Comparative Analysis of Information and Communication Technology (ICT) Use by Agricultural Extension Workers in South-west and North-central Nigeria

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ABSTRACT

Location differences usually create challenges and opportunities in most economic activities the world over. The application of Information and Communication Technology (ICT) to agriculture is no exception. However, specific environments require specific solutions, which may be arrived at after the identification of peculiar challenges in order to achieve sustainable improvement efforts. Hence, this study assessed the differences in ICT use by extension workers in South-west and North-central Nigeria. A multi-stage sampling technique was adopted in selecting 140 extension personnel from four State Agricultural Development Programmes in Nigeria. A structured questionnaire was used to interview and elicit information from the respondents. Data generated were analyzed with descriptive statistics and (Binary) Logistic model. The proportion of respondents who did not have the requisite knowledge on computer use was slightly higher in the North-central (57.14%) than in the South-west (55.71%). Age and ownership of a personal computer (PC) were significant factors ($p < 0.1$) influencing the probability of using ICT to search for information by respondents in South-west Nigeria while age and computer training were the significant factors ($p < 0.1$) determining the probability of ICT use to search for information by respondents in North-central Nigeria. In the short-run, there is need for improvement of ICT literacy level of extension personnel in the North-central and training and retraining of extension personnel in the South-west while in the long-run, a succession plan for extension personnel should be implemented in both regions in order to replace older generation of extension workers with younger and dynamic, computer literate, ICT knowledgeable workers.

INTRODUCTION

Locational differences usually occur in most economic activities the world over. These differences could be in terms of challenges and opportunities. The differences in these areas could be as a result of socio-economic factors (such as gender, type of vocation and educational status), as well as concentration of activities (such as urbanization and existence of markets). The application of Information and Communication Technology (ICT) to agriculture is no exception. Gelb and Parker (2007) revealed that participants at the year 2005 fifth EFITA Conference in Portugal asserted that ICT adoption for Agriculture and Rural Development remains a major national and international concern. This is a reaffirmation of the submissions of researchers such as Grilliches (1957); Gelb, Schmidt and Rauschkolb (1985); Harsh (1986) as well as Lebowitz (2007).

Iddings and Apps (1990) used the farming survey carried out in the USA to synchronize factors influencing computer use by US farmers. The study (Iddings & Apps, 1990) made use of the differences existing from state to state in the US in synchronizing nine factors influencing the use of computers by

farmers. Also, Lebowitz (2007) confirmed that regional, national and international interest were part of the major obstacles faced by AGRIS (The International Information System for the Agricultural Sciences and Technology) of the Food and Agriculture Organization of the United Nations (FAO). Although the problems were later surmounted.

According to Gelb and Bonati (2007), specific environments dictate specific solutions. However, before solution(s) could be formulated and applied; the peculiar challenges need be identified and properly analyzed for the sustainability of whatever effort for improvement is to be put in place. In view of this, this study assessed the differences in the use of ICT in disseminating agricultural information by extension workers in South-west and North-central Nigeria.

METHODOLOGY

The study made use of multi-stage sampling technique in respondent selection. The first stage involved a random selection of two (North-central and South-west) out of the six geopolitical zones in Nigeria (33%) as the study area. Simple random sampling technique was adopted in the second stage in selecting two States each from the two selected geo-political zones.

The third stage was characterized by the random sampling of two zones each from the administrative zones of the Agricultural Development Programmes (ADPs) from the selected States. In the last stage, eighteen extension workers were randomly sampled with the use of a well-structured questionnaire from each selected zone of each state. This gives a total of 144 respondents. However, 120 questionnaire sets were found useful while the remaining (24) were rejected as a result of irresolvable deficiencies, such as inadequate information and serious inconsistencies (a 83.33% response rate).

Respondent specific information such as age, gender, educational and marital status as well as ICT specific information such as competency in the use of computer softwares and accessories; proficiency in the use of ICT equipment such as PCs and internet and perception on the relevance of ICT to agricultural extension were some of the information sourced by the structured questionnaires include.
The analytical technique used descriptive statistics and Chi-square statistics.
The Chi-square statistics used is as expressed below:

$$Y^2 = \sum[(B_i - X_i)(X_i)^{-1}] \text{ ---------- 1}$$

where:
Y^2 = Chi-square statistic;
$\sum$ = summation of;
B_i = observed value of variable;
X_i = expected value of variable.
The variables used for this analysis are:
GD = gender (GD = 1 if male, 0 otherwise);
AG = age of respondent (years);
MS = marital status (MS = 1 if married, 0 otherwise);
ES = educational status (ES = 1 if respondent holds a University degree, 0 otherwise);
SP = schooling period (years);
WE = working experience (years);
SI = income/salary (₦);
CU = computer proficiency (PC = 1 if respondent can use computer, 0 otherwise);
CT = computer training (CT = 1 if respondent has computer use training, 0 otherwise);
PC = computer ownership (PC = 1 if respondent owns computer, 0 otherwise);
SI = searching of agric. information (SI = 1 if respondent search information with computer, 0 otherwise);
DI = dissemination of agric. information (DI = 1 if respondent disseminate agric. information

using computer, 0 otherwise).

RESULT AND DISCUSSION

ICT is dependent on the computer because it serves as the operating platform on which ICT is based. This could vary due to a number of factors of which regional differences is one. Therefore, respondents' level of proficiency computing in South-west and North-central Nigeria was examined. Table 1 and Table 2 show that the proportion of respondents who did not have the requisite knowledge on how to use the computer was slightly higher in the North-central (57.14%) than in the South-west (55.71%). Furthermore, the proportion of respondents who had no training in computing was quite higher in the North-central (68.57%) than in the South-west (51.43%). However, a greater proportion of respondents owned a personal computer in the South-west (81.43%) than in the North-central (65.71%). This implies that more extension personnel in the North-central are not computer literate in comparison to the South-west.

Table 1: Respondents' Proficiency on Computer as ICT Tool in South-west Nigeria.

Variable	*Yes*		*No*	
	Frequency	*%*	*Frequency*	*%*
Knowledge of Computing	31	44.29	39	55.71
Owns Personal computer	13	18.57	57	81.43
Has training in computing	34	48.57	36	51.43

Source: Field Survey 2008.

Table 2: Respondents' Proficiency on Computer as ICT Tool in North-central Nigeria.

Variable	*Yes*		*No*	
	Frequency	*%*	*Frequency*	*%*
Knowledge of Computing	30	42.86	40	57.14
Owns Personal computer	24	34.29	46	65.71
Has training in computing	22	31.43	48	68.57

Source: Field Survey 2008.

While majority (51.43%) of the respondents had a low level ICT use in South-west Nigeria, majority had moderate (43.86%) to high level (48.57%) ICT use in North-central Nigeria (Table 3 and Table 4). Furthermore, while a larger proportion (67.24%) of respondents in the North-central had a high knowledge of ICT use; an average proportion (54.29%) had moderate knowledge of ICT use (Table 3 and Table 4). Also, a greater proportion (62.86%) of respondents in the North-central believed that the importance of ICT to extension functions is very high, while a larger proportion (44.29%) believed that ICT is moderately important to extension function. This is a higher prospect for a faster adoption of ICT for application in agricultural extension activities in North-central than South-western Nigeria.

Table 3: Prospect of ICT in Respondents' Functions in South-west Nigeria.

Variable	*V. High*		*High*		*Moderate*		*Low*		*V. Low*		*Total*	
	Q	%	Q	%	Q	%	*Q*	*%*	*Q*	*%*	*Q*	*%*
ICT Use	0	0.00	2	2.86	20	28.57	36	51.43	12	17.14	***70***	***100.00***
Level of ICT knowledge	7	10.00	8	11.43	38	54.29	17	24.29	0	0.00	***70***	***100.00***
Level of importance of ICT to extension work	21	30.00	7	10.00	31	44.29	0	0.00	11	15.71	***70***	***100.00***

Q = Frequency, % = percentage.

Source: Field Survey 2008.

Table 4: Prospect of ICT in Respondents' Functions in North-central Nigeria.

Variable	*V. High*		*High*		*Moderate*		*Low*		*V. Low*		*Total*	
	Q	%	Q	%	Q	%	*Q*	*%*	*Q*	*%*	*Q*	*%*
ICT Use	0	0.00	34	48.57	30	42.86	6	8.57	0	0.00	***70***	***100.00***
Level of ICT knowledge	0	0.00	47	67.14	23	32.86	0	0.00	0	0.00	***70***	***100.00***
Level of importance of ICT to extension work	44	62.86	21	30.00	5	7.14	0	0.00	0	0.00	***70***	***100.00***

Q = Frequency, % = percentage.
Source: Field Survey 2008.

From Table 5, it can be noted that age and ownership of a personal computer (PC) were significant factors ($p<0.1$ and $p<0.1$ respectively) influencing the probability of using ICT to search for information by respondents in South-west Nigeria. The younger the age, the higher the probability of the use of ICT to search for information while respondents having a PC had a higher probability of searching for information with the use of ICT in the South-west.

On the other hand, according to Table 6, age and computer training were the significant factors ($p<0.1$ and $p<0.1$respectively) determining the probability of ICT use to search for information by respondents in North-central Nigeria. The younger the age, the higher the probability of the use of ICT to search for information while respondents having a training computing had a higher probability of searching for information with using ICT.

Table 5: Regression Result for Factors Influencing Searching of Information with ICT for South-west Nigeria.

Variable	*Estimate*	*S.E.*	*Sig.*
Constant	9.156	6.61	0.17
GD	-0.27	0.88	0.76
AG	-0.27	0.16	0.08
MS	-0.72	0.63	0.25
ES	-0.07	0.78	0.93
SP	0.15	0.28	0.60
WE	0.31	0.19	0.11
SI	-9.09	25.61	0.72
PC	0.17	1.13	0.09
CT	0.22	1.05	0.83
DI	-0.37	0.29	0.20
Loglikelihood	82.703	-	-

Table 6: Regression Result for Factors Influencing Searching of Information with ICT for North-central Nigeria.

Variable	*Estimate*	*S.E.*	*Sig.*
Constant	-3.00	15.86	0.85
GD	7.91	17.62	0.65
AG	-0.98	2.88	0.05
MS	-8.45	23.51	0.72
ES	-12.70	33.71	0.71
SP	-1.65	5.21	0.75
WE	-0.57	1.75	0.75
SI	-0.45	0.45	0.33
PC	5.16	18.90	0.79
CT	6.30	15.08	0.08
DI	0.96	0.62	0.12
Loglikelihood	78.41	-	-

CONCLUSION

More extension personnel in the North-central were not computer literate in comparison to the South-west. However, age and ownership of a personal computer (PC) were significant factors ($p<0.1$ and $p<0.1$respectively) influencing the probability of using ICT to search for information by respondents in South-west Nigeria, age and computer training were the significant factors ($p<0.1$ and $p<0.1$respectively) determining the probability of ICT use to search for information by respondents in North-central Nigeria. These findings indicate a higher prospect for a faster adoption of ICT for application in agricultural extension activities in North-central than South-western Nigeria. Hence, a conscientious planning and execution of an action plan for turning (agricultural) extension services into an ICT-based system by policy makers becomes highly imperative.

In the short-run, efforts should be targeted at improving the ICT literacy level of extension personnel in the North-central as well as assisting them to acquire PCs. Also, in the short-run, training and retraining of extension personnel in the South-west for enhanced job performance should be vigorously pursued. However, in the long-run, a succession plan for extension personnel should be implemented in both regions in order to replace older generation of extension workers with younger and dynamic, computer literate, ICT-compliant ones who would be well empowered through training and re-training via refresher courses as well as being provided with the wherewithal to access up-to-date facilities in ICT.

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