Sardiana and Singhanian, 2018) defined digital payment as payments made with digital means such as mobile payment, digital currency and electronic payments. A study by (Omokugbo and Festus, 2020) grouped digital payment systems into four categories, namely, online electronic cash system, electronic cheque system, smart and online credit card payment system. According to them, each of these payment systems possesses its unique requirements such as security acceptability, convenience, cost, anonymity, control and traceability. Other advantages that these payment systems possess over our previous systems such as trade by barter, paper money, coin, etc., are compatibility, convenience, mobility, low financial risk, efficiency, privacy, etc. Research by (Sutresna et al., 2023) reported that there is a global increase in acceptance of technological advancement and cashless policy. Similarly, (Sutresna et al., 2023) and (Alam et al., 2021) attributed the global increase in the use of digital payments to the evolution of COVID-19 and its associated social distancing measures. As reported by (Sutresna et al., 2023), global transaction in digital payment was about USD 5.44 trillion.

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Previous research has listed factors that determine people's adoption of digital payment as perceived usefulness or performance expectancy (Alkhowaiter, 2020) (Al-Okaily et al., 2020) (Aseng, 2020) (Alam et al., 2021), effort expectancy or perceived ease of use, social influence and facilitating condition (Aseng, 2020) (Sutresna et al., 2023). Other factors that constrained the use of digital payment are government policy, e.g., taxes on digital payment, high agency fee and structural rigidity (Seethamraju and Diatha, 2018) (Simatele and Mbedz, 2021) as well as risk and cost associated with using it (Ligon et al., 2019) (Lutfi et al., 2021) (Seethamraju and Diatha, 2018).

Livestock farmers are among those set of farmers that require the use of digital payment for efficient marketing of their produce. This is necessary because bulks of their products are sold at farm gates. Also, farmers need to cope with unforeseen occurrences such as the last outbreak of the COVID-19 pandemic where there was movement restriction. It is also desired because most bank branches are not located in rural areas where majority of farmers reside and carry out their farming activities. Therefore, given the numerous benefits associated with digital payment, farmers in Akwa Ibom State need to be encouraged through adequate sensitization on the need to adopt it. In achieving this, certain issues need to be addressed, such as creating enabling infrastructure, carrying out adequate sensitization, considering security conditions, and resolving unstable networks that often lead to multiple debiting of individuals.

Problem statement

Before the introduction of cashless policy in Nigeria, the banking sector was characterized by long queues, delay in settlement of transactions, administrative bottleneck and high cost of operations (Agu and Agu, 2020) (Omokugbo and Festus, 2020). It was a common practice to find long queues of customers in banking halls waiting to carry out transactions. Incidence of delayed clearing of cheques and other forms of delayed transactions were paramount. There were instances where customers carry huge volume of cash about putting them at risk of being robbed.

As part of financial policy reforms, the Central Bank of Nigeria declared a cashless policy on June 1, 2012. According to (Agu and Agu, 2020), the emergence of this policy has minimized crime rate, reduced risk associated with carrying bulk cash, reduced banking cost and improved monetary policy. Studies by (Kumari and Klenna, 2017) and (Najib and Fahma, 2020) further reported that the policy has improved operational efficiency of banks, hiked their cost of operation and increased profit. In addition to enhancing financial inclusion (Mohammad and Kassim, 2017), it reduces queuing time at banks and the risk of carrying cash (Kadir et al., 2015).

Despite the global importance of the policy, a study by (Ligon et al., 2019) reported that the adoption of this policy in some countries including Nigeria remains low in spite of its promotion by government. Similarly, (Taiwo et al., 2016) reported that the adoption of this policy in Nigeria is low as some Nigerians are still skeptical about it, especially those that have previously lost money through it. A study by (Sutresna, et al., 2023) further reported that inconsistencies in most of the automated teller machine (ATM) terminals across the country cast some doubts in the minds of Nigerians on the reliability and safety of these channels. This is further worsened by the unstable network services, which usually result in multiple debits and the fact that most rural bank branches do not have ATMs. Consequentially, the use of cash for settlement of transaction is still very high in Nigeria.

In the face of these challenges, studies by (Agu and Agu, 2020) and (Omokugbo and Festus, 2020) reported that many Nigerians, especially those in urban areas, have embraced this policy. However, the situation in Akwa Ibom State remains uncertain. Given the high involvement of rural households in agriculture, the acceptance of digital payments by farmers is imperative due to its potential to improve financial literacy and reduce financial exclusion. Digital payments can also facilitate prompt settlement of transactions and minimize the risks associated with carrying large amounts of cash. Therefore, there is an urgent need to pursue policies that promote the adoption of this system among livestock farmers in Akwa Ibom State. This requires an in-depth assessment of their financial knowledge and willingness to accept digital payments. Accordingly, this study will examine the use of digital payments by livestock farmers in Akwa Ibom State, Nigeria.

Research Method

The study was conducted in the Oron Agricultural Zone of Akwa Ibom State, Nigeria. Oron is located in the southeastern part of Nigeria's tropical rainforest zone. The zone comprises five Local Government Areas: Oron, Mbo, Urue-Offong/Oruko and Okobo. Akwa Ibom State lies between latitudes 4°-5° N and longitudes 7°-8° E. Oron Agricultural Zone is one of six agricultural zones in the state and consists of five blocks: Oron, Okobo, Mbo, Udung Uko and Urue-Offong/Oruko. Fishing and subsistence agriculture are the main occupations of the people. Crops grown in the area include cassava, pineapple, plantain, banana, maize, yam, oil palm, cocoyam and various vegetables.

Data source and sampling procedure

Primary data for the study were collected using a structured questionnaire and oral interviews. A three-stage sampling procedure was used to randomly select respondents. The first stage involved the random selection of four extension blocks from the existing five that make up the Oron Agricultural Zone. In the second stage, five extension cells were randomly selected from each of the chosen blocks, making a total of 20 cells. In the third stage, seven livestock farmers were randomly selected from each selected cell, resulting in a total of 140 livestock farmers for the study. The selection of farmers was done at intervals using the list of livestock farmers registered with the Agricultural Development Program (ADP) office in the state.

Since the population of livestock farmers in the study area was known, a formula developed by (Yamane, 1967) for determining the sample size was used. The formula is as follows:

$$n = N/1 + N(e)^2 \quad (1)$$

where n = sample size, N = total number of registered poultry farmers, e = allowable level of error and 1 = constant.

Accordingly, the sample size is computed as follows:

$$n = 218/1 + 218(0.05)^2 = 141 \quad (2)$$

Data from the ADP office show that the zone has a total of 218 registered livestock farmers. A breakdown of this shows that Oron has 70, Okobo 65, Mbo 40 and Urue-Offong/Oruko 43. Accordingly, 45 farmers were purposively selected from Oron, 42 from Okobo, 26 from Mbo and 28 from Urue-Offong/Oruko blocks, making a total of 141 livestock farmers who were administered the questionnaire. However, only 140 questionnaires were retrieved and duly completed. This reduced the total number of livestock farmers used for the research to 140 (Table 1).

Blocks	Number of Cells Chosen	Number of Registered Farmers	Number of Farmers Selected
Oron	5	70	45
Okobo	5	65	42
Mbo	5	40	26
Urue-Offong/Oruko	5	43	28
Total	20	218	141

TABLE 1: Sampling Distribution of Respondents

Source: Field survey, 2024

Analytical technique

In addition to descriptive statistics, the following analytical tools were used:

Likert scale rating technique: A 4-point Likert scale rating technique was used to analyze the level of use of digital payment channels and the constraints to the use of digital payment.

(i) Use of digital payment: The weights were categorized as “Most Highly Utilized = 4”, “Highly Utilized = 3”, “Utilized = 2” and “Not Highly Utilized = 1”. The benchmark was determined by computing the mean of the weight as follows:

$$4 + 3 + 2 + 1/4 = 10/4 = 2.5 \quad (3)$$

(ii) Constraints to the use digital payment: The weights for constraints to the use of digital payment were “very serious = 4”, “Serious = 3”, “Not too Serious = 2” and “Not Serious = 1”. The benchmark was computed as:

$$4 + 3 + 2 + 1 = 10/4 = 2.5 \quad (4)$$

Accordingly, any payment channel or constraint with a mean score of 2.50 and above was adjudged to be

“Utilized” or “Sever” while those with mean scores less than 2.5 were adjudged to be “Not utilized” or “Not severe”, respectively.

Multiple regression analysis: This was used to estimate the determinants of use of digital payment by livestock farmers. The explicit form of the model is stated as follows:

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}X_{10} + b_{11}X_{11} + e \quad (5)$$

where Y = digital payment (measured as the index of utilization computed by dividing the number of digital channels used by an individual farmer by the total number of payment channels utilized in the study area).

b_0 = the intercept

b_1 - b_{11} = the estimated coefficients

e = statistic error term

X_1 = Group membership (number of social groups that a farmer belongs to)

X_2 = Flock size (number of livestock kept)

X_3 = Information intensity (number of source that a poultry farm gets livestock production and marketing information)

X_4 = Awareness (number of digital payment channels that an individual farmer is familiar with its use)

X_5 = Educational level of a livestock farmer (years)

X_6 = Cost of implementing digital payment (charges for using a particular digital channel)

X_7 = Household size (number of persons)

X_8 = Access to digital payment facility (distance between the farmers' residential home and a nearby financial institution or transaction point)

X_9 = Reaming experience (years)

X_{10} = Financial literacy (1 if the farmer owns a bank account or 0 if otherwise)

X_{11} = Age of a farmer (years)

Results And Discussion

Socioeconomic characteristics of livestock farmers

Table 2 shows that most livestock farmers (54.2%) had a household size of 5-10 persons, with a mean of six people. This suggests a higher likelihood of accessing family labor in the study area. (Udoka et al., 2019) reported mean household sizes of five and six persons among livestock farmers in the same area. The age range of livestock farmers was 26-72 years, with a mean of 40 years, indicating that farmers are still active and agile enough to handle the stresses associated with livestock production. This finding aligns with (Bassey et al., 2022), who reported mean ages of 38 and 39 years in the study area. Additionally, most livestock farmers (81.4%) were married, supporting the findings of (Bassey et al., 2021), who reported that 85% of livestock farmers in the study area were married. Quantitative variables in Table 2 (e.g., household size, age, farming experience, livestock numbers) are continuous and thus appropriately summarized using mean values. In contrast, categorical variables (e.g., marital status, credit access, cooperative membership) lack numeric meaning and are correctly presented using frequencies and percentages, aligning with standard socio-economic descriptive practices.

Livestock farmers were quite experienced, with a mean of 9 years' experience. The majority (36.4%) had 11-15 years' experience, 28.6% had 5-10 years, while 27.18% and 7.9% had above 15 years and less than 5 years' experience, respectively. (Bassey et al., 2022) had reported a mean of 11 years' experience among livestock farmers in the study area. Results for education show that 89.3% of livestock farmers were

educated, with a mean of 8 years of educational attainment; 50.7% attended secondary school, 35.7% primary school and 2.9% tertiary institutions. A study by (Bassey et al., 2022) had reported that majority (88.9%) and (52.1%) of livestock farmers in the study area were educated. Most livestock farmers (52.1%) were male, indicating that men dominated livestock production in the area. This trend was previously attested to among livestock farmers. Access to credit was poor as majority (94.3%) could not access credit. This finding is in line with those of (Ajah and Ukpog, 2023), who reported that most broiler farmers in the study area were unable to access credit.

The survey result also shows that membership of cooperative and other farmers' union was high (100%), indicating a higher human capital formation in the study area. This will promote information sharing among livestock farmers as well as access to basic production inputs. Result also shows that most (92.9%) livestock farmers were engaged in one form of off-farm income-generating activity or the other. This implied that majority of them were into part-time livestock production. The high (100%) participation in off-farm activities by livestock farmers was previously reported in the study area by (Bassey et al., 2022). The major type of livestock kept was poultry (85.7%), followed by pigs (12.9%) and sheep/cows (1.4%). This shows that poultry production dominated the study area. Considering the flock size, survey result reveals that a larger number of farmers (40.7%) had more than 500 livestock, with a mean of 201 livestock. Further breakdown shows that 28.1% kept between 201 and 400 livestock, 19.3% kept between 100 and 200 livestock while 11.4% kept less than 100 livestock. This indicated that livestock production in the study area was done on small-scale basis.

Variable	Frequency	Percentage	Mean
Household Size			
<5	57	40.7	
5-10	76	54.3	
11-15	5	3.6	
Above 15	2	1.4	6
Age			
Less than 30	8	5.7	
30-40	30	21.4	
41-50	48	34.3	
Above 50	54	38.6	40
Marital Status			
Married	114	81.4	
Single	18	12.9	
Separated/divorce	8	5.9	
Farming Experience			
Less than 5 years	10	7.9	
5-10 years	40	28.6	
11-15 years	51	36.4	
Above 15 years	38	27.1	9
Educational Level			
Not educated	15	10.7	
Primary school	50	35.7	
Secondary school	71	50.7	8
Access to Credit			
Yes	8	5.7	
No	132	94.3	

Extension Access			
Yes	35	25	
No	105	75	
Membership of Cooperative and Other Farmers' Union			
Yes	140	100	
No	0	9	
Participation in Off-Farm Work			
Yes	130	92.9	
No	10	7.1	
Type of Livestock Kept			
Poultry	120	85.7	
Pig	18	12.9	
Ship/cow/others	2	1.4	
Number of Livestock Kept			
Less than 100	16	11.4	
100-200	27	19.3	
201-400	40	28.6	
Above 400	57	40.7	201

TABLE 2: Socioeconomic Characteristics of Livestock Farmers

Awareness of livestock farmers on the existence of digital payment channels

Table 3 presents the level of awareness of livestock farmers regarding digital payment. Livestock farmers were asked to indicate their awareness of digital payment. A total of six digital options were identified in the literature and made available for them to indicate their awareness level using "Aware" and "Not Aware" as their options. The results presented in Table 3 show that livestock farmers were generally aware of digital payment channels, with a mean awareness level of 59.6%. All respondents (100%) were aware of point of sale (POS), 90.9% of mobile banking, 82.1% of ATMs, 60% of internet banking, while 22.9% and 2.1% were aware of telephone banking and electronic currencies such as cryptocurrencies, respectively. The high awareness among livestock farmers can be attributed to enabling laws in Nigeria that encourage citizens to adopt digital payments. Consequently, livestock farmers have aligned with this policy to familiarize themselves with these channels, presumably to identify and use the most reliable, convenient, safe and cost-effective options. However, (Akanni-John and Olukotun, 2019) argued that high level of awareness is not often an indication of adoption or utilization. Therefore, the extent of utilization of these digital payment channels is examined in the next section.

Digital Payment Channels	Aware	%	Not Aware	%
Mobile banking	127	90.7	13	9.3
Internet banking	84	60	56	40
Telephone banking	32	22.9	108	77
Point of sale	140	100	0	0
Automated teller machine	115	82.1	25	18
Electronic currencies, e.g. Cry NO	3	2.1	137	98
Mean awareness = 59.6				

TABLE 3: Awareness of Livestock Farmers on the Existence of Digital Payment Channels

Source: Computed by author using field survey data

Rate and extent of use of digital payment channels

Table 4, which shows the rate and extent of use of digital payment, reveals that a variety of digital payment channels were utilized by livestock farmers. The utilization rate was high for POS (100%), mobile banking (90.7%) and ATMs (85.7%), with a mean rate of utilization of 58.6%. This indicated that more of the digital payment channels were utilized.

The table further presents the Likert scale rating for extent of utilization of these channels among livestock farmers. Result yielded an average mean extent of utilization of 2.67 for all the digital payment channels. POS recorded a mean score of 3.85, ATM 3.50 and mobile banking 3.05, all of which were considered utilized based on our decision criterion of 2.50, as previously discussed. Internet banking (2.12) and telephone banking (2.00) had lower mean scores, indicating they were not highly utilized. The high use of ATM, mobile banking and POS can be attributed to their availability, as they are always readily available and can be easily be accessed. A study by (Iwedi, 2024) had previously reported the high use of ATM, POS, mobile banking and ATM.

Digital Platform	Frequency	%	Most Highly Utilized	Highly Utilized	Utilized	Not Highly Utilized	Mean	Remark
Mobile banking	127	90.7	50	45	20	12	3.05	HU
Internet banking	16	11.4	-	2	14	-	2.12	NHU
Telephone banking	8	5.7	-	-	8	0	2	NHU
Automated teller machine	140	100	80	50	10	0	3.5	HU
Point of scale	120	85.7	70	45	23	2	3.85	HU
Digital currency	0	0	0	0	0	0	0	NHU
Grand mean	58.6						2.67	

TABLE 4: Rate and Extent of Use of Digital Payment Channels by Livestock Farmers

Note: Mean score >2.50 was adjudged as utilized and vice versa. HU and NHU refer to Highly Utilized and Not Highly Utilized, respectively.

Source: Field survey data, 2024

Factors affecting the use of digital payment

Table 5 presents the results of the regression analysis carried out to estimate the determinants of digital payment use. The linear model was chosen as the lead equation among the three models estimated (linear, exponential and double log). The choice of the linear model was justified by its higher R^2 and F-statistic values, as well as the conformity of the estimates to theoretical expectations. The values in brackets are z-statistics. The coefficient of determination (R^2) had a value of 0.792 in the lead equation, implying that

about 79.2% of the variation in digital payment utilization was explained by the variables included in the model, while the remaining 20.8% was attributed to other factors not included. The F-statistic value of 1.968 was significant at the 10% level, indicating the overall significance of the estimated model.

The variable for group membership was positive and significant at 5% level, indicating that the use of digital payment will increase with an increase in group membership. Membership of group such as cooperative and fishing group is capable of provoking social influence. Through group interaction, group members who have adopted digital payment can also persuade and convince other members to do so. This finding is consistent with those of (Abdullah et al., 2020) who reported that the utilization of e-wallet in Malazia was positive and significantly influenced by social influence generated by group membership. Other studies by (Aseng, 2020) and (Rahman et al., 2022) also reported the positive impact of group influence on adoption of digital payment. However, a study by (Purwanto and Loisa, 2020) has also reported that social influence does not have significant effect on utilization of mobile banking.

The variable for information intensity, which was measured as the number of sources that a livestock farmer gets production or marketing information, was also positive and significantly increased the use of digital payment at 1% level. This is in line with theoretical literature because access to timely information is expected to create awareness and broaden livestock farmer's knowledge, which will invariably trigger their use of digital payment. Result is consistent with those of (Rahman et al., 2022). The estimated coefficient of education was significant and positively related to the use of digital payment of 5% level. This means that as livestock farmers acquire more education, their chances of utilizing digital payment will increase. This is justified because education will broaden farmers' knowledge and contact as well as access to timely information. Hence, lightly educated farmers are more likely expected to utilize more sophisticated and complex payment options than illiterate ones. This result supports those of (Paudel et al., 2020).

The variable for access to digital payment facility was also positive and significantly increased the utilization of digital payment at 10% level. This is because livestock farmers who reside nearer to a financial institution will most likely use digital platforms such as ATM and bank transfer than those residing several kilometers away from the bank. Also, farmers who own mobile phones or have all-round access to computers will most likely utilize mobile payment and internet than those without mobile phones and computers or laptops. This finding supports those of (Dimitorva et al., 2022), who reported that access to digital payment facilitates its use.

The coefficient for financial literacy was positive and significantly related with the use of digital payment at 5% level, indicating that the use of digital payment will increase with increasing financial literacy. This is expected because farmers who own a bank account are most likely to use more digital payment than those without bank accounts.

The age variable was significant and inversely related to the use of digital payment at 1% level. This indicates that digital payment usage decreases as farmers' age increases. This may be because older individuals tend to be more risk-averse than younger farmers, who are often more willing to explore new opportunities and take risks. As farmers age, they become more conservative and cautious, avoiding certain digital payment platforms, especially cordless channels that are more vulnerable to internet-related crimes. However, these findings contrast with those of (Santosa et al., 2021), who reported that the older generation was more accepting of digital technology than the younger generation.

Coefficient	Linear ^L	Exponential	Double log
Constant	71.696 (8.086)***	51.614 (4.104)***	4.486** -2.062
Group membership	1.055 (2.214)***	-9.886 -1.014	0.503** -2.004
Flock size	36.078 (-1.603)	-14.783 (-1.985)	-8.801 (-1.678)
Information intensity	0.274 -3.062	0.282 (1.653)	0.152 -0.0941
Awareness	0.023 -0.944	0.328 -1.98	-4.8 (-0.922)
Educational level	22.46 (2.414)**	-49.662 -0.942	0.693 -1.124
Cost of implementing digital payment	0.114 -0.159	-0.004 (3.334)***	-0.08 -0.884
Household size	-12.955 -1.044	-1.601 -1.114	-0.592 -1.636
Access to digital payment facility	2.014 -1.933	0.636 -0.296	0.414*** -8.703
Rearing experience	4.553 -0.863	-68.13 -0.875	0.894*** -3.042
Financial literacy	0.055 -2.086	-622 -0.432	-10.31 -1.0672
Age	-18.781 -9.633	-952 (2.084)**	-0.532 -1.008
R ²	0.792 (1.9968)*	0.583 (1.3620)	0.514 -1.333
F-statistics	35.162	21.544	16.382

TABLE 5: Multiple Regression Estimates for Factors Influencing the Use of Digital Payment

Note: ***, **, and * signify significance at 1%, 5%, and 10% levels, respectively, while L is the lead equation.

Source: Field survey data, 2024

Constraints to the use of digital payment

Table 6 presents the distribution of livestock farmers based on their responses on factors affecting the use of digital payment in the study area. Findings shows that 10 out of a total of 14 constraints identified in the study area had a mean score of 2.5 and above and were adjudged as a serious constraint. These were poor network connectivity, low IT/computer literacy, government policies, security concerns, technological setbacks and poor infrastructure to support e-banking. Other challenges included insufficient skilled manpower to monitor and maintain electronic equipment, high transaction costs, epileptic power supply, higher risks compared to cash and the high cost of implementing digital policy. As acknowledged by (Omokugbo and Festus, 2020) and (Taiwo et al., 2016), poor network connectivity is a glaring issue across virtually all e-payment platforms in Nigeria. This often leads to multiple debiting of

customers' accounts, with reversals sometimes taking between two weeks and one month, depending on the bank involved. Regarding government policy, (Saxena and Joshni, 2018) reported that government through their policies can also hinder the adoption of digital payment. Such policies include taxes on daily transfers, withdrawal limits, etc. In their study on agricultural value chain, (Habiyaemye et al., 2019) reported that government plays a critical role in facilitating the adoption of digital payment. A study by (Simatele and Mbedz, 2021) listed such government policies to include taxes on digital payment, high agency fees and structural rigidity. In the area of security, (Taiwo et al., 2016) pointed out that security is important to the use of digital payment. They mentioned cases of unauthorized access to customer accounts, untraceable embezzlement by bank officials, fake internet bank website and cloning of smart cards as part of security challenges associated with digital payments. In terms of infrastructure, the success of digital payments depends largely on availability of infrastructure to thrive. Sadly, most bank branches lack sophisticated infrastructures like computers, durable communication lines, internets, etc., which digital payment requires. For instance, most banks branches in remote villages do not have ATM, which, invariably, limits its utilization. (Omokugbo and Festus, 2020) had reported that digital payment in Nigeria is hindered by infrastructural deficiencies. High incidence of lack of skilled manpower to monitor and maintain electronic equipment has also been reported as a constraint by (Musa et al., 2013). Implementation of cashless policy requires complex technologies that must be acquired, installed and serviced/maintained periodically. Sadly, such engineers (both soft and hardware) are most times scarce, compelling bank to seek the services of foreigners who charge outrageous fees in hard currencies, thereby increasing the overall operational cost of the bank. (Omokugbo and Festus, 2020) had also reported inadequate skill manpower as a barrier to the implementation of digital payment.

High transaction cost has also been reported as a constraint to the use of digital payment by (Ligon et al., 2019), (Lutfi et al., 2021) and (Taiwo et al., 2016). For instance, most banks and settlement platforms charge very outrageous withdrawal and maintenance fees, which add up to the overall bank charges and increase the bank operational cost. Regarding risk, studies by (Ligon et al., 2019) and (Lutfi et al., 2021) have reported separately that utilization of digital payment is also constrained by risk. Such risk includes loss of money due to non-refunds of multiple debits, unauthorized withdrawals perpetrated by scammers in connivance with bank officials, etc. Also, poor and epileptic nature of our electricity supply has been listed by (Musa et al., 2013) as challenge to the utilization of digital payment. Because of poor power supply, most banks have to power their generating sets throughout the day. This increases their overhead cost, with its associated multiplier effect on bank charges and other transaction cost. Among those that were not adjudged as serious constraints were poor government/institution support, problem with specified cash limit, and low acceptance of digital payment repetitively.

Constraints	Very Serious	Serious	Not Too Serious	Not Serious	Mean	Remark
Poor network connectivity	65	49	24	2	3.26	Serious
Low knowledge of IT/Computer literacy	58	54	27	3	3.22	Serious
Government policy, e.g., taxes, VATs and other charges	48	72	16	4	3.17	Serious
Security and technical setback	56	55	20	9	3.13	Serious
Poor infrastructure to support e-banking	56	54	19	13	3.12	Serious
Insufficient skilled manpower to monitor and maintain electronic equipment	52	61	22	5	3.11	Serious
High transaction cost	50	60	20	10	3.07	Serious
Epileptic power supply	37	63	26	12	2.95	Serious
Highly risky than cash	30	72	30	8	2.89	Serious
High cost of implementing policy	40	59	21	20	2.85	Serious
Poor government/institutional support	10	15	60	55	1.88	Not serious
Problem with specified cash limit	8	22	40	70	1.77	Not serious
Lack of awareness	8	20	18	94	1.59	Not serious
Low acceptance of digital payment	9	11	30	90	1.56	Not serious

TABLE 6: Constraint to the Utilization of Digital Payment

Any constraint with a mean score of 2.50 or higher is regarded as serious, while those below 2.50 are considered not serious.
Source: Field survey data, 2024

Conclusions

In this study, the awareness and utilization of digital payment by livestock farmers have been examined. Findings have shown that though farmers were quite aware of the existence of several payment channels, the most frequently used channels were ATM, mobile banking and POS. Additionally, utilization of digital payment was significantly influenced by group membership, information intensity, educational attainment, access to digital payment facility, financial illiteracy and age. It was also revealed that the use of digital payment was constrained by poor network connectivity, low IT shells/knowledge, government policy, security and technical issues and poor infrastructures, among others. Hence, the study concludes that the current level of digital payment utilization by livestock farmers can be sustained and enhanced if strategic efforts are put in place to address the challenges identified in the study. The following recommendations are offered: (i) Adequate security measures should be put in place to checkmate incidence of online banking frauds and to educate farmers who use digital channels on the risk and dangers associated with their use. (ii) Adequate regulatory framework should be instituted that will compel network providers and financial institution including payment agents to upgrade their facilities. (iii) Government and other stakeholders in the power sector should guarantee uninterrupted power supply as well as communication links. (iv) Access to digital payment channels should be enhanced by encouraging banks and other financial agents to open up more branches and payment outlets in the study area. (v) To enhance their conversance level with digital channels, financial institution in collaboration with other financial stakeholders should periodically sensitize and educate farmers on the use of these channels. (vi) Government in collaboration with other stakeholders should regulate bank and agency fees/charge on digital transaction in the study area.

Appendices

Please find below the different sections of the questionnaire used for the study (Tables 7-11).

S/N	Variable	Response Options
1	Gender	☐ Male ☐ Female
2	Age (in years)	_____
3	Marital Status	☐ Single ☐ Married ☐ Divorced/Separated ☐ Widowed
4	Household Size	_____ persons
5	Highest Educational Level	☐ No Formal Education ☐ Primary ☐ Secondary ☐ Tertiary
6	Years of Livestock Farming Experience	☐ < 5 ☐ 5–10 ☐ 11–15 ☐ >15
7	Type of Livestock Kept	☐ Poultry ☐ Pigs ☐ Goats/Sheep ☐ Cattle
8	Number of Livestock Kept	☐ < 100 ☐ 100–200 ☐ 201–400 ☐ > 400
9	Do you have access to credit?	☐ Yes ☐ No
10	Do you receive extension services?	☐ Yes ☐ No
11	Are you a member of any farmers' cooperative/association?	☐ Yes ☐ No
12	Do you engage in off-farm income activities?	☐ Yes ☐ No
13	Do you own a bank account? (Financial Literacy)	☐ Yes ☐ No
14	Distance to nearest payment facility/bank (in minutes)	_____ mins

TABLE 7: Section A: Socioeconomic Characteristics of Respondents

S/N	Digital Payment Channel	Aware (☐)	Not Aware (☐)
1	Mobile Banking	☐	☐
2	Internet Banking	☐	☐
3	Telephone Banking	☐	☐
4	Point of Sale	☐	☐
5	Automated Teller Machine	☐	☐
6	Digital Currency (e.g., Crypto)	☐	☐

TABLE 8: Section B: Awareness of Digital Payment Channels

S/N	Channel	Not Highly Utilized (1)	Utilized (2)	Highly Utilized (3)	Most Highly Utilized (4)
1	Mobile Banking	☐	☐	☐	☐
2	Internet Banking	☐	☐	☐	☐
3	Telephone Banking	☐	☐	☐	☐
4	Point of Sale	☐	☐	☐	☐
5	Automated Teller Machine	☐	☐	☐	☐
6	Digital Currency (Crypto, etc.)	☐	☐	☐	☐

TABLE 9: Section C: Rate and Extent of Use of Digital Payment Channels

S/N	Statement	Strongly Disagree (1)	Disagree (2)	Agree (3)	Strongly Agree (4)
1	Membership in farmers' groups influences my use of digital payments.	☐	☐	☐	☐
2	I receive digital payment information from various sources.	☐	☐	☐	☐
3	My educational background helps me understand how to use digital payment systems.	☐	☐	☐	☐
4	My distance from a payment point affects how I use digital payment channels.	☐	☐	☐	☐
5	I own a bank account which makes digital payments easier for me.	☐	☐	☐	☐
6	I find digital payments more convenient than cash.	☐	☐	☐	☐
7	As I grow older, I am less willing to use digital payment channels.	☐	☐	☐	☐
8	High transaction costs discourage me from using digital payment systems.	☐	☐	☐	☐

TABLE 10: Section D: Factors Influencing Use of Digital Payment

S/N	Constraint	Not Serious (1)	Not Too Serious (2)	Serious (3)	Very Serious (4)
1	Poor network connectivity	☐	☐	☐	☐
2	Low computer/IT literacy	☐	☐	☐	☐
3	Unfriendly government policies (e.g. taxes, fees)	☐	☐	☐	☐
4	Security and fraud issues	☐	☐	☐	☐
5	Poor infrastructure (e.g. lack of ATMs)	☐	☐	☐	☐
6	Lack of skilled manpower for maintenance	☐	☐	☐	☐
7	High transaction costs	☐	☐	☐	☐
8	Epileptic power supply	☐	☐	☐	☐
9	Digital payment is riskier than cash	☐	☐	☐	☐
10	High implementation cost	☐	☐	☐	☐

TABLE 11: Section E: Constraints to the Use of Digital Payments

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Concept and design: Nsikan Bassey, Offiong Offor, Augustine Ntekim, Emediong Fred

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Disclosures

Human subjects: Consent was obtained or waived by all participants in this study. Department of Agricultural Economics and Extension, Akwa Ibom State University issued approval (AKSU/AEC/0024). This study involved human subjects who participated voluntarily in the research. The participants were adult individuals aged 18 years and above, primarily consisting of livestock farmers residing in the Oron Agricultural Zone, Akwa Ibom State, Nigeria. Prior to their participation, all respondents were adequately informed about the purpose, nature, and objectives of the study. Participation was entirely voluntary, and informed consent was obtained from each participant before data collection commenced. They were assured of the confidentiality of all information provided and were informed that the data collected would be used strictly for academic and research purposes. No personally identifiable information was collected or published. The study complied with ethical guidelines for research involving human subjects as stipulated by Akwa Ibom State University, and all procedures were carried out with integrity, ensuring respect for the rights and welfare of the participants. No physical, psychological, or social harm was posed to participants during or after the research. Respondents were given the liberty to withdraw from the study at any point without penalty. **Animal subjects:** All authors have confirmed that this study did not involve animal subjects or tissue. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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