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Analysis of Factors Influencing the use of ICT Among Cassava Farmers in Anambra State, Nigeria

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ABSTRACT

The study examined factors influencing the use of ICT among cassava value chain actor (farmers) in Anambra State. A well-structured questionnaire was used to obtain relevant information from respondents. A total of 109 respondents constitutes the sample size, which were selected through simple random sampling technique. The study revealed that 39.4% of the respondents were within age of 21-40 with majority (59.6%) were male, had household size of between 1-5 persons and majority (60.2%) were First School Living Certificate (FSLC) holders. Majority (63.3%) of the respondents had farming experience of above 10 years. The study also revealed that the major perceived effects of use of ICT on respondents were timely weeding ($\bar{x}$=4.34), information on land use (($\bar{x}$=4.22) and helped in information dissemination ($\bar{x}$=4.17). Major constraints to use of ICT by respondents were erratic power supply ($\bar{x}$=3.94) and high cost of ICT facilities ($\bar{x}$=3.89). The multiple regression analysis shows that age, household size, cost of ICT servicing, cost of ICT equipment, government policies had negative and significant effect on the use of ICT on farmers while education and farming experience had positive and significant effect on the use of ICT on farmers. It is therefore recommended that farmers should be trained on the usage of ICT and they should be made to understand the relevance of ICT tools in agricultural production to improve their welfare.

INTRODUCTION

Cassava is the most important crop by production, the second most important crop by consumption (Sahel, 2016) and it is largely cultivated by small-scaled farmers that depend on seasonal rainfall (Ganeshkumar, 2017). Cassava is regarded as the most widely cultivated root crop in the tropical region. It is a crop that persistently contribute to food security mainly because of its ability to store its matured edible roots in the ground for about three years and unarguably the sixth most important crop, following crops like wheat, rice, maize, potato, and barley, in the world (Osuafor *et al*., 2020; Saranraj, 2019). It occupies a unique position in the world's food economy, especially due to the fact that it survives where other crops do not thrive (Anarah *et al*., 2021). As a most important local staple and cash crop, cassava availability throughout the year could support the attainment of food security for the rural households in the cassava growing areas (Anarah *et al*., 2019).

Value chain is a series of activities or processes that aim at creating and adding value to a product (Lee, 2018). Value chain is an enhancement of product from production to end-users and along the chain value is added (Wen-Lung, 2018). Digital technologies popularly known as information and

communication technologies (ICT) comprised various technologies that are used to aid information exchange and communication. These technologies include hardware (computers and mobile phones) and software (e.g., Internet facilities and media for information transmission) (Kaware, 2015). ICT facilitates transaction among farmers as well as help farmers to distribute resources efficiently by exchange of agricultural information and ideas. It is therefore significant to determine perceived effects of use of ICT among farmers in cassava value chain in Anambra State.

METHODOLOGY

The study was carried out in Anambra State, South-East geopolitical Zone of Nigeria. The indigenous ethnic groups in Anambra State are the Igbos (98% of population) and a small population of Igala (2%); who live mainly in the North-West part of the State. It is made up of 21 Local Government Areas, located between latitude 5º 32 and 6º43 N and longitude 6º43 and 7º22 within the Greenwich meridian (Chukwuma, 2016). The area has a mean temperature of 30ºC during the hottest period (January) and 21ºC during the coldest period (July). The State has two distinct seasons; dry and rainy seasons. The annual average rainfall is between 2000mm to 2300mm and distributed through March to November. The mean annual sunshine intensity is 5.2 hours and the relative humidity is 28.2m (Nigeria Meteorological Agency (NIMET), 2016). Anambra was created on 27 August 1991 and according to National Population Commission (NPC, 2006), the population was estimated to be 4,177,828 (2,117,984 male and 2,059,844 female) with density of 846/km (2,200/sqm) and total 2 land mass of 4,854km. Anambra is rich in 2 natural gas, crude oil, bauxite, and ceramics and has an almost 100% arable soil (Anambra State, 2018). Agriculture is the State is predominantly in rural areas one of the highest producers of cassava in Nigeria (Wossen, 2017).

The study was carried out in Aguata Agricultural Zone of Anambra State. A multi-stage random sampling technique was adopted in selecting respondents. Two local government areas (Orumba North and Orumba South) were randomly selected from the zone; two communities were selected from each of the local government areas; twenty eight (28) smallholder cassava farmers were randomly selected from each of the communities. A total of 109 respondents were returned and formed sample size. The data for this study were obtained from primary source. Questionnaire was the main instrument for data collection and complimented with interview schedule. The questionnaire comprises of demographic characteristics, perceived effects of use of ICT on farmers (planting of seeds at the right dept/density, improved timely weeding, it helped in information dissemination, etc,) and major constraints on use of ICT. A total of 109 household respondents were selected. Data generated for this study were analyzed using descriptive statistics and multiple regression.

Model Specification

The multiple regression equation implicitly specified as follows:

$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9)$.....

Where:
Y= socioeconomic factors influencing use of ICT
X_1=age (year)
X_2= Educational level
X_3= Sex
X_4= Household size
X_5= Farming experience
X_6= Cultural/religion factors (no influence=0, positive=1, negative=2)
X_7= Cost of ICT maintenance
X_8= Cost of ICT equipment
X_9= Government policies (no influence=0, positive=1, negative=2)

RESULTS AND DISCUSSIONS

Table 1: Distribution of the respondents according to their socio-economic status

Variables	Frequency	Percentage
Age		
Less than 21years	6	5.5
21-30	37	33.9
31-40	30	27.6
41-50	29	26.6
Above 50	7	6.4
Total	109	100
Sex		
Male	65	59.6
Female	44	40.4
Total	109	100
Marital Status		
Married	81	74.3
Single	19	17.4
Separated/Divorce	7	6.5
Widowed	2	1.8
Total	109	100
Educational qualification		
No formal education	21	19.3
First School Living Certificate	65	59.6
Senior School Certificate Examination	12	11.0
Higher education	11	10.1
Total	109	100
Household Size		
1—3	13	11.9
4—6	81	74.3
7—10	15	13.8
Total	109	100
Farming Experience		
1—3	1	0.9
4—6	22	20.2
7—10	17	15.6
Above 10	69	63.3
Total	109	100

Source: Field survey, 2021

The result in Table 1 shows that greater proportions of the farmers (39.4%) were on the age bracket of 21-40. It implies that the farmers are predominantly within the productive and economically viable age. This study is similar with Nuer (2018) who reported that ICT is considered to entice the youth to engage in agribusiness and make agriculture more attractive to them. Majority (59.6%) of the farmers are male. This implies that male have higher access to productive resource such as land. This finding concurs with result of Machina (2018) who reported that Male-headed households have higher access to productive resources and information that increases the chances of using ICT in farming. Majority (75.0%) of the farmers are married. It may imply that economic imperatives of family responsibility may be the driving force behind married person participating in the cassava value chain production for food security. This result is in line with the observation of Nwokoro (2017) that larger percentage of married persons can be attributed to the highly patriarchal orientation in rural settings which tend to give married individuals an edge over

unmarried ones. It revealed that majority of the farmers (60.2%) were first school living certificate (FSLC) holders. This implies that majority of the farming households have basic literacy but may not be said to be adequately educated. Response on household size revealed that majority (74.3%) of the farmers had household size of between 1-5 persons. It implied that there is available family labour for cassava production. This is in line with Anate (2018) who posited that the small household size could be as a result of yielding effect of awareness on family planning by rural dwellers and benefits of family planning as a valuable tool in helping to space pregnancies, reducing the risks of maternal and child deaths through the use of ICT tools. The results further showed that majority (63.3%) of the farmers had farming experience of above 10 years. It implies that the farmers had been in the cassava production business for many years. This result concurred with the finding of Zhang et al. (2016) who posited that experience in business is vital to its progress.

Table 2: Distribution of respondents according to the perceived effects of use of ICT on cassava value chain actors (farmers)

Perceived effects of use of ICT on cassava value chain actors (Farmers	SA	A	U	D	SD	Total	Mean
Planting of seeds at the right dept/density	250	60	30	18	10	368	3.38
Improved timely weeding	300	140	21	10	2	473	4.34
It helped in information dissemination	275	132	30	14	4	455	4.17
Information on land use practices	255	160	33	10	2	460	4.22
Information on how to use &apply fertilizer	235	148	36	10	8	437	4.00
Skill to monitor pest and disease outbreak	225	160	45	6	6	442	4.06
Skills on how to store properly	215	156	48	10	6	435	3.99
Improve land preparation technique	205	160	60	10	3	438	4.02
Better residue organic matter management	210	148	60	18	1	437 Grand Mean	4.01 36.19

Source: Field survey, 2021 Cut off mean=3, *Where: SA= Strongly Agreed, A= Agreed, U= Uncertain, D= Disagreed, SD= Strongly Disagree*

Table 2 shows that use of ICT had positive effects on farmers. The perceived effects of use of ICT on cassava value chain actors were improved timely weeding ($\bar{x}$= 4.34), information on land use practices ($\bar{x}$= 4.22), it helped in information dissemination ($\bar{x}$= 4.17), skill to monitor pest and disease outbreak ($\bar{x}$= 4.06), improved land preparation technique ($\bar{x}$= 4.02), better residue organic matter management ($\bar{x}$= 4.01), information on how to use and apply fertilizer ($\bar{x}$= 4.00), skills on how to store properly ($\bar{x}$= 3.99) and the least was planting of seeds at the right dept/density ($\bar{x}$= 3.39) with the grand mean of .36.19. This implies that use of ICT has positive effects on farmers. This finding is in line with Boshkoska (2019) reports that a wide range of agricultural information can be provided through the use of ICT such as data on inputs and best agricultural practices, advances in precision agriculture, remote sensing, robots, farm management information systems and (agronomic) decision support systems.

Table 3: Major constraints to use of ICT by cassava value chain actor (farmers)

Variables	Farmers Mean ($\bar{x}$)
Erratic power supply	3.94
Poor network coverage	3.12
Lack of durable ICTs equipment/facilities	3.22
Inadequate ICT training centre	2.13
High cost of ICTS facilities	3.89
High cost of internet subscription	3.01
High cost of maintenance service	3.15
General lack of awareness of the important of ICTS in agriculture	1.12
Low literacy level among actors	2.11

Source: Field survey, 2021 Cut off mean=3

Table 3 reveals the major constraints to the use of ICT by cassava value chain actors (farmers). It shows that major constraints include: erratic power supply ($\bar{x}$=3.94), high cost of ICT facilities ($\bar{x}$=3.89), lack of durable ICT facilities/equipment ($\bar{x}$=3.22), high cost of maintenance service (($\bar{x}$=3.15) and poor network coverage (($\bar{x}$=3.12). This finding agrees with Titilope (2017) who identified challenges on use of ICT as erratic power supply, poor network coverage, inadequate ICT training centre, high cost of ICT facilities, high cost of internet subscription, high cost of maintenance service and poor infrastructure.

Table 4: ICTs Utilized by Cassava Value Chain Actors (Cassava Farmers).

Variables (ICT Tools)	Frequency	Percentage
Radio	10	9.2
Mobile Phone	75	68.8
Television	2	1.8
Computer	4	3.7
Internet	2	1.8
Audio Cassette	3	2.8
Camera	2	1.8
Video Recording	3	2.8
Remote sensing	8	7.3
Total	109	100

Source: Field Survey, 2021

Table 4 shows ICT used by cassava value chain actors (farmers) in the study area. The majority (69%) of the respondents used mobile phone while the least (2%) used television, internet and camera each. Hence, ICT tools offer the opportunity to reach often remote, dispersed and poorly serviced farmers and other actors by overcoming barriers of distance and poor road infrastructure. This finding is consistent with Hudson (2017) who stated that radio and television are among the most widely used media for disseminating information to rural audience across Africa together with mobile phones, as a result of the increased ownership and widespread use among farmers.

Table 5. Influence of socio-economic characteristics of farmers on use of ICT

Variables	Coefficients	Std. Error	T-test	Sig
Constant	0.014	0.927	0.015	0.988
Age	-1.006	0.114	-8.825	0.000
Education	1.149	0.114	10.08	0.000
Sex	0.067	0.240	0.280	0.780
Household size	-0.016	0.029	-0.547	0.585
Farming experience	1.008	0.029	34.75	0.000
Cultural religion factors	0.130	0.181	0.718	0.474
Cost of ICT maintenance	-1.086	0.100	-10.86	0.000
Cost of ICT equipment	-1.210	0.110	-11.00	0.000
Government policies	-0.747	0.215	-3.479	0.001
R^2	0.794			
F-stat	9.566			
F(prob)	0.000			

Source: Field survey, 2021

Table 5 shows the result of multiple regressions on socioeconomic characteristics of farmers influencing use of ICT. The coefficient of determination value of 0.794 showed that 79% of the dependent variable depends on the independent variables in the study. The F-value was 9.566 at 1% significant level. Hence, age, household size, cost of ICT servicing, cost of ICT equipment, government policies had negative and significant effect on the use of ICT by farmers while education and farming experience had positive and significant effect on the use of ICT by farmers.

Specifically, the coefficient of age (-1.006) was negative and statistically significant at 1% probability level. This indicates that an increase in age of the respondents decreased the use of ICT by farmers in the study area. The result is in line with Nuer (2018) who reported that ICT is considered to entice the youth to engage in agribusiness and make agriculture more attractive to them. The coefficient of education (1.149) was positive and statistically significant at 1% probability level. This implies that an increase in education of the respondents increase the use of ICT by farmers in the study area. The result is in line with the finding of Naminse (2018) who reported that education and technical training appear to have a positive effect on farmers' use of ICT to boost their production and allows people to adapt more easily to both social and technical changes. The coefficient of farming experience (1.008) was positive and statistically significant at 1% probability level. This implies that an increase in farming experience of the respondents increases the use of ICT by farmers in the study area. The result concurred with finding of Zhang et al. (2016) who posited that experience in business is vital to its progress. The coefficient of cost of ICT servicing maintenance (1.086) was negative and statistically significant at 1% probability level. This implies that an increase in cost of ICT servicing/maintenance decrease the use of ICT by farmers in the study area. The coefficient of cost of ICT equipment (-1.210) was negative and statistically significant at 1% probability level. This implies that an increase in cost of ICT equipment decreased the use of ICT by farmers in the study area. This result is in line with Sievert (2020) who posited that the high service cost in most of rural communities limited number of people because they are poor. The coefficient of government policies (-1.747) was negative and statistically significant at 1% probability level. This implies that an increase in government policies (especially non-friendly policies like increase in tariff) decreased the use of ICT by farmers in the study area. This result is consistent with the finding of Van Schalkwyk (2017) who observed that poor commitment and collaborative efforts of the governments in implementing adequate policies that support the varied stakeholders poses a significant challenge to conducive ICT initiatives.

These results are consistent with the findings of Alavion, (2017) who examined factors affecting use of ICT and reported that age, farming experience, education and cost of ICT equipment are significant variables that influence use of ICT.

CONCLUSION

Based on the findings of this study, it can be concluded that farmers had positive perception of use of ICT on their cassava value chain activities. ICT is one of the main driving forces that can bring about development and change in this present digital age. The rapid development of ICT continues to have major influence on the livelihood of people across the world and in Nigeria in particular. Social research has shown that adoption of ICT can be a major fuel for economic and community development in rural areas. ICT is still under-utilized in the rural areas owing to low level of education and other major constraints (erratic power supply and high cost of ICT facilities). The coordinated efforts by government, researchers, Telecoms, ICT experts and farmers would produce full utilization of ICT in cassava value chain in Nigeria.

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