TECHMIND RESEARCH
OPEN ACCESS PUBLISHER
ISSN: 2292-9355

Journal of Research in Marketing
Volume 9 No.1 April 2018

Empirical Investigation of factors affecting information and communication technologies (icts) in Agric-Business among small scale farmers in Esan Community, Edo State, Nigeria

Simon Awojide[1], Sunday Olufemi Akintelu[2*]

Samuel Adegboyega University, PMB 001, Ehor Road, Ogwa, Edo State, Nigeria[1&2]

princefemi2002@yahoo.com[1]

sakintelu@sau.edu.ng[2]

*Corresponding author

Abstract- *ICTs are vital technologies for the development of agricultural sector in Nigeria. Its usage has created wealth to many, both in developed and developing countries. The study evaluated the usage of ICT in agricultural practices and determined factors influencing its usage among farmers in Esan community of Edo State, Nigeria. Data used for the study were generated from a sample of 75 respondents using structured questionnaire and interview schedule. Data collected were analysed using inferential statistical method. The result of ANOVA analysis revealed that factors limiting the use of ICT on farming activities among small scale farmers in the community include inability of farmers to use ICT (0.017 ≤ 0.05), lack of technological infrastructure (0.012 ≤ 0.05), cost of technology (0.039 ≤ 0.05), fear of technology (0.015 ≤ 0.05), time to spend on technology (0.026 ≤ 0.05), value of ICT (0.011 ≤ 0.05) and trustworthiness (0.007 ≤ 0.05). These factors are significant at 0.05 level of significance and tend to have varying impact on the adoption of ICT with respect to age, implying that lower age group tend to favour factors such as: time spent on technology, value of ICT and trustworthiness, while higher age group are compatible with technological infrastructure and the inability to use ICT. The study concluded that the adoption of ICT begins at lower age group, While, at higher age group, this tendency tends to decline. The study recommends that aggressive policy of digital revolution should be lunch in the community and could re-orient farmers and make them conversant with the beneficial effect of ICT in agricultural process.*

Keywords: *ICT; Small scale farmers; age group; agric-business*

1. INTRODUCTION

Agriculture is an information dependent sector where most farmers uses Information and Communication Technologies (ICTs) for different crop operations. ICTs have been known as vital technologies comprising hardware and software infrastructure that are associated with production mechanisms (Oshikoya & Hussain 2007[15]; Akintelu, Irefin & Akarakiri, 2017)[1]. ICTs are the modern infrastructural tools use in sourcing for information and also handling and processing of information. Agricultural sector is involved in applying technologies to crop production ranging from planting to post-harvesting.

Agricultural sector is favourable since it allows greater employment opportunities for the poor (Omorogiuwa, Zivkovic & Ademoh, 2014)[14]. The use and adoption of Information and Communication Technologies (ICTs) has increases over the years, it has become a global tools for sourcing the rightful information. Gelb, Maru, Brodgen Dodsworth, Smii and Pesce (2008)[6] referred that, ICT Adoption has got to be at all levels of agricultural production and rural communities. ICT are tools, unless we understand what the tools are for, they are useless. The adoption of ICT is closely related to economic growth. It is a powerful tool for increasing productivity (Adekunjo & Ebohon, 2013)[2].

Productivity gained in Agricultural sector, globally are directly attributed to the technological advances experienced by modern farmers (Esumeh, 2016)[5] However, Nigerian economy have been facing several problems in the agricultural sector including food security, access to natural and human resources, population growth, food import values amomg others (Omorogiuwa, Zivkovic & Ademoh, 2014)[14]. Some of these problems came as a result of low input and productivity of agricultural sector (Ayodele, Obafemi & Ebong, 2013)[4].

ICT must be delivering a specific solution for a specific problem, the question about adopting an ICT must be: Is it helping farmers to achieve something? ICT are new technologies that cannot be ignored in Africa, especially for development in all sector, agriculture inclusive, This is because, ICT is one of the main driving forces that can bring about development and change in this present digital age (Olaniyi, Adetumbi & Adereti, 2013)[13].

Several Studies (Adekunjo & Ebohon, 2013[2]; Hopestone 2014)[7] have established the importance of deploying ICTs tools in Nigeria to farmers, for a sustainable and productive farming. According to

Hopestone (2014)[7] the utilization of ICTs, for example a mobile technology, helps agricultural producers, who are often unaware of commodity prices in adjacent markets and rely on information from traders in determining when, where or how much to sell their produce, to have a relevant and timely information. Mwakaje (2010)[11] supposed that accessing market information has proved difficult for many. Lack of market Information represents a significant impediment to market access, especially for smallholder farmers in rural areas; it substantially increases transaction costs and reduces market efficiency.

Other technologies like Internet, Computer, Radio, Television and Applications are most important tools for communication and to provide knowledge and information to farmers about agricultural practices. This technologies are affordable and available tools that could be used among subsistence farmers in rural area, most especially for an upcoming farmer who has no experience in farming. The value of information can never be under estimated because of it uses for decision-making (Lucky & Achebe, 2013)[10].

Most farmers in Edo State Nigeria, especially its rural areas are known to major on agriculture practices for their income and daily consumption. There is a need to know the extent at which ICT infrastructure are deployed in this area, likewise to know the level of awareness of ICT among farmers. Awareness should be generated among young and middle-aged farmers about availability of ICT services in order to increase farmers' participation in ICT initiatives, (Usman & Adeboye, 2012) and to know the relevance of ICT to farmers. This research paper focuses on investigating the usage of ICT among farmers in the study area, evaluating farmer's perception on Information and Communication Technology usage in agricultural practices and to examine factors influencing the usage of ICT among farmers in the rural environment towards getting a quality and quantity production.

2. LITERATURE REVIEW

Information and data is an essential ingredient in agricultural development programs but Nigerian farmers seldom feel the impact of agricultural innovations either because they have no access to such vital information or because it is poorly disseminated (Esumeh, 2016)[5]. As often happens, agricultural information and data is not integrated with other development programs to address the numerous related problems that face farmers. No one can categorically claim to know all the information needs of farmers especially in an information dependent sector like agriculture where there are new and rather complex problems facing farmers every day. The information needs may be grouped into four headings: extension education, agricultural technology, agricultural credit, and inputs and marketing. Usman, et al. (2012)[18]based on the findings, it was recommended that ICTs should be incorporated into all endeavors related to agricultural development. Awareness should be generated among young and middle-aged farmers about availability of ICT services in order to increase farmers' participation in ICT initiatives. Also, since small or and marginal farmers were using ICTs services, more emphasis should be given to providing information strictly relevant to their farming systems. Strong interfaces should be developed at village level so that the problem of computer illiteracy among farmers may be resolved. Hopestone (2013) Suggest that ICs play a significant role in enhancing agricultural production, despite mobile phones having an insignificant impact while telephone main lines remain a significant contributor to agricultural growth despite the wide proliferation of mobile technologies. The results also suggest that certain socio-economic characteristics such as higher education levels and skills are prerequisites for effective improvements in agricultural production due to the adoption and utilization of new technologies. Some factors were found to be positively related to ICT utilization. Age, education and training made positive contributions at 5% level of probability. Conclusion It was therefore concluded that youth need resources (education and training) in order to utilize ICT in food production. It is recommended youth need empowerment and training to utilize ICT for food production (Jiriko, Obianuko & Jiriko, 2015)[9]. Oyeyinka and Bello (2013)[16] found out that majority (61.3%) of the respondents indicated that there were low level category of ICTs users in agricultural practices. Their findings also showed that, marital status and educational attainment of the respondents had significant relationship with the level of use of ICTs for agricultural marketing information on a 0.05 level of significance. Their study recommends that government and other stake holders in the Information and Communication Technology industries should endeavor to eliminate the identified barriers to the effective use of ICTs for marketing information outlets in the study area (Oyeyinka & Bello, 2013)[16]. Okwusi, Nwachkwu and Ekumankama (2009) efforts should be made by Federal, State and Local Governments to provide adequate ICT resources in both urban and rural areas. The Ministry of Information and Communication need to carry out a massive sensitization of the potentials of the ICTs for the speedy or timely dissemination of information to farmers. Intensive training in the use of ICTs should be organized by government to enable farmers know how to make use of varied ICT resources. Massive awareness campaign should be conducted among farmers articulating the use as well as relevance of ICTs in agricultural information exchange. Olaniyi, et al. (2013)[13] categorised radio, television, video recorder, audio cassette, mobile phone (GSM), computer and camera into high level of awareness and access. These ICT tools were also rated as highly relevant to cassava production activities in the area of cassava stem selection, land selection, land preparation, time of planting of cassava stem; and marketing of cassava produce. Based on their result using independent sampled t-test, there

were significant differences in the mean scores of awareness and access to radio, television, computer, video and camera. These ICT tools were highly relevant to cassava production in the study area. Olaniyi et al. (2013)[13] also established that there is a significant relationship between age ($r = -0.434$, $p \leq 0.05$) and accessibility to ICT. Sequel to the findings of the study, it was recommended that, the extension institutions in Nigeria should concentrate their effort on agricultural information delivery through these ICT facilities. Lucky and Achebe (2013) said, ICT as an indispensable tool for information dissemination cuts across every field of knowledge. However the use of ICT poses a great challenge to the extension worker confronted with the burden of disseminating agricultural information to rural farmers because of their high level of illiteracy and the low level of deployment of ICT. The findings showed that the low level deployment of ICT in information dissemination leaves a lot of room for improvement. Rosebella and Kate (2016) discovered in their work that most African countries have not yet devoted adequate attention in providing their citizens with the necessary access to information, especially in rural areas, where 70-80% of the African population lives. Thus, to utilize the increasing growth of ICTs, farmers are to pay attention towards efficacy of ICTs in agricultural production.

3. METHODOLOGY

The study examined the Information and Communication Technologies (ICT's) usage among small scale farmers and investigated the factors influencing its usage among the farmers Esan community in Edo State. Data were collected from 75 small scale farmers in Esan West and Ugueben local governments in Edo State through the use of structured questionnaire. Purposive sampling technique was used for the selection. The questionnaire elicited information on factors limiting the use of ICTs and the extent of influence it has across age group of farmers in the community. Data were analyzed using inferential statistics such as Analysis of variance (ANOVA) and Least Square method.

4. DATA ANALYSIS AND INTERPRETATION

Table 1 shows the responses given by farmers on some factors limiting the use of ICT on farming activities across different age group using analysis of variance. This was done in order to determine whether there is any significance difference in the way these factors hinders the farmers in their adoption of ICT. Factors such as inability of farmers to use ICT; lack of technological infrastructure; cost of technology; fear of technology; and not enough time to spend on technology as well as not understanding the value of ICT, awareness; and trustworthiness of the content showed a statistical difference across famers age group at 0.05 level of significance. Indicating that there is an evidence to suggest these factors affect farmers across age group differently. The work of Oyeyinka and Bello support this findings as recorded that majority of farmers indicated that there is low level category of ICTs users among them. Olaniyi et al. (2013)[13] also affirmed that access to ICTs had significant influence on agricultural produce. The compared results specifically demonstrates that the individual factors which contribute to the adoption of ICT were significantly different from zero (0) implying that the importance of these factors to the adoption ICT cannot be attributed to the mere chance as they are significant variables influencing ICT adoption. However, a further analysis of multiple comparisons using least significant difference (LSD) test was carried out to determine actual point along the age groups where the major differences lied.

Table 1: Factors limiting the use of ICT on farming

ANOVA					
	Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
Inability to use ICT	85.986	71	4.571	3.253	.017
Hard to use	102.000	71	3.672	1.649	.172
Technological infrastructure	71.500	71	3.955	3.475	.012
Cost of technology	81.653	71	3.869	2.684	.039
Fear of technology	119.653	71	6.440	3.322	.015
Time to spend on technology	131.778	71	5.604	2.949	.026
Value of ICT	100.611	66	5.634	3.548	.011
Training	77.500	71	3.430	2.388	.060
Better alternative	88.507	66	2.217	.615	.654
Impediments	69.167	65	1.691	.544	.704
Integrated with farm system	90.800	69	3.496	1.777	.144
Trustworthiness	135.843	69	8.218	3.868	.007
Illiteracy on ICT skills	152.800	69	6.724	2.317	.066

The multiple comparisons result was adopted to test the differential impact of age on the adoption of ICT as contained in table 2. The result shows that age differences has a pronounce bearing on the inability to use ICT.

Higher age tends to enhance the adoption of ICT in agricultural processing since they become more acquainted with the importance and technical skills necessary to efficiently use ICT. For instance, the multiple comparisons test reveals that farmers of between ages 29 years and below, 30 to 39 years, and 40 to 49 years reported a high negative effect of their inability to use ICT for agricultural processing more than farmers of age 50 to 59 years. Farmers between age 50 and 59 years tends to report less on the negative impact of their inability to use ICT and its consequences on farm productivity.

Similarly, with respect to the differential impact of age groups on technological infrastructure, table 3 shows that lower age group admitted that technological infrastructure is a factor limiting the adoption of ICT. Apparently, as the farmers advances in age, the ability to adopt ICT on the basis of technological infrastructure become more significant invariably, there is evidence of heterogeneous impact of the age group on the adoption of ICT using technology infrastructure as a factor. This has an important policy with which shows that training and acquaintance of farmers with the relevant infrastructure should be a continuous process. For instance, within age group 40-49, one significantly level was observed, while for age group 50-59 years two significantly revels were observed and for 60 years and above, three significance levels were observed indicating that, the individual age group have heterogeneous and varying effect on ICT adoption.

Table 2: Multiple comparisons on age group of farmers and inability to use ICT

Multiple Comparisons LSD					
Dependent Variable	Age group	Age group	Mean Difference	Std. Error	Sig.
Inability to use ICT	29 and below	30 - 39	.038	.374	.920
		40 - 49	-.034	.374	.929
		50 - 59	1.224*	.413	.004
		60 and above	.588	.356	.103
	30 - 39	29 and below	-.038	.374	.920
		40 - 49	-.071	.392	.856
		50 - 59	1.186*	.429	.007
		60 and above	.550	.374	.146
	40 - 49	29 and below	.034	.374	.929
		30 - 39	.071	.392	.856
		50 - 59	1.257*	.429	.005
		60 and above	.622	.374	.101
	50 - 59	29 and below	-1.224*	.413	.004
		30 - 39	-1.186*	.429	.007
		40 - 49	-1.257*	.429	.005
		60 and above	-.635	.413	.129
	60 and above	29 and below	-.588	.356	.103
		30 - 39	-.550	.374	.146
		40 - 49	-.622	.374	.101
		50 - 59	.635	.413	.129

Table 3: Multiple comparisons on age group of farmers and Technological infrastructure

Multiple Comparisons LSD					
Dependent Variable	Age group	Age group	Mean Difference	Std. Error	Sig.
Technological infrastructure	29 and below	30 - 39	-.080	.339	.815
		40 - 49	-.008	.339	.980

		50 - 59	.706	.375	.064
		60 and above	.882*	.322	.008
	30 - 39	29 and below	.080	.339	.815
		40 - 49	.071	.355	.841
		50 - 59	.786*	.389	.048
		60 and above	.962*	.339	.006
	40 - 49	29 and below	.008	.339	.980
		30 - 39	-.071	.355	.841
		50 - 59	.714	.389	.071
		60 and above	.891*	.339	.011
	50 - 59	29 and below	-.706	.375	.064
		30 - 39	-.786*	.389	.048
		40 - 49	-.714	.389	.071
		60 and above	.176	.375	.639
	60 and above	29 and below	-.882*	.322	.008
		30 - 39	-.962*	.339	.006
		40 - 49	-.891*	.339	.011
		50 - 59	-.176	.375	.639

Table 4 reveals how significant cost of technology is to the age groups, the result clearly show similar pattern as previously noticed, for lower age group, 29 and below only one significant point was observed at 0.05 level of significant. For 30 – 39 age group, the significance level increase marginally to two. This was however repeated in the case of 40-49 and that of 50-59 age groups. Finally, for age group 60 and above, three significant levels were observed. Evidentially, there is one level of convenience on the adoption of ICT using cost of technology at the middle age group.

On the fear of technology (Table 5), the empirical result assumed a different dimension from the observed pattern. At lower level of age group 29 and above, 30-39 and 40-49, the fear of technology seems to be relatively insignificant, while for 50-59 and 60 age groups and above, the fear of technology was more pronounced. This result corroborates the reality that the younger age group tend to be more conversant with the intricacies of technology known as the digital age revolution where every youth is well acquainted with technology. Therefore, fear of technology seems to be more significant at higher age group.

Table 4: Multiple comparisons on age group of farmers and Cost of technology

Multiple Comparisons LSD					
Dependent Variable	Age group	Age group	Mean Difference	Std. Error	Sig.
Cost of technology	29 and below	30 - 39	-.113	.370	.760
		40 - 49	-.185	.370	.619
		50 - 59	.729	.408	.079
		60 and above	.706*	.352	.049
	30 - 39	29 and below	.113	.370	.760
		40 - 49	-.071	.387	.854
		50 - 59	.843	.424	.051
		60 and above	.819*	.370	.030
	40 - 49	29 and below	.185	.370	.619

		30 - 39	.071	.387	.854
		50 - 59	.914*	.424	.035
		60 and above	.891*	.370	.019
	50 - 59	29 and below	-.729	.408	.079
		30 - 39	-.843	.424	.051
		40 - 49	-.914*	.424	.035
		60 and above	-.024	.408	.954
	60 and above	29 and below	-.706*	.352	.049
		30 - 39	-.819*	.370	.030
		40 - 49	-.891*	.370	.019
		50 - 59	.024	.408	.954

*. The mean difference is significant at the 0.05 level

Table 5: Multiple comparisons on age group of farmers and Fear of technology

Multiple Comparisons LSD					
Dependent Variable	Age group	Age group	Mean Difference	Std. Error	Sig.
Fear of technology	29 and below	30 - 39	.924*	.441	.040
		40 - 49	.853	.441	.057
		50 - 59	1.653*	.487	.001
		60 and above	.412	.419	.329
	30 - 39	29 and below	-.924*	.441	.040
		40 - 49	-.071	.461	.877
		50 - 59	.729	.505	.154
		60 and above	-.513	.441	.249
	40 - 49	29 and below	-.853	.441	.057
		30 - 39	.071	.461	.877
		50 - 59	.800	.505	.118
		60 and above	-.441	.441	.320
	50 - 59	29 and below	-1.653*	.487	.001
		30 - 39	-.729	.505	.154
		40 - 49	-.800	.505	.118
		60 and above	-1.241*	.487	.013
	60 and above	29 and below	-.412	.419	.329
		30 - 39	.513	.441	.249
		40 - 49	.441	.441	.320
		50 - 59	1.241*	.487	.013

*. The mean difference is significant at the 0.05 level

Table 6 shows some level of convergence between four age groups (20 above, 30-39, 40-49 and 50-59) as required from time spent on technology. This implies that a considerable level of time is spent on technology at these age groups. At higher level of age group (60 and above), the time spent on technology tends to reduce since at that level, the farmers seem to approach the upper level. This indicates that less considerable time is spent on technology. Table 7 shows result on value of ICT and it empirically revealed that with age group 20 and below,

the value of ICT seems to be significant at three different levels, for age group 20-29 only one level of significant is detected. While other age groups are insignificant. This result shows that at lower level of age, the value of ICT tends to be more appreciated, while this relevance decline at higher level.

In relation to trustworthiness as a factor to be considered in the adoption of ICT as shown in table 8, the result clearly shows that within age group 29 and below, three level of significant are noticed. For age group 30-39, 40-49, 50- 59, 60 and above, only one level of significance was observed indicating that at these levels, the trustworthiness in term of the efficacy of ICT is not very strong. The implication is that lower age group tend to trust the efficacy of ICT than higher age group. The result implies that the absorption and adoption of ICT is relatively high at lower level of age.

In all, the efficacy of the adoption of ICT in terms of the trust that farmers have on ICT seems to have a very high impact at age group 20-29 than other cross section of age group.

Table 6: Multiple comparisons on age group of farmers and Time to spend on technology

Multiple Comparisons LSD					
Dependent Variable	Age group	Age group	Mean Difference	Std. Error	Sig.
Time to spend on technology	29 and below	30 - 39	.429	.467	.362
		40 - 49	-.714	.467	.131
		50 - 59	1.000	.515	.057
		60 and above	-.118	.444	.792
	30 - 39	29 and below	-.429	.467	.362
		40 - 49	-1.143*	.489	.022
		50 - 59	.571	.535	.290
		60 and above	-.546	.467	.246
	40 - 49	29 and below	.714	.467	.131
		30 - 39	1.143*	.489	.022
		50 - 59	1.714*	.535	.002
		60 and above	.597	.467	.206
	50 - 59	29 and below	-1.000	.515	.057
		30 - 39	-.571	.535	.290
		40 - 49	-1.714*	.535	.002
		60 and above	-1.118*	.515	.034
	60 and above	29 and below	.118	.444	.792
		30 - 39	.546	.467	.246
		40 - 49	-.597	.467	.206
		50 - 59	1.118*	.515	.034

*. The mean difference is significant at the 0.05 level

Table 7: Multiple comparisons on age group of farmers and Value of ICT

Multiple Comparisons LSD					
Dependent Variable	Age group	Age group	Mean Difference	Std. Error	Sig.
Value of ICT	29 and below	30 - 39	1.017*	.402	.014
		40 - 49	.731	.402	.073
		50 - 59	1.588*	.444	.001

		60 and above	.706	.382	.069
	30 - 39	29 and below	-1.017*	.402	.014
		40 - 49	-.286	.421	.499
		50 - 59	.571	.461	.219
		60 and above	-.311	.402	.442
	40 - 49	29 and below	-.731	.402	.073
		30 - 39	.286	.421	.499
		50 - 59	.857	.461	.067
		60 and above	-.025	.402	.950
	50 - 59	29 and below	-1.588*	.444	.001
		30 - 39	-.571	.461	.219
		40 - 49	-.857	.461	.067
		60 and above	-.882	.444	.051
	60 and above	29 and below	-.706	.382	.069
		30 - 39	.311	.402	.442
		40 - 49	.025	.402	.950
		50 - 59	.882	.444	.051

*. The mean difference is significant at the 0.05 level

Table 8: Multiple comparisons on age group of farmers and Trustworthiness

Multiple Comparisons LSD					
Dependent Variable	Age group	Age group	Mean Difference	Std. Error	Sig.
Trustworthiness	29 and below	30 - 39	1.036*	.479	.034
		40 - 49	1.311*	.469	.007
		50 - 59	1.782*	.518	.001
		60 and above	1.320*	.453	.005
	30 - 39	29 and below	-1.036*	.479	.034
		40 - 49	.275	.500	.585
		50 - 59	.746	.546	.177
		60 and above	.284	.485	.561
	40 - 49	29 and below	-1.311*	.469	.007
		30 - 39	-.275	.500	.585
		50 - 59	.471	.538	.384
		60 and above	.009	.475	.985
	50 - 59	29 and below	-1.782*	.518	.001
		30 - 39	-.746	.546	.177
		40 - 49	-.471	.538	.384
		60 and above	-.462	.524	.380
	60 and above	29 and below	-1.320*	.453	.005
		30 - 39	-.284	.485	.561

		40 - 49	-.009	.475	.985
		50 - 59	.462	.524	.380

*. The mean difference is significant at the 0.05 level

5. CONCLUSION

A number of important policy issues can be generated from the analysis. First, the respective factors which influence the adoption of ICT are; inability to use ICT, technological infrastructure, cost of technology, fear of technology and trustworthiness. Second, the individual factors tend to have varying impact on the adoption of ICT with respect to age, implying that age consideration is relevant in the analysis of these factors that determinate the adoption of ICT

Third, the result clearly shows that lower age group tend to favour factors such as: time spent on technology, value of ICT and trustworthiness, while higher age group are compatible with technological infrastructure and the inability to use ICT. This therefore, implies that adoption of ICT begins at lower age group, While, the ability to sustain it grow with higher age group.

Finally, the result provides evidence that digital age revolution has dramatically led to increase in knowledge and that the use of ICT begins more with the youth. At higher age group, this tendency tends to decline.

6. RECOMMENDATIONS

Based on the empirical findings of this study, the following policy recommendation are advanced:

1. All aggressive policy of digital revolution should be lunch. This should re-orient farmers and make them conversant with the beneficial effect of ICT in agricultural process.
2. Increase investment in technological infrastructure, particularly telecommunication, power etc. this are necessary to support the lunch of information tech.
3. Conversant and Policy makers should develop effective cost reducing technologies. This will help the absorption of ICT in agricultural practices.
4. ICT seminars should be lunch using an integrated and holistic approach involving both public and private partners. This would help in enhancing the value of ICT and reduce the fear of technology common among the youth.
5. Finally, supplementary approach to the adoption of ICT such as regular training and ICT value chain in agriculture should be implemented.

6. REFERENCES

[1] Akintelu, S. O. Irefin, I. A & Akarakiri, J. B. (2017). Information and Communication Technologies and Project Planing in the Nigerain Food and Beverage Industry. *Journal of Global Economics, Management and Business Research*. Vol 9. No. 2, pp. 52 – 59

[2] Adekunjo O. A. & Ebohon S. (2013). The Impact of Information and Communication Technology on research output of Scientist in two selected Nigeria Agricultural Research Institute. *ARPN Journal of Science and Technology*, VOL.3 No. 5, pp…

[3] Agnes, G. M. (2010). Information and Communication Technology for Rural Farmers Market Access in Tanzania. *Journal of Information Technology Impact* Vol. 10, No. 2, pp. 111-128.

[4] Ayodele, O. S. Obafemi, F. N. & Ebong, F. S (2013). Challenges facing the achievement of the Nigeria Vision. *Global Advanced Research Journal of Socioal Sciences*. Vol. 27 pp. 143 – 157

[5] Esumeh, C. (2016). ERP for the Agricultural Sector in Nigeria. Transforming Big Data into Big Value in the Agriculture Industry. Signal Alliance. Lagos.

[6] Gelb, E. Maru, A. Brodgen, J. Dodsworth, E. Sanmii, R & Pesce, V. (2008). Adoption of ICT Enabled information Systems for Agricultural Development and Rural Viability. 6th Conference of the Asian Federation of Information Technology in Agriculture (AFITA)/12 World Congress of the International Association of agricultural Information Specialists. (IAALD)/6 World Congress on Computer in Agriculture (WCCA) in Atsugi Japan.

[7] Hopestone, K. C. (2014). The Role of ICTs in Agricultural Production in Africa. *Journal of Development and Agricultural Economics* Vol. 6(7), pp. 279-289.

[8] Kante, M. Oboko, R & Chepken, C. (2016). Factors affecting the use of ICTs on Agricultural input Information by farmers in developing Countries. *AIMS Agricultural and food*, 1(13): 315-329.

[9] Jiriko, R. K. Obianuko, J. C & Jiriko, K. G (2015). Socio-economic factors affecting ICT utilization by Youths in fish farming in kaduna state, Nigeria. Global Journal of Agricultural Research, Vol.3, No.4, pp.12-22, Published by European Centre for Research Training and Development UK (www.eajournals.org)

[10] Lucky, A. T. & Achebe, N. E. E. (2013). Information Communication Technology and Agricultural Information Dissemination: A Case Study of Institute of Agricultural Research (IAR) Research, *Journal of Information Technology* 5(1): 11-17.

[11] Mwakaje, A. G. (2010). Information and Communication Technology for Rural Farmers Market Access in Tanzania. *Journal of Information Technology Impact* Vol. 10, No. 2, pp. 111-128,

[12] Okwusi, M. C, Nwachkwu I. & Ekumankama O. O. (2009). Effect of Utilization of ICTs for Agricultural Information on Social Economic Characteristics of Farmers in Southern Nigeria Global Approaches to Extension Practice, A journal of Agricultural Extension

[13] Olaniyi, O. A. Adetumbi, S. I. & Adereti, M. A (2013). Accessibility and relevance of information and communication technologies (ICTs) among cassava

farmers in Nigeria , *African Journal of Agricultural Research*, Vol. 8 (35), pp. 4514 – 4522.

[14] Omorogiuwa, O. Zivkovia, J. & Ademoh, F. (2014). The Role of Agriculture in the Economic Develoment of Nigeria. *European Scientific Journal* Vol. 10 No. 4, pp. 133 -147

[15] Oshikoya, T. W & Hussain, M. N. (2007). Information Technology and the Challenge of Economic Development. In African E-Markets Information and Economic Development, In Opoku-Mensah, A. and Salih, M.A.M. (Eds.), *Economic Commission for Africa*.; 43-76.

[16] Oyeyinka R. A. & Bello R. O. (2013). Farmers Use of ICTs for Marketing Information Outlets in Oyo State, Nigeria. *Journal of Agricultural Science;* Vol. 5, No. 11, pp.

[17] Rosebella J. L. & Kate, O. L (2016). Information Communication Technologies and Marketing Decisions Among Small Scale Farmers in Kenya: review of evidence. *International journal of economics, commerce and management.* vol. IV, issue 4, April 2016 Licensed under creative common page 1167 *Http://ijecm.co.uk/* issn 2348 0386

[18] Usman, J. M. Adeboye, J. K. Oluyole K. A & Ajijola S. (2012). Use of Information and Communication Technology by Rural Farmers in Oluyole Local Government Area of Oyo State, Nigeria. *Journal of stored products and postharvest Research*, Vol. 3(11), pp. 156-159