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Adeyemi Adewale Akinola

Nigerian Institute of International Affairs, akinolaadeyemi@yahoo.com

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INFLUENCE OF SOCIO-ECONOMIC FACTORS ON FARMERS' USE OF MOBILE PHONES FOR AGRICULTURAL INFORMATION IN NIGERIA

Akinola, Adeyemi Adewale

Librarian, Nigerian Institute of International Affairs ((NIIA), Lagos, Nigeria.
akinolaadeyemi@yahoo.com

Corresponding Author: akinolaadeyemi@yahoo.com

ABSTRACT

Farmers use mobile phones to access information needed to improve their agricultural practice. However, in cases where they do not maximize their mobile phone utilization, they may be hindered by some socio-economic factors which may lead to inadequate access to agricultural information. Therefore, this study investigated the influence of socio-economic factors on farmers' use of mobile phones for agricultural information in Nigeria. The research adopted a survey design. The study population was 9,650 registered farmers in Yewa South Local Government, Ogun State, Nigeria. The proportionate stratified random sampling technique was used. The instrument used was structured questionnaire. Data were collected from 363 farmers; thus the study had 93%. Data was analyzed using descriptive statistics, Regression and Multi regression analysis. Findings from this study revealed that majority of the farmers use mobile phones daily (75.5%). It was further showed that farmers use mobile phones for specific purposes such as making phone calls (mean= 3.47), and receiving text messages (mean= 2.90). The findings also revealed that farmers use mobile phones to acquire different types of Agricultural information such as fertilizer and pesticide information (mean=2.52), and market information (mean=2.31). High tariff deductions from telecommunication companies (mean=3.53) was a major constrain. Findings further revealed that family size ($\beta = .173$; $P < .05$), and Farm Size ($\beta = .168$; $P < .05$) had positive significant influence on farmers' use of mobile phones for agricultural information while Age range ($\beta = -.031$; $P < .05$), Gender ($\beta = -.027$; $P < .05$), Marital status ($\beta = -.18$; $P < .05$), Educational qualification ($\beta = -.031$; $P < .05$), Years of farming ($\beta = -.126$; $P < .05$), Farm income per month ($\beta = -.021$; $P < .05$) had negative influence respectively. Finally, socio-economic factors jointly influenced farmers' use of mobile phones for agricultural information ($F = 3.81$; $R^2 = .58$, $p < .05$). The study concluded that, socio-economic factors collectively contribute to farmers' use of mobile phones for agricultural information. Therefore, it is recommended that telecommunication companies in Nigeria, in conjunction with the Federal Government, should provide a low tariff plans for farmers. This would enable them to adequately utilize their mobile phones for agricultural information.

Keywords: Socio-economic factors, Mobile phone use, Farmers, and Agricultural information

1. INTRODUCTION

In agriculture and other sectors of the economy, information plays an important role as people need it to move ahead in life. Information is necessary for human survival as it leads to positive change in one's state of knowledge. Reitz (2004) defined information as data that are presented in a readily and comprehensive form to which meaning has been attributed within a given context for its use. Agricultural information can be said to be information related to agriculture. It is a piece of information needed for the development of agricultural practices such as in crop, livestock and other aspects of farming. It can also be seen as the transmission of agricultural information to farmers, government, extension officers, researchers, policy makers, and members of the community.

The need for agricultural information according to Kaaya (1999), is rooted not just in the need to improve farm yield but also for the economic and social development of countries. Agricultural information can be accessed from networks of information providers such as agriculture extension officers, traders, veterinary doctors, ministry of agriculture, and agricultural experts. Such information provides information about the market price, transport information, fertilizer and pesticide availability, and agricultural policy. Agricultural sector in Nigeria and other parts of the world have experienced a decrease in process as a result of illiteracy, inability to adapt to change, negligence on the part of government and stakeholders, inadequate information and lack of modern technology to supplement local tools; which has led to stagnancy and deficiency in agricultural process. Byerlee, de Janvry and Sadoulet (2009) on agricultural development, affirmed that despite the importance of agriculture for economic development, agriculture is yet to perform as an engine of growth in many developing countries especially in sub-Saharan Africa. This position has given room for low per capita income in many African countries especially in the rural areas.

The use of Information and Communication Technology (ICT) as noted by Olorunda and Oyelude (2008) could be of tremendous help to farmers as it could abate some of the challenges faced by farmers by increasing their knowledge of planning, decision making and the execution of programmes. Mobile phones in particular as one of the ICT tools could be used, not only for person- to- person voice communication, but also, as a means of access to information through

services like multi-media, Bluetooth, internet, and text message among others. To acknowledge the growth of mobile communication, the penetration of mobile phones in Nigeria has reached nearly 70% as of 2009 while only 2.3% of the population had mobile phones nine years earlier (World Bank, 2011). In other words, the adoption of mobile phone is growing fast among Nigerians. Many Nigerians, including farmers now use mobile phones either for personal or business transactions. Farmers could use mobile phones to acquire information especially on price, products, transport, and weather forecast which would assist them on decision making especially on seasons to plant, breed new species, and harvest farm products. Jensen (2007) on adoption of mobile phones, explained that fishermen and wholesalers in South India associated with a dramatic reduction in price dispersion and near-perfect adherence to the law of one price. The use of mobile phones by farmers saves costs by providing access to agricultural information through communicating with traders and other partners involved in agricultural processes. It opens new market opportunities, especially in situations of changing market price, helps in the acquisition of fertilizers and pesticide information for pest and disease control.

Aker and Mbiti (2010:207) identified some potential mechanisms through which mobile phones can provide economic benefits:

First, mobile phones can improve access to and use of information, thereby reducing search costs, improving coordination among agents and increasing market efficiency. Second, mobile phones create new jobs to address demand for mobile-related services, thereby providing income-generating opportunities in rural and urban areas. Finally, mobile phone-based applications and development projects sometimes known as “m-development” have the potential to facilitate the delivery of financial, agricultural, health and educational services.

In other words, farmers in Africa and other parts of the world can utilize the potentials of mobile phones to enhance productions, generate income, and have better access to agricultural information. Although the use of mobile phones is essential for the acquisition of agricultural information which would aid agricultural activities to have formidable impact in countries, the use

of mobile phone is often influenced by socio-economic factors such as educational background, age, gender, income, farm experience, family size and farm size among others. Age is one of the essential factors that determine the adequate use of mobile phones. A study by Jain and Hundal (2007) in India revealed that the majority of phone users (62%) are within the age group of 20 to 40. In a study on Grameen Telecom's Village Phone Program in Bangladesh, Richardson, Ramirez, and Haq (2000) explained that people aged 20 to 30, is an age group of farmers that would more likely be receptive to a wider range of phone services, including card phones. Gender has also been noted to influence farmers' use of mobile phones as female farmers have been noted to adopt the use of mobile phones recently than male farmers. This is as a result of government and non-government organizations focusing more attention on women than men in their resources allocation and grant of credit facilities. Kalba (2008) argues that the adoption of certain technology attributes or alternatives (e.g. fixed vs mobile connection and postpaid vs pre-paid services) depends on the level of farmers' income over time. Also, in relations to income, farmers' earnings would determine the type of mobile phones to buy and how it will be utilized in terms of the amount of call card to buy which could result in the rate of agricultural information acquired. The rate of income depends on how farmers gain access to information through adequate use of mobile phones. Educational qualification on the other hand, may also contribute to mobile phone usage as farmers need to have a certain level of educational background or literacy to guide them before they can access some functions on mobile phones appropriately. In other words, educated farmers easily learn how to use mobile phones than uneducated ones. Hence, they are more likely to be innovative in their use of mobile phones.

While the people of Nigeria are blessed with access to various mobile networks, it is not certain how they use mobile phones for Agricultural information, or how socio-economic factors affect their use of mobile phones for agricultural information. The dearth of literature on the farmers' use of mobile phones for Agricultural information in Nigeria, necessitates the need for this study.

2. Objective of the Study

The main objective of this study is to identify the influence of socio-economic factors on farmers' use of mobile phones for agricultural information in Nigeria. The specific objectives are to:

1. identify the socio-economic characteristics of farmers in Nigeria;
2. find out farmers' frequency of use of mobile phones for agricultural information in Nigeria;
3. determine the types of agricultural information acquired through the use of mobile phones by farmers in Nigeria;
4. ascertain the specific purposes for farmers' use of mobile phones in Nigeria;
5. find out the relationship between socio-economic factors and farmers' use of mobile phones for agricultural information in Nigeria and
6. determine the challenges encountered by farmers in the use of mobile phones for agricultural information in Nigeria.

3. Research Questions

In order to achieve the research objectives, the following questions are posed:

1. What are the socio-economic characteristics of farmers in Nigeria?
2. How frequently do farmers use mobile phones for agricultural information in Nigeria?
3. What types of agricultural information do farmers acquire through the use of mobile phones in Nigeria?
4. What are the specific purposes for farmers' use of mobile phones in Nigeria?
5. What are the challenges encountered by farmers in the use of mobile phones for agricultural information in Nigeria?

4. Research Hypothesis

The following research hypothesis are tested in the study at $\alpha = 0.05$ level of significance:

H01. Socio-economic factors do not significantly influence farmers' use of mobile phones for agricultural information in Nigeria.

5. METHODOLOGY

The study adopted a descriptive survey research design to gather information from a representative sample of the population under study. The study population consist of 9,650 number of registered farmers in Yewa South Local Government, Ogun State, Nigeria according to the Federal Ministry

of Agriculture, as at July 2013 is 9,650. The registration was done at the ten wards of the Local Government. Proportionate stratified random sampling technique was adopted for the study and the sample size comprised 4% of each ward in the Local Government. In all, a total of 387 farmers in Yewa South Local Government constitute the study sample size. This is considered appropriate for generalisation based on Nwana (1981) who affirmed that if a population is in hundreds, one needs a sample size of 20%. But if a population is in thousands, one needs a sample size of 10% to 5% or less. This procedure for selection was based on the fact that each of the ten wards has equal chance of being included in the sample. The questionnaire consists of two sections. Section A elicit the socio-economic characteristics of the respondents like age, gender, marital status, years of farming experience, educational background, farm size, farming experience and farmers income. While section B contained farmers' use of mobile phones for agricultural information.

6. Presentation of Findings

A total of three hundred and eighty seven (387) copies of questionnaire were distributed to the respondents and three hundred and sixty three (363) copies were retrieved.

Socio-economic Characteristics of the Respondents

Table 1: Distribution of the Respondents by Age

Age	Frequency	Percentage %
20-30 years	52	14.3
31-40 years	62	17.1
41-50 years	103	28.4
51 -60 years	88	24.2
61 + years	58	16.0
Total	363	100.0

Table 1 shows that 52(14.3%) of the respondents were aged 20-30 years, 62(17.1%) were aged 31-40 years, 103(28.4%) were aged 41-50 years, 88(24.2%) were aged 51-60 years, while 58(16.0%) were aged 61 and above. By implication the result in Table 1 indicates that majority of farmers in Nigeria are in their prime age.

Table 2: Distribution of the Respondents by Gender

Gender	Frequency	Percentage %
Male	231	63.6
Female	132	36.4
Total	363	100.0

Table 2: shows that the male respondents are 231(63.6%) while the female respondents' are 132 (36.4%). This findings implies that the farmers in the study locale are mostly male as indicated in the result in Table 2.

Table 3: Distribution of the Respondents by Marital Status

Marital status	Frequency	Percentage %
Single	43	22.0
Married	287	44.0
Widow	33	33.9
Total	363	100.0

The result in Table 3 shows that most of the famers in the study are married 287(44.0%) followed by 43(22.0%) single, and lastly widowed farmers which constitutes the lowest in percentage ranking 33(33.9%)

Table 4: Distribution of the Respondents by Educational Qualification

Educational Qualification	Frequency	Percentage %
First leaving	89	24.5
SSCE	125	34.4
BSc	79	21.8
MSc	6	1.7
PhD	3	.8
None	61	16.8
Total	363	100.0

The findings in Table 4 indicate that majority of the farmers 125(34.4%) have SSCE. This is followed by first school leaving certificate 89(24.5%), then Bsc 79(21.8%) and 61(16.8%) of the respondents, as indicated in table 4 have no degree while farmers with MSc are 6(1.7) and PhD degree 3(.8%), respectively ranked lowest. By implication this findings may have suggested that majority of the farmers in Nigeria may not have passed through a university system to attain a high qualification.

Table 5: Distribution of the Respondents by Years of farming

Year of farming	Frequency	Percentage %
1-10	76	20.9
11-20	142	39.1
21-30	83	22.9
31-40	27	7.4
40 above	35	9.6
Total	363	100.0

Table 5 shows that majority of farmers indicated in the result have 11-20 years of farming experience 142(39.1%). This is followed by 21-30 years of farming experience 83(22.9%), 1-10 years of farming 76(20.9%) and 31-40 has 35(9.6%), Ranking lowest is 40 and above.

Table 6: Distribution of the Respondents by Family Size

Family size	Frequency	Percentage %
1-2	72	19.8
3-4	163	44.9
5-6	94	25.9
7-8	26	7.2
9+	8	2.2
Total	363	100.0

The result in Table 6 indicates that the most of the farmers in the study area have the family size of 3-4, 163(44.9%) ranking highest in the scale. This is followed by 5-6 family size 94(25.9%) and 1-2 72(19.8%) while 7-8 26(7.2%) and 9 above 8(2.2%) rank lowest.

Table 7: Distribution of the Respondents by Farm Size

Farm Size	Frequency	Percentage %
0-2	71	19.6
3-4	92	25.3
5-6	122	33.6
7-8	67	18.5
9+	11	3.0
Total	363	100

The result in Table 7 indicates that 122(33.6%) of the respondents have 5-6 acres of farm land, 92(25.3%) have 3-4, 71(19.8%) have 0-2 acres of land, while 67(18.5%) have 7-8 acres, and 11(3.0%) have 9 and above acres of farm land. It implies that majority of the respondents have 5-6 acres of farm land. It indicates that farmers in Nigeria are operating on small scale farming.

Table 8: Distribution of the Respondents by Farm Income per Month

Farm income per month	Frequency	Percentage %
Less than N18,000	141	38.8
N18,001-N36,000	48	13.2
N36,001-N54,000	87	24.0
N54,001-N72,000	44	12.1
N72,000 and above	43	11.8
Total	363	100.0

Table 8 shows that 141(38.8%) of the respondents earn less than N18,000, 87(24.0%) earn between N36,000 and N54,000, 48(13.2%) earn between N18,000 and N36,000, while 44(12.1%) earn between N54,000 to N72,000 and 43(11.8%) earn between N72,000 and above. This result reveals

that majority of the respondents, 141(38.8%) earn less than N18, 000. It implies that majority of farmers in Nigeria earn are very low income.

Table 9: Frequency of Mobile Phones Usage for Agricultural Information

Categories	Frequency	Percentage %
Daily	274	75.5
Weekly	17	4.7
2-3 times in a month	32	8.8
2-3 times in a week	40	11.0
Total	363	100.0

Result from Table 9 reveals that majority 274(75.5%) of the respondents make use of mobile phone daily, 40(11.0%) make use of mobile phones 2-3 times in a week, while 17(4.7%) use mobile phone weekly and 32(8.8%) of the respondents use the mobile phone 2-3 times in a month. It implies that majority of the respondents 274(75.5%) use their mobile phones on a daily basis. This indicates that farmers in Nigeria use their mobile phones for agricultural information on daily basis.

Table 10: Purpose of Mobile Phone Usage

S/N	I use Mobile Phones for:	SA	A	D	SD	Mean	Std. D.
1	Making phone calls	227 62.5 %	88 24.2%	38 10.5%	10 2.8%	3.47	.791
2	Listening to radio	164 45.2%	124 34.2%	47 12.9%	28 7.7%	3.17	.929
3	Sending and receiving text messages	133 36.6%	99 27.3%	94 25.9%	37 10.2%	2.90	1.013
4	Taking photographs	96 26.4%	140 38.6%	85 23.4%	42 11.6%	2.80	.961
5	Watching videos	98 27.0%	138 38.0%	82 22.6%	45 12.4%	2.80	.976
6	Chatting with friends	94 25.9%	126 34.7%	96 26.4%	47 12.9%	2.74	.987
7	Reading online news papers	87 24.0%	86 23.7%	127 35.0%	63 17.4%	2.54	1.038
8	Playing games during my free time	69 19.0%	103 28.4%	115 31.7%	76 20.9%	2.45	1.025
9	Seeking agricultural information	97 26.7%	39 10.7%	158 43.5%	69 19.0%	2.45	1.080
10	Accessing internet services	71 19.6%	57 15.7%	149 41.0%	86 23.7%	2.31	1.040
11	Sending and receiving multi-media messages	72 19.8%	50 13.8%	155 42.7%	86 23.7%	2.30	1.040
12	Recording business transactions	62 17.1%	58 16.0%	150 41.3%	93 25.6%	2.25	1.021
13	Getting updates on weather Forecast	50 13.8%	43 11.8%	179 49.3%	91 25.1%	2.14	.950

Table 10 shows the result on the responses of the specific purposes for farmers' use of mobile phones. Making phone calls (mean=3.47) ranked highest by the mean score rating was followed by listening to radio (mean=3.17). Getting updates on weather forecast (mean=2.14) was ranked the lowest by the mean rating, this is followed by recording business transactions (mean=2.25). In the result above, we can deduce that the purpose for which farmers in the study area make use of mobile phone is to interact with other farmers in a phone conversation or on other agricultural activities which is closely followed by listening to radio which may also indicate that apart from conventional radio information, they can as well listen to news on agriculture.

Table 11: Types of Agricultural Information

S/N	I use mobile phones to acquire:	SA	A	D	SD	Mean	Std.D.
1	Fertilizer and pesticide information	76 20.9%	119 32.8%	85 23.4%	83 22.9%	2.52	1.062
2	Market information	81 22.3%	51 14.0%	130 35.8%	101 27.8%	2.31	1.104
3	General agricultural news	62 17.1%	70 19.3%	132 36.4%	99 27.3%	2.26	1.041
4	Information from other farmers	82 22.6%	37 10.2%	137 37.7%	107 29.5%	2.26	1.112
5	Information on sale of farm equipment	60 16.5%	62 17.1%	122 33.6%	119 32.8%	2.17	1.064
6	Transport information	70 19.3%	31 8.5%	150 41.3%	112 30.9%	2.16	1.069
7	Information on preservation of farm products	64 17.6%	47 12.9%	133 36.6%	119 32.8%	2.15	1.069
8	Information on new species of plant and seed	55 15.2%	48 13.2%	138 38.0%	122 33.6%	2.10	1.033
9	Information on new breed of animals	41 11.3%	67 18.5%	133 36.6%	122 33.6%	2.07	.985
10	Training from Agricultural extension services	32 8.8%	53 14.6%	169 46.6%	109 30.0%	2.02	.895
11	Soil testing and soil sampling information	36 9.9%	34 9.4%	162 44.6%	131 36.1%	1.93	.921
12	General agricultural news	23 6.3%	41 11.3%	156 43.0%	143 39.4%	1.85	.859

Table 11 mentions the types of agricultural information acquired through mobile phones use: Fertilizer and pesticide information (mean=2.52) ranked highest by the mean score rating and this was followed by market information (mean=2.31). Updates on weather forecast (mean=1.85) was ranked lowest and this was followed by soil testing and soil sampling information (mean=1.93). The findings reveal that farmers may use mobile phones to acquire agricultural products such as fertilizer and other agricultural products.

Table 12: Challenges Encountered

S/N	Challenges encounter are:	SA	A	D	SD	Mean	Std.D
1	High tariff deductions from telecommunication companies	242 66.7%	84 23.1%	24 6.6%	13 3.6%	3.53	.773
2	Epileptic electric supply	215 59.2%	99 27.3%	21 5.8%	28 7.7%	3.38	.904
3	Poor network infrastructure	178 49.0%	130 35.8%	32 8.8%	23 6.3%	3.28	.871
4	Cost of recharging mobile phones	185 51.0%	104 28.7%	29 8.0%	45 12.4%	3.18	1.027
5	Lack of adequate network coverage	131 36.1%	127 35.0%	66 18.2%	39 10.7%	2.96	.987
6	Difficulty in using mobile phones	142 39.1%	69 19.0%	101 27.8%	51 14.0%	2.83	1.098
7	Lack of training on the use of mobile phone	104 28.7%	63 17.4%	104 28.7%	92 25.3%	2.49	1.155

Table 12 indicating the result on the challenges encountered by farmers in their use of mobile phones shows that high tariff deductions from telecommunication companies (mean=3.53) ranked highest by the mean score rating and this was followed by epileptic electric supply (mean=3.38). Lack of training on the use of mobile phone (mean=2.49) was ranked lowest by the mean score rating and this was followed by difficulty in using mobile phones (mean=2.83). It implies that the major challenges militating against the use of mobile phones among farmers in Nigeria include high tariff deductions from telecommunication companies, epileptic electric supply and poor network infrastructure.

Analysis of Research Hypothesis

H₀: socio-economic factors do not significantly influence farmers' use of mobile phones for agricultural information in Nigeria.

Table 13: Influence of Ssocio-economic Factors on Farmers' Use of Mobile Phone for Agricultural Information.

Regression

R	R Square	Adjusted R Square	Std. Error of the Estimate		
.282	.079	.058	.85310		
ANOVA					
Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	22.185	8	2.773	3.810	.000
Residual	257.634	354	.728		
Total	279.819	362			

Table 13 shows the joint contribution of the socio-economic characteristics (age, gender, marital status, educational qualification, years of farming, family size, and farm income per month) to the prediction of farmers' use of mobile phones for agricultural information. It is clearly seen in table 4.13 that socio-economic factors are positively correlated with farmers' use of mobile phones for agricultural information ($R=0.28$). The table also shows 5.8% as the variance in the farmers use of mobile phones for agricultural information (Adjusted $R^2 =0.58$). The table also shows that the analysis of variance for the regression yielded (F-ratio of 3.81, $df=8;354$) significant at 0.05 level. This implies that the joint contribution of the independent variable to the dependent variables was significant. Hence, we reject the H_0 and accept H_1 .

Therefore, socio-economic factors significantly influence farmers' use of mobile phones for agricultural information in Nigeria.

Table 14: Coefficients of Variance of Dependent Variable Socio-economic Factors and the Prediction of Farmers' Use of Mobile Phone for Agricultural Information.

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Remark
		B	Std. Error	Beta			
1	(Constant)	1.849	.294		6.287	.000	
	Age Range	-.021	.048	-.031	-.450	.653	n.s
	Gender	-.050	.104	-.027	-.480	.632	n.s
	Marital status	-.034	.110	-.018	-.308	.758	n.s
	Educational Qualification	.016	.030	.031	.542	.588	n.s
	Year of Farming	-.094	.047	-.126	-2.007	.046	Sig
	Family size	.163	.057	.173	2.869	.004	Sig
	Farm Size	.136	.054	.168	2.491	.013	Sig
	Farm income per month	-.013	.037	-.021	-.350	.727	n.s
a. Dependent Variable: Use of Mobile Phone							

Table 14, reveals the relative contribution of the dependent variable, socio-economic characteristics (age, gender, marital status educational qualification, farm size, family size, years of farming and farm income per month) to the independent variable, (farmers' use of mobile phones for agricultural information). The table shows the results, expressed as beta weights as follows: Family size ($\beta= .173$), Farm Size ($\beta= .168$), Age range ($\beta= -.031$), Gender ($\beta= -.027$),

Marital status ($\beta = -.18$), Educational qualification ($\beta = -.031$), Years of farming ($\beta = -.126$), Farm income per month ($\beta = -.021$). The results indicate that family size and farm size was found to be significant while age, gender, marital status, educational qualification, years of farming and farm income per month were not. It therefore implies that it is only family size and farm size that have a major relative contribution and that age, gender, marital status, educational qualification, years of farming and farm income per month do not significantly contribute to the prediction of farmers' use of mobile phones for agricultural information in Nigeria.

5.2 Conclusion

Mobile phone serves as an important tool in the hand of farmers generally. It offers timely and reliable information as it has brought changes in the way farmers do their business especially in the rural communities. Some of the benefits of using mobile phone as outlined by Khalil et al. (2009) include mobility, ease of use, flexible deployment and relatively low and declining costs of purchase/ownership. Mobile phones are used by farmers in various parts of the world as a means of communication and to implement their daily activities. When farmers have access to mobile phones, they get more information on agricultural news, update and report of market information among others.

Farmer's access to mobile phones has brought drastic improvement into agricultural sector in Nigeria and other developing countries. The development of an agricultural mobile application in the Nigerian telecommunication industry, will bring rural development, better access to market, disease control, adequate access to climate information, improved access to agricultural extension services, better distribution channels, improved financial access to loans like insurance, credit facilities and easy repayment methods would all be harnessed.

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