KNOWLEDGE OF INFORMATION AND COMMUNICATION TECHNOLOGIES USAGE AMONG ARABLE FARMERS IN EKITI STATE, NIGERIA

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ABSTRACT

The study focused on the knowledge of information and communication technologies (ICTs) usage among arable farmers in Ekiti State, Nigeria. A multi-stage sampling procedure was employed to select 240 respondents in the study area. Primary data was collected from the respondents through a well-structured interview schedule and analyzed using descriptive statistics as well as regression analysis. The mean age of the respondents was 54±14 years respectively, and had a mean household size of 6±3 persons. Most (87.5%) had formal education. More than half (55.8%) had no contact with extension agents. Mobile telephone (35.6%), radio (32.3%), and television (11.3%) were the most available ICTs. Awareness of ICTs by the respondents was 2.75. Awareness of mobile phones for making calls or text messages to co-farmers or family members (3.7), mobile phones used as electronic diary (3.2), radio for listening to agricultural programs (3.2), mobile phone to receive and disseminate information to transporters and laborers (3.0), television for getting information on farm inputs (2.9), mobile phone for farm business (2.8), mobile phone for market update (2.8) and FM radio for news and current affairs (2.8) and mostly (58.3%) had moderate knowledge of ICTs usage. Significant relationships exist between household size, extension agent contact, awareness level, and knowledge of ICT usage. Efforts should be made to increase farmers' knowledge of ICTs usage especially computer-based technologies for documenting farm activities through extension agent contact, creating more awareness of ICTs, and providing incentives to acquire such ICTs tools for agricultural proficiency to enhance productivity.

Keywords: ***knowledge; information; communication; technologies; usage***

INTRODUCTION

Information and Communication Technologies (ICTs) play a critical role in the agricultural development of a nation. ICTs help in transmitting relevant information to farmers so as to update their knowledge of improved agricultural technologies. ICT is any device, tool, or application that permits the exchange or collection of data through interaction or transmission which includes radio, satellite imagery, mobile phones, and electronic money transfers (Salampasis and Theodoridis, 2013). Information and communication technologies can also be grouped into broadcast technology (radio, television), print technology (print media), and computer/microelectronic technology (telephones, computer, fax, email, CD-ROM, Geographical Information System (GIS) and the internet) (Subejo, *et al.*, 2019). Radio and television help farmers access marketing information and improved technologies (Das *et al*., 2021). Print media such as posters, pamphlets, newspapers, magazines, and journals are used in disseminating agricultural information. Computers/ microelectronic technologies are used for the record-keeping of information involved in agricultural production and processing. Information and communication technologies usage among farmers create

access to relevant and suitable information on best agricultural practices, innovations, postharvest handling, value-addition, and marketing strategies for improved food production. The use of ICTs in the agricultural sector as the largest economic sector in most African countries affords the best chance of economic growth and poverty alleviation on the continent (World Bank, African Development Bank, African Union Commission, 2012).

The key players in agriculture are the farmers, and their ability to use the technologies defines the role of ICT in agriculture (Nwagwu and Opeyemi, 2015). There are a large number of ICT-enabled services that can improve many processes in the agricultural sector such as software used for supply chain or financial management, mobile applications for small farm management, applications for agricultural land use optimization, precision agriculture applications, and others which fall into other categories of ICT-enabled services (Salampasis and Theodoridis, 2013). ICTs provide agricultural information to enhance proficiency among farmers for better productivity. Thus, the knowledge of ICTs usage increases the flow of applicable information in agricultural activities for the agricultural development of the nation.

In Ekiti State, agriculture is a predominant occupation and most of the farmers operate on small-scale production. The farmers are mostly rural dwellers having little or no access to relevant agricultural information. Underutilization of ICT tools especially among farming households has contributed to problems militating against Nigerian agriculture (Olaniyi and Ismaila, 2016). Therefore, these farmers are faced with the challenges of inadequate agricultural information on how to increase yields and improve their level of production and standard of living. However, Information and communication technology (ICT) is crucial in the dissemination of agricultural information to farmers to improve their livelihoods (Ajayi, 2022). ICT offers a great opportunity to reach farmers with the required technical information to increase yields (Chikaire, 2017).

Furthermore, agricultural information which is aimed at increasing farmers' efficiency and agricultural production would indirectly meet the food demands of the ever-increasing population in the country. Agricultural development is sine-qua-non to improving the standard of living of the majority of the nation's populace. Therefore, the knowledge of ICTs usage in agricultural activities among farmers in Ekiti State must be determined to provide quick and lasting solutions to pending problems faced by farmers in their production activities for improved food production and enhanced productivity. Thus, the study seeks to determine the knowledge of Information and communication technologies usage among farmers in Ekiti State.

The study aimed to examine the knowledge of ICTs usage among farmers in Ekiti State, Nigeria. The specific objectives of the study were to:

i. describe the socio-economic characteristics of farmers in the study area;
ii. identify available ICTs tools by the farmers in the study area;
iii. determine the farmers' awareness of various ICTs in the study area;
iv. determine the level of knowledge of ICTs usage among the respondents in the study area.
v. determine factors influencing knowledge of ICTs usage among the respondents in the study area.

MATERIALS AND METHOD

The study area was Ekiti State. The state is located in Southwest Nigeria within the tropics. It is predominantly an agrarian state with food crops grown such as cassava, yam, cocoyam, vegetables, and grains such as maize, rice, etc. The state has two main seasons i.e. the rainy season and the dry season. A multi-stage sampling procedure was employed in the selection of the respondents in the study area. Firstly, four out of sixteen Local Government Areas (LGAs) were randomly selected namely Ikere, Emure, and Moba LGAs. The second stage involved selecting three farming communities from each LGA randomly. These were Ikere (Agamo, Ugbo-Iyan, and Aba Arokun); Emure (Ose, Owode, and Owosi), and Moba (Aramoko, Kajola, and Egede). Lastly, there was a random selection of twenty (20) arable farmers from each of the communities, making a sample size of two hundred and forty (240) arable farmers. A well-structured interview schedule was employed in the collection of primary data. Descriptive statistics such as mean, frequency counts, and percentages were used to analyze objectives 1 and 2. Likert-type scale was employed to measure objective 3 as Very Much Aware (4), Much Aware (3), Aware (2), and Not Aware (1). The mean score of the scaling statement is 2.5. Therefore, any mean score value greater or equal to 2.5 was regarded as Aware while any mean score value less than 2.5 was regarded as Not aware. Objective 4 was measured using the Likert-type scale as High (4), Moderate (3), Low (2), and No knowledge (1) with any mean score value greater or equal to 2.5 was regarded as High while any mean score value less than 2.5 was regarded as Low.

Knowledge score was obtained from the summary of respondents' responses to 10 items on knowledge and skills in the use of ICT. The maximum score for level of knowledge was 40 points while the minimum score was 10. The minimum score was subtracted from the highest score; the difference was divided by three to get three levels of knowledge. The quotient was used as a class interval to categorize the respondents as having low, moderate, and high levels of knowledge. Thus, the levels of knowledge were determined as, Low level of knowledge (10-19), Moderate level of knowledge (20-29), and High level of knowledge (30-40). Furthermore, inferential statistics such as regression analysis was used to analyze objective 5.

Multiple Regression Model:

The model was specified in its explicit form thus;

$$Y = f(bo + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}X_{10} + e)$$

Where,

Y = Knowledge index of the respondents

bo = Constant b_1 – b_5 = Coefficients of multiple regression

X_1 = Age of the respondents (years)

X_2 = Gender (male =1, female =0)

X_3 = Household size (persons)

X_4 = Level of education (educated =1, not educated =0)

X_5 = Farming experience (years)

X_6 = Farm labour (family labour = 1, hired labour = 0)

X_7 = Nature farming (full time =1, part-time = 0)

X_8 = Social participation (participated = 1, not participated =0)

X_9 = Agricultural extension contact (contact =1, no contact 0)

X_{10} = Level of awareness (aware =1, not aware = 0

e = Error term

RESULTS AND DISCUSSION

Socio-economic characteristics of the respondents

The mean age was 54±14.0 years. This means that most of the respondents were in their middle age and this might influence their level of knowledge of ICTs to get relevant agricultural information. This finding concords with Tomar et al. (2016) who reported that the majority of the farmers were in their middle age and had no influence on the use of ICTsThe result revealed that most of the respondents were males (66.7%) and married (73.3%). The respondents had a mean household size of 6±3.0 persons. This means that family farm labour would be available for farming. This finding agrees with the findings of Williams and Agbo (2013) reported the mean household size of the farmers was 6 which could be of great importance as a source of cheap and affordable farm labour was also revealed that the respondents mostly (87.5%) had formal education. This could enhance the utilization of ICTs among the farmers. This finding is in line with the findings of Chikaire et al. (2017) that about 87 per cent of farmers had formal education and would use ICTs. The mean years of experience for the respondents were 26.0 ±13.0 years, mostly (64.2%) used family labour, and 58.2 per cent operated as full-time farmers. Most (75.8%) of the respondents did not participate in social groups. This might be due to their inactive age. This aligns with Sennuga et al. (2020) that younger people tended to be more productive than their older counterparts. Most (55.8%) had contact with extension agents.

Availability of ICTs tools

The result revealed that the respondents indicated available ICTs tools as mobile telephone (35.6%), radio (32.2%), and television (11.3%). This result means that the use of mobile telephones, radio, and television were the most common ICTs tools available to the farmers. This result implies that agricultural information will be less derived from other ICT tools apart from mobile telephones, radio, and television. This might be due to technological know-how to operate the internet, computer, and video recorder, and limited access to print media in rural areas. This finding is in agreement with Sennuga *et al.* (2020) who reported that mobile telephones, radio, and television are the most available ICTs devices among farmers.

Level of respondents' awareness of ICTs

The result revealed that mobile phones had the highest mean score of 3.75 indicating that the arable farmers were much more aware of mobile phones than other ICTs. Radio had a mean score of 3.59, followed by Television (3.41), Internet (2.59), and Video recorder (2.57). The respondents were aware of the radio, television, internet, and video recorder as ICT tools with a grand mean of 2.75. This implies that the respondents were aware of ICTs and this might influence their knowledge of these ICTs. This finding agrees with the findings of Nnenna (2013) that the farmers were aware of phones, radio, and television.

Farmers' knowledge of ICTs usage

The study revealed that the respondents indicated a high level of knowledge of ICTs usage with the mean scores as the use of mobile phones as electronic diaries and reminders for meetings (3.2), radio for listening to agricultural programmes (3.2), receiving and disseminating information through mobile phone to transporters and laborers (3.0). The results further revealed the mean scores of television for getting information on farm inputs (2.9), mobile phone for sending and receiving SMS (short message service) on farm business (2.8), mobile phone for market update (2.8), FM radio for news and current affairs (2.8), and

mobile phone for making calls or text messages to co-farmers or family members (2.7) were indicated by the respondents. This means that the farmers' knowledge of ICT tools such as mobile phones, radio, and television was high. This finding agrees with Ajayi *et al.* (2018) who found that farmers had more knowledge of the use of FM radio, mobile phones, and television which are the commonest in ICTs used by farmers.

Table 1: Socio-economic characteristics of the respondents

Socio-economic Variables	Frequency	Percentages	Mean	Standard deviation
Age (years)				
≤ 30	10	4.2	54	14.0
31 – 40	32	13.3		
41 – 50	64	26.7		
51 – 60	60	25.0		
≥ 61	74	30.8		
Gender				
Male	160	66.7		
Female	80	33.3		
Marital Status				
Single	12	5.0		
Married	176	73.3		
Divorced	30	12.5		
Widowed	22	9.2		
Household size (persons)				
≤ 3	40	16.7	6	3.0
4-6	142	59.2		
7-9	54	22.5		
> 9	4	1.7		
Educational level				
No Formal Education	30	12.5		
Primary Education	56	23.3		
Secondary Education	70	29.2		
Tertiary Education	84	35.0		
Farming Experience (years)				
≤ 10	18	7.5	26	13.0
11-20	86	35.8		
21-30	54	22.5		
31-40	52	21.7		
≥ 41	30	12.5		
Source of Farm labour				
Family labour	154	64.2		
Hired labour	86	35.8		
Nature of farming				
Part-time	100	41.7		
Full-time	140	58.3		
Social group participation				

Participated	182	75.8
Not participated	58	24.2
Contact with extension agents		
Contact	134	55.8
No contact	106	44.2

Source: Field Survey, 2021

Table 2: Distribution of respondents by available ICT Tools

*Available ICTs	Frequency	Percentage
Mobile telephone	107	35.6
Radio	97	32.2
Television	34	11.3
Internet	27	9.0
Computer	16	5.2
Video recorder	15	5.0
Printer media	5	1.7

*Multiple responses
Source: Field Survey, 2021

Table 3: Level of respondents' awareness of ICTs

ICTs	Very much aware	Much aware	Aware	Not aware	Mean
Mobile Telephone	206(85.8)	20(8.3)	4(1.7)	10(4.2)	3.75
Radio	168(70.0)	52(21.7)	14(5.8)	6(2.5)	3.59
Television	130(54.2)	84(25.0)	20(8.3)	6(2.5)	3.41
Video recorder	22(9.2)	110(45.8)	92(38.3)	16(6.7)	2.57
Projector	18(7.5)	82(34.2)	78(32.5)	62(25.8)	2.23
Telegram	12(5.0)	52(21.7)	80(33.3)	96(40.0)	1.91
Computer	40(16.7)	58(24.2)	78(32.5)	64(26.7)	2.31
Internet	42(17.5)	90(37.5)	76(31.7)	32(13.3)	2.59
Print media	38(15.8)	66(27.5)	86(35.8)	50(20.8)	2.36

*Percentages are in parenthesis Grand mean = 2.75
Source: Field Survey, 2021

On the contrary, the farmers' knowledge of digital computers and video recorders was low. This implies that farmers' knowledge of digital computers and video recorders for agricultural purposes was poor. This finding is in line with Mwanga *et al.* (2020) that computer-based technology for documenting farm records is not accepted by many small-scale farmers as it is still expensive to own a computer and most farmers do not prefer it as it is difficult to operate. However, the grand mean level of knowledge of ICTs was 2.78.

Furthermore, the results in Table 5 showed that 58.3 percent of the respondents had moderate knowledge of ICTs usage while 41.7 percent of the respondents had high knowledge. This means that most of the respondents had moderate knowledge of ICTs, implying that the respondents might have difficulty in using other ICT tools with high demand of technical knowledge to operate especially computer-based

technologies such as internet, fax, telegram, email, computer, and so on. This finding is in line with the findings of Kabir (2015) who found that farmers had medium knowledge of ICTs.

Table 4: Farmers' Knowledge in the use of ICTs

Knowledge and skills	High	Moderate	Low	No Knowledge	Mean
Mobile phone use as electronic diary and reminder for meetings and events	44(36.67)	61(50,83)	14(11.67)	1(0.83)	3.2
Radio for listening to agricultural programmes	47(39.17)	47(39.17)	24(20.00)	2(1.67)	3.2
Receiving and disseminating information through mobile phones to transporters and laborers	33(27.50)	55(45.83)	27(22.50)	5(4.17)	3.0
Television for getting information on farm inputs	29(24.17)	56(46.67)	28(23.33)	7(5.83)	2.9
Mobile phone for sending and receiving SMS (short message service) on farm business	36(30.00)	46(38.33)	17(14.17)	21(17.50)	2.8
Mobile phone for market update	22(18.33)	58(48.33)	33(27.50)	7(5.83)	2.8
Radio for receiving news and current affairs	35(29.17)	42(35.00)	30(25.00)	13(10.83)	2.8
Mobile phone for making calls or text messages to co-farmers or family members	2(1.67)	88(73.33)	25(20.83)	5(4.17)	2.7
Documenting farm activities through digital computer	13(10.830)	29(24.17)	46(38.33)	32(26.67)	2.2
Documenting farm activities through video recorder	16(13.33)	25(20.83)	44(36.67)	35(29.17)	2.2

*Percentages are in parenthesis Grand mean = 2.78

Source: Field Survey, 2021

Table 5: Knowledge score of ICTs usage

Knowledge score	Frequency	Percentage
Moderate	140	58.3
High	100	41.7
Total	240	100.0

Source: Field Survey, 2021

Factors influencing knowledge of ICTs usage among the respondents

The study revealed that agricultural extension contact, awareness of ICTs, household size, and farm labour significantly influence knowledge of ICTs usage among the respondents.

The results revealed that agricultural extension contact and awareness of ICTs

significantly influence the knowledge of ICTs at a 1% level of significance. The results revealed that the coefficient of agricultural extension contact was positively correlated with the knowledge of ICTs and statistically significant at a 1% level of significance. This indicates that an increase in agricultural extension contact might bring an increase in knowledge of ICTs among farmers. This could be due to the involvement of agricultural extension agents in sensitizing and training farmers on relevant agricultural information using ICTs tools. This finding agrees with the findings of Tomar *et al.* (2016) who found that agricultural extension contact had a positive significant relationship with ICT usage among farmers.

From the results, it was shown that awareness of ICTs had a positive relationship with the knowledge of ICTs and it was statistically significant at a 1% level of significance. This indicates that the more the awareness of ICTs, the higher the likelihood of an increase in knowledge of ICTs usage by the farmers. This might be attributed to the fact that the creation of awareness among farmers would sensitize them to the knowledge of ICTs usage. This finding corroborates the findings of Ajayi *et al.* (2018) who stated that farmers' awareness had a positive significant relationship with knowledge of ICTs.

Furthermore, the result revealed that household size had a significant relationship with the knowledge of ICTs at a 5% level of significance. The coefficient of household size of the respondents was positively related to the knowledge of ICTs and statistically significant at a 5% level. A positive significant relationship between household size and knowledge of ICTs usage indicates that household size might influence the knowledge and skills of ICTs. The implication is that the increase in household size might increase the knowledge of ICTs usage among farmers. This could be because the more the household size, the more the farmers' agricultural activities which might result in more reasons to acquire knowledge of ICTs usage for relevant agricultural information. This finding concords with the findings of Ajayi (2022) who reported that household size had a positive significant relationship with ICT usage among farmers.

Also, the coefficient of source of farm labour was negatively correlated with knowledge of ICTs usage and statistically significant at a 10% level. This is an indication that a reduction in the source of farm labour might bring an increase in knowledge of ICTs usage among farmers. Also, the more farm labour, the less knowledge of ICTs usage. This could be because most of the respondents indicated family labour as the source of farm labour which indicates that the farmers operate on small-scale production and might not be able to afford the cost of ICTs and this could limit their knowledge of ICTs usage. This finding is in line with the Food and Agricultural Organisation (2022) that as farm operations and the use of technologies increase, agricultural labour reduces.

CONCLUSION

The mean age of the respondents was 54 years, and the mean household size of 6 persons. Most (87.5%) had formal of education and a mean farming experience of 26 years. More than half (55.8%) had no contact with extension agents. Mobile telephones, radio, and television were the most available ICTs. Most of the farmers were aware of mobile telephone, radio, television, internet and video recorders but not aware of telegram, projector, computer and print media. The grand mean of awareness of ICTs tools was 2.75

Table 5: Factors influencing knowledge of ICTs usage among the respondents

Model	Standard Error	Standardized Coefficients	t	Significance
(Constant)	0.295		6.489	0.000
Age	0.005	-0.062	-0.374	0.709
Gender	0.080	-0.142	-1.585	0.116
Household size	0.018	0.223**	1.970	0.051
Level of education	0.179	0.057	0.674	0.502
Farming experience	0.006	0.043	0.247	0.806
Nature of farming	0.073	-0.099	-1.156	0.250
Social participation	0.084	0.086	0.998	0.320
Farm labour	0.134	-0.268*	-1.761	0.081
Extension contact	0.127	0.407***	2.719	0.008
Level of Awareness	0.066	0.338***	4.002	0.000

Source: Field Survey, 2021

Note: ***, **, and * denote statistically significant at 0.1, 0.5, 0.01 levels of significance respectively

Also, farmers' knowledge and skills of the use of ICT tools such as mobile phones for making calls or text messages to co-farmers or family members, mobile phone use as an electronic diary, radio for listening to agricultural programmes, receiving and disseminating information through mobile phone to transporters and laborers, television for getting information on farm inputs, mobile phone for farm business, mobile phone for market update and radio for receiving news and current affairs was high while the knowledge and skills of using digital computer and video recorder for documenting farm activities were low. Furthermore, most of the farmers had moderate knowledge of ICTs usage in their agricultural activities, implying that these farmers might not be able to maximize the use of ICT tools especially those technologies with high demand of technical knowledge to operate such as computer-based technologies.

Finally, the study revealed that household size, extension agent contact, and level of awareness had significant relationships with knowledge and skills of ICTs usage. The study, therefore, recommends that the government should make efforts to increase farmers' knowledge of ICTs usage, especially in documenting farm activities through extension training, creation of awareness and incentives to procure computer-based technologies for skill proficiency and better productivity.

REFERENCES

Ajayi, A. O., Alabi O. S., and Okanlawon B. I. (2018): Knowledge and perception of farmers on the use of information and communication technology (ICT) in Ife Central Local Government Area of Osun State: Implications for rural development. *Journal of Agricultural Extension and Rural Development*; 10(3), 44-53

Ajayi, G.T. (2022): The Use of Information and Communication Technologies among Farmers in Ekiti State, Nigeria. *Global Journal of Science Frontier Research;* 22 (1), 26-32.

Chikaire, J.U., Anyoha, N.O., Anaeto, F.C., and Orusha, J.O. (2017): Effects of Use of Information and Communication Technologies (ICTs) on Farmers' Agricultural Practices and Welfare in Orlu Agricultural Zone of Imo State, Nigeria. *International Journal of Research in Agriculture and Forestry*; 4(3), 6-15.

Das, S., Ahmed, K. U., & Awal, M. A. (2021). The role of radio and television in the dissemination of agricultural technologies among farmers of Bangladesh. *Bangladesh Journal of Agriculture*, 55-64.

Food and Agriculture Organization (2022).The State of Food and Agriculture 2022: Leverage Automation in Agriculture for Transforming Agrifood Systems. *Food and Agriculture Organization of the United Nations.* www.fao.org/publication .

Kabir, K. H. (2015): Attitude and Level of Knowledge of Farmers on ICT-based Farming. *European Academic Research*; 2(10), 13177-13196.

Mwanga, G., Mbega, E.,Yonah, Z. and Chagunda, M.G.G. (2020). How Information Communication Technology Can Enhance Evidence-Based Decisions and Farm-to-Fork Animal Traceability for Livestock Farmers. *The Scientific World Journal, 2020:1-12.*

Nnnena, E. A. (2013). Access and Application of Information and Communication Technology (ICT) among Farming Households of South East Nigeria. *Agriculture and Biology Journal of North America*; 4(6), 605-616.

Nwagwu, W.E. and Opeyemi, S. (2015). ICT Use in Livestock Innovation Chain in Ibadan City in Nigeria. *Advances in Life Science and Technology*, 32.

Olaniyi, O.A., and Ismaila, O.K. (2016). Information and Communication Technologies (ICTs) Usage and Household Food Security Status of Maize Crop Farmers in Ondo State, Nigeria: Implication for Sustainable Development. Library Philosophy and Practice (e-journal). 1446. http://digitalcommons.unl.edu/libphilprac/1446.

Salampasis, M., and Theodoridis, A. (2013): Information and Communication Technology in Agricultural Development. 6th International Conference on Information and Communication Technologies in Agriculture, Food and Environment (HAICTA 2013). *Procedia Technology;* 8, 1-3.

Sennuga, S.O., Conway, J.S., and Sennuga, M.A. (2020): Impact of Information and Communication Technologies (ICTs) on Agricultural Productivity among Smallholder Farmers: Evidence from Sub-Saharan African Communities. *International Journal of Agricultural Extension and Rural Development Studies*; 7(1), 27-43.

Subejo, S., Untari, D. W., Wati, R. I., and Mewasdinta, G. (2019). Modernization of agriculture and use of information and communication technologies by farmers in coastal Yogyakarta. *Indonesian Journal of Geography*, 51(3), 332-345.

Tomar, A., Bhardwaj, N., Verma, A. P., & Sawant, M. N. (2016). Association between socio-demographic profile

and extent of use of ICT among farmers. *International Journal of Agricultural Science and Research*, 6(6), 163-168.

Williams, E. E. and Agbo, I. S. (2013). Evaluation of the Use of ICT in Agricultural Technology Delivery to Farmers in Ebonyi State, Nigeria. *Journal of Information Engineering and Applications*, 3 (10): 18 -26.

World Bank, African Development Bank, African Union Commission, (2012): The Transformation Use of Information and Communication Technologies in Africa, https://siteresources.worldbank.org Accessed on (December 2012)