Effect of personal characteristics of extension managers and supervisors on information technology needs in the Niger Delta area of Nigeria

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ABSTRACT

This paper examines the effect of personal characteristics of Extension managers and supervisors on their information technology needs in the Niger delta area of Nigeria. Data collection was with the aid of a structured questionnaire administered to 87 respondents in the study area. The z-test result showed that there is no significant difference in the Information Technology needs of both categories of respondents. Findings also revealed that number of associations belonged to, educational qualification, training, category of organization were the personal characteristics that significantly influenced information technologies needed by extension managers and supervisors. It is therefore recommended that training in various areas of Information Technology such as use of Internet, sending and receiving e-mails, surfing the web, using chat rooms, and newsgroups, should be enforced to further enhance the performance of extension managers in the discharge of their duties. This is to make the recipients ready to meet challenges in the contemporary global network of Information Technology. Extension Managers and Supervisors should be encouraged to belong to Professional Associations in their various disciplines. This should be made compulsory and possibly a condition for promotions so that it can be adhered to. Allowances should however be made available and regularly too, for such activities. Extension Managers and Supervisors should be given available opportunity to use and apply Information Technologies regularly. This will expose them significantly and encourage a fuse into the global community.

Key words: Extension managers, supervisors, information technology needed

INTRODUCTION

Information is a necessary component of agricultural extension. Olowu and Yahaya (1998) observed that over the years, agricultural information experts have been trying to develop some framework or methodology upon which to effectively and precisely predict and analyze information needs. Agricultural extension organizations in Nigeria employ agents that will help to hasten the communication of information needs of farmers identified by Olowu and Yahaya (1998). The information needs arise in the technical, marketing, social and legal information areas. These are mostly delivered through various media such as television, radio, newspaper, bulletin, and pamphlets. But the limitations of these media in actually improving extension work are many. This incorporates the use of computers and other electronic equipments for efficient communication of agricultural information. These technologies apply scientific information to the end-users need.

Information has been identified as one of the resources required for the improvement of agricultural production (Aina, 1995). It is said to be a resource that must be acquired and used in order to make an informed decision. Those who possess appropriate and timely information will make a more rational decision than those without. The various agricultural information users populations can be categorized as policy makers and planners; researchers; extension staff; educators and students; agro-based industries and services staff; and farmers. It was also observed that each of the sectors mentioned above contribute directly to the improvement of agriculture hence relevant information provided to each category of these user populations will contribute positively to the development of agriculture in Africa. Information is the potential ingredient for the advancement of agriculture. Without information the agricultural sector may degenerate into extinction. Information provides the basis for scientific innovations in agriculture. Agricultural information has been defined as all published or unpublished knowledge on all aspects of agriculture.

The advent of the computer gave a new direction to the information and communication technology industry. This is evident in the use of technologies such as electronic mail (e-mail), electronic commerce (e-commerce) and more recently mobile phone, which Salihu (2000) referred to as *Palm assistant,* because of its palm-size nature. According to Kerrigan, Lindsey and Novak (1994) communication technologies such as electronic mail (e-mail) and electronic conferencing provide scientists, administrators and information staff with rapid and reliable communication, while increasing productivity and decreasing communication costs by reducing the physical means of communication channels. These are some of the benefits of information technology. In the same vein, while discussing information technology as a transfer, Metcalfe and Gilmore (1990) observed that because of the remarkable pace of development within the short time that computers were introduced information technology now impinges upon virtually every aspect of society; and has developed dramatically. Information technology can be described as computer-related mechanisms through which information is obtained and shared with relevant users. Metcalfe and Gilmore (1990) listed Compact Disk - Read Only Memory (CD-ROM), local databases, electronic publishing and the expert systems as useful information technologies.

In recent years there has been much discussions about the appropriate role of the agricultural extension service (Nitsch, 1982). These discussions reflect drastic changes that have occurred during the last few decades in agricultural production and in the characteristics of rural communities. Rural communities according to Mchombu (1992) have two information systems, which have become uncoupled, the indigenous knowledge system and the external knowledge system. It was stated that both are closely knit. The provision of information to rural communities is a responsibility fragmented among several government ministries, non-governmental agencies and parastatals. These agencies have helped to provide valuable information to the end-users.

Originally, agricultural extension service was conceived in Europe at a time when agriculture was the mainstay of the economy. In Nigeria agriculture was the main source of revenue generation and a sustained means of livelihood in the pre-oil boom era. Nitsch (1982) observed that Extension which was widely conceived as an information-delivery based structure was at the fore of channeling the proper agricultural information to farmers who remain the major stakeholders in the agricultural development process. Under the conditions prevailing when extension was initiated it could be assumed that new technology was relevant and applicable for most farmers. It could be expected that once a farmer had adopted a new farm practice, others would learn about the new practice and soon the information diffuses to the majority of farmers in the community. As farmers usually had little exposure to technical information through mass media, it was natural for the agricultural extension service to take as its primary role the function of a linkage "between the producers of technology and the end-users of these innovations" to promote economic efficiency in farming (Rogers, Eveland and Bean, 1976).

Allmand, Balantyne and Ngwira (2001) observed that in this new millennium the information world faces an era of great changes, which influence directly the way scientific information is produced, processed by intermediaries, distributed and accessed. They noted that information and communication technology and especially the internet have made a huge impact. It was therefore stated that information services, traditionally responsible for managing this information, are passing through a process of change. Meera, Jhamtani and Rao (2004) noted that a new paradigm of agricultural development is fast emerging. It was noted that old ways of delivering important services to citizens are being challenged; and traditional societies are being transformed into knowledge societies all over the world.

Meera et al (2004) stated that agricultural extension has to escape from the narrow mindset of transferring technology packages to transferring knowledge or information packages. If this can be achieved, with the help of Information and Communication Technology, extension will become more diversified, more knowledge-intensive, and more demand driven, and thus more effective in meeting farmers' information needs. Apart from the conventional Audio-visual Aids (AVAs) used by agricultural extension personnel in Nigeria modern information technologies have not been fully utilized in the discharge of their job functions.

For agricultural extension in Nigeria to be effective, extension personnel, especially managers and supervisors must acquire the requisite knowledge and skills necessary for using modern information technologies. Supervisors and Managers are highly indispensable to the extension programme because as Madukwe (1993) observed the extension supervisor is the link between top and middle level extension administrators and farmer-contact extension agents. In this wise the success of the extension agents and indeed the entire extension service depends partly on the effectiveness of the extension supervisors (Igben and Nwosu 1987; Madukwe 1990). The position of supervisors in the extension service is so strategic that they are in constant touch with the management and thus will be useful to the lower level officers for decisions concerning them. The extension personnel at the managerial level and or supervisory levels do not have direct, personal or skin-to-skin contact with farmers but their decisions make extension work to progress in the right path. Since managers and supervisors are indispensable they should be conversant with the information technology dynamics for the benefit of agricultural extension service. The communication of agricultural information can only be meaningful if the extension personnel at this level of management actually know how to use the complex information technologies (both hardware and software), and also to know when the information technology would be useful in discharging their duties adequately.

The world today is going electronic and electronic communication has many advantages over the traditional and conventional methods of using paper-based materials. A larger volume of information can be handled with the aid of information technology (which is electronic based), and it is faster and more efficient. Inter-organizational communication can be made reliably possible with the electronic information technology, which overcomes the limitations of distance barrier. However, in Nigeria the information technology approach is gradually spreading and obviously will take time to be fully integrated into the agricultural systems. The question that readily comes to mind in this regard is: are the areas of needs concerning the Information Technologies in extension? What are the types of information technologies needed by extension Managers and supervisors? The specific objectives of the study are to: identify the Information Technology needs of agricultural extension managers and supervisors in selected organizations in the study area; the study further determines whether there is a significant difference in Information Technology needs of private and public extension managers and supervisors. Also, the study determines whether there is any significant relationship between socio-demographic characteristics of respondents and their Information Technology needs

METHODOLOGY

The study area is the Niger Delta area of Nigeria which is made up of nine states comprising Rivers, Bayelsa, Imo Abia, Delta, Edo, Akwa Ibom, cross river and Ondo states. The target population Comprised agricultural extension managers and supervisors in extension based organizations in the study area. The extension-based organization was stratified into private and public. The public organization chosen for the study was primarily Agricultural Development Programme (ADP) while the private organization chosen was the multinational organizations which include the Green River Project (GRP) of Nigerian Agip Oil Company (NAOC) and the Agricultural Programme of Shell Petroleum Development Company (SPDC). The ADP was chosen because it is the main government organization responsible for extension work while the two multinationals were the most significant private extension – organization in the area.

Out of the 9 states that make up the Niger Delta region, 7 were involved in the study namely Imo, Rivers, Bayelsa, Delta, Edo, Ondo and Cross River. A purposive sampling technique was used to select respondents involved in the study. Only management level staff were involved to include directors, and their deputies, zonal managers, supervisors, extension Advisers and coordinators. Seventy five Extension Managers/Supervisors were identified in the public organizations but 60 participated in the study. On the other hand 32 Extensions managers/supervisors were identified in the private organization while 27, participated in the study. On the whole 87 respondents were involved in the study. The instrument used for data collection was a structured questionnaire which contained information on socio- personal characteristics, adequate access to information technology, attitude towards Information Technology. The instrument was tested for reliability and a reliability coefficient of 0.72 was obtained using a split-half method. Data analysis was by frequency, percentage, mean, z-test and Tobit regression.

Dependent variable: Information Technology Needs

Seventeen Information Technology (IT) types were listed and respondents identified the types needed. The IT types needed were measured based on a Yes or No response but each of the IT type was taken as a proportion of the total IT needed. In essence each information technology needed was summed up over the total number of information technology needed to give a fraction. This fraction was then used for analysis. The fraction was the dependent variable which means that the dependent variable, *Information Technology Need* cannot take on values below zero.

Independent variables

The independent variable include Socio-demographic characteristics of Extension Managers and supervisors, which are working experience, marital status, gender, age, educational qualification, field of specialization, knowledge of Information Technology. Both open and closed ended questions were used in obtaining the required information.

Model Specification

Z statistic was employed in testing differences in Information Technology Needs of Public and Private Agricultural extension Managers/Supervisors. The mathematical expression of Z-test is given as

$$Z_1 = \frac{X_1 - X_2}{\sqrt{\dfrac{S_1^2}{n_1} + \dfrac{S_2^2}{n_2}}}$$

where:

Z_1 = the value by which the statistical significance of the mean difference of the pair of variables is adjudged

X_1 = mean number of respondents in private Extension organization who need Information Technologies

X_2 = mean number of respondents in public Extension organization who need Information Technologies

S_1^2 = variance from the mean value of sample 1

S_2^2 = variance from the mean value of sample 2

n_1 = frequency of respondents in private extension organization

n_2 = frequency of respondents in public extension organization

The Tobit regression model was used to determine whether there is any significant relationship between socio-demographic characteristics of Extension Managers and Supervisors and their Information Technology Needs.

Information Technology Need was measured as a proportion of total Information Technologies Needed. This suggests that the proportion of Information Technology needed cannot take a value below zero, which means that the dependent variable, *Information Technology Need* has a truncated normal distribution, and the Tobit model is appropriate for this. The Tobit model combines the properties of multiple regression and probit/logit model (Rahji, 2000). It indicates the decision of whether or not Information Technology is needed, and also considers the intensity of need.

Adopting the notation of McDonald and Moffitt (1980), Shapiro, Brorsen and Doster (1992), Gujarati (1995) and Rahji (2000), the Tobit model is given as

$$Y_i = X_i\beta + \mu \text{ if } X_i\beta + \mu > Y_0$$
$$Y_i = 0 \qquad \text{if } X_i\beta + \mu \le Y_0 \qquad\qquad (1)$$
$$i = 1, 2, 3 \ldots, N$$

where

Y_i is the probability of Information Technology Needed/Intensity of Information Technology Needed

X_i is a vector of explanatory variables

β is a vector of parameters

μ is the error term $\mu \, N(0, \sigma^2)$

Y_i is continuous if $Y_i^* \ge Y_0$

$Y_i = 0$ if $Y_i^* \le Y_0$

Y_0 is the non-observable threshold level

The total change in Y associated with a change in Xi can be decomposed into the change in the probability of Y being above zero and the change in the value of Y if it is above zero. This corresponds to the choice of whether or not Information Technology is needed and the proportion needed by extension Managers and Supervisors.

In calculating change in probability of Information Technology Needed, the notation is given as:

$$\frac{\partial F(Z)}{\partial Xi} = \frac{f(z)}{\beta i/\delta} \qquad \ldots \ldots \ldots \ldots \qquad (2)$$

In calculating change in intensity of Information Technology needed the notation is given as:

$$\frac{\partial F(Y^a)}{\partial Xi} = \frac{\beta i(1-zf(z)}{F(Z)} \_ \frac{f(z)^2}{F(Z)^2} \qquad \ldots \ldots \ldots \qquad (3)$$

In calculating total change or marginal effect of the explanatory variable on the expected value of the dependent variable, the notation is given as:

$$\frac{\partial E(Y)}{\partial Xi} = F(z)\beta i \qquad \ldots \ldots \ldots \ldots \ldots \qquad (4)$$

RESULTS AND DISCUSSION

Personal characteristics of respondents

Table 1 shows that majority of the respondents had working experience ranging from 5 to 15 years with a mean working experience of 15.52years. Most respondents were married, and were male. It was also found that majority of the respondents were between 40 and 45 years old, with mean age of 42.4 years. It was found that most respondents had an MSc degree.

Also, 62.10% of the respondents indicated that they have adequate access to information Technology, while 37.90% indicated that they do not. About 98 percent of the respondents agreed that they were aware about information technologies, while 2.3 percent were not. This means that most of the respondents were aware of information technologies especially as they concern Agricultural Extension work.

Table 1: Personal characteristics of respondents

Personal characteristics	Frequency	Percentage
Working experience		
5 – 15years	56	64.37
16 –25years	25	28.74 mean = 15.52 years
26 –35years	6	6.89
Marital status		
Unmarried	8	9.20
Married	78	89.70
Widowed	1	1.10
Gender		
Male	77	88.50
Female	10	11.50
Age		
Less than 40years	16	18.40
40 –45 years	28	32.20
46 – 50years	24	27.60 mean =42.40years
51 – 55years	14	16.10
56 – 60years	5	5.70
Academic qualification		
BSc	36	41.40
MSc	43	49.40
PhD	4	4.60
Others (MPhil, PGD, HND)	4	4.60
Knowledge of information technology		
Yes	85	97.7
No	2	3.3
Adequate access		
Yes	54	62.10
No	33	37.90

Types of Information Technologies needed

Table 2 shows that 98.9 percent of the respondents needed mobile phone for extension work, 81.6 percent needed E-mail, 64.4 percent needed worldwide web, 62.1 percent needed computer word processing, 54 percent needed data management with computer, 42.5 percent needed facsimile (Fax) and video conferencing, 32.2 percent needed desktop publishing and downloading vital information from the internet 28.7 percent of the respondents needed downloading software.

The findings suggest that respondents needed Information Technologies like mobile phone, E-mail, worldwide web, computer word processing, which are the commonest types of Information Technologies. Onaes (2003) observed that because of the speed with which activities need to be done, the e-mail continues to serve its clients to the fullest.

Table 2: Distribution of respondents according to types of Information Technologies needed

Types	Frequency*	Percentage
Mobile Phone	86	98.9
E-mail	71	81.6
Worldwide web (www)	56	64.4
Data generation from CD	23	26.4
E-library	21	24.1
Chat room	10	11.5
Newsgroups/Usenet	13	14.9
E-magazine	21	24.1
Computer word processing	54	62.1
Video conference	57	42.5
Facsimile	37	42.5
Data management with computer	47	54.0
Downloading software	25	28.7
Downloading vital info from internet	28	32.2
Desktop publishing	28	32.2
E-conference	15	17.2
E-workshop	14	16.1

Source: Field Survey data, 2003
　　　Multiple responses recorded

Differences in Information Technology Needs of Public and Private Agricultural extension Managers/Supervisors

The z-test result as shown in Table 3 reveals that there is no significant difference in the Information Technology needs of both categories of respondents. The implication of this is that Private Extension Managers and Supervisors need Information Technology just as their Public counterparts. This further implies that both categories of Extension personnel appreciate the importance of Information Technology for agricultural development process in their respective organizations.

Table 3: Analysis of differences in Information Technology needs between Private and Public Extension Managers and supervisors

Category	N	Mean	df	SD	z-value
Private	27	26.5	85	4.73	0.958^{NS}
Public	60	0.379		3.79	

Source: Field survey data, 2003
NS = z-value Not significant at 0.05 level

Relationship between socio-demographic characteristics of Extension Managers/ supervisors and their Information Technology Needs

Table 4 is the Estimated Tobit model for the relationship between selected socio-demographic characteristics of respondents and Information Technology Needs. The result showed that number of associations belonged to, significantly influenced information technology needed by Extension managers and supervisors. The relationship is positive at 0.05 level. The implication of this is that the higher the number of associations belonged to, the more the information technologies needed and vice versa. This suggests that belonging to more associations enhances interaction with others and therefore more exposure to the use of IT. Adetunji , Oladeji and Olowu (2002) while supporting the establishment of professional association opined that this will increase mutual scientific collaboration and also academic interaction.

Educational qualification showed significant but negative relationship with information technology needed. This implies that the higher the educational qualification the less the information technologies needed and the lower the educational qualification the more the information technologies needed. It is possible that respondents with higher qualifications may have too many responsibilities to grapple with, hence may not have the time to appreciate more need for Information technologies. Training also showed significant and positive relationship with information technologies needed. This suggests that training in Information Technology has positive influence on Information Technologies needed by respondents. Among the benefits of training, Asiabaka (2002) noted that it helps to reduce the time it takes extension workers to reach acceptable levels of performance in their jobs. Category of organization (that is Private or Public) showed significant and positive relationship with information technologies needed. This implies that Extension managers and supervisors in one of the categories of organizations need more information technologies than the other. This is more applicable to the Private Extension organizations since information technology use is more functional than in the Public extension organization.

Table 4: Estimated Tobit model showing relationship between information technology needs and socio-demographic characteristics

Variables	Coefficient	Marginal effect (total change)	Change in prob- ability	Change in intensity
Marital	0.7217	0.007	0.0156	0.007
Gender	0.2059	0.020	0.00456	0.021
Numbassoc	0.4671*	0.0460	0.0100	0.0473
Qualification	-0.5553*	-0.0553	-0.0070	-0.0563
Training	0.5692*	0.0569	0.0123	0.0577
Knowledge	-0.1632	-0.002	-0.00034	-0.001
Adequate Access	0.1492	0.015	0.00325	0.015
Specialization	-0.2223	-0.057	-0.0123	-0.058
Age	-0.5102	-0.056	-0.01	-0.047
Category	0.4305*	0.0431	0.00932	0.0436

Source: Field survey data, 2003
* Significant at 0.05 level

From Table 4, the Tobit model showed that a percentage increase in the number of associations belonged to, by Extension Managers and Supervisors leads to about 4.6% increase in Information Technology needed. This is decomposed into about 1% increase in probability of Information needed, and a 4.7% increase in intensity of Information Technology needed. The implication of this is that as the Extension Manager/Supervisor gets interacted with other members of the professional association, there is the likelihood of his being exposed to more information technologies which will to a great extent improve his skills and knowledge in Information Technology usage. This will eventually influence the need for Information technologies.

The effect of educational qualification on Information Technologies needed is more on the intensity of need. With a one percent increase (change) in educational qualification, Information Technology need decreased by 5.5%. This gave about 0.7% decrease in probability of Information Technology needed and about 5.6% decrease (change) in intensity of need. This suggests that as the respondent gets a higher educational qualification, he may not need more than what he already has concerning Information Technology because he may have acquired more before attaining that level over the years.

A one percent change in training received by respondent leads to 5.7% increase in Information Technology needed. This translates to about 1.23% increase in probability of Information Technology needed, and about 5.8% increase in intensity of Information Technology needed. This implication of this finding is that training in Information Technology increases the need for Information Technology. This is expected since the respondent may be curious to explore other areas that will further enhance his skill in Information Technology and ultimately his job function.

A percentage increase in Category of Extension organization belonged to by respondent however, increased Information Technology needed by 4.3%. This gives only 0.932% increase in probability of Information Technology needed, and a 4.4% increase in the intensity of Information Technology needed. This finding suggests that the category of Extension organization belonged to, influence the need for Information Technology. The Private organizations provide more functional facilities for Information Technology than the Public organizations so this will increase their need for Information Technology, especially as they have been very actively involved in agricultural extension services.

CONCLUSION AND RECOMMENDATIONS

Information Technologies are relevant to Extension Managers and Supervisors in the present era of global networking. This is of greater importance to them especially in information management and processing. This study has revealed that Extension Managers and Supervisors need Information Technologies for effective discharge of their managerial and supervisory functions. This is what will make their extension function complete and also more useful and viable. The study concludes that Information technology characteristics like training, awareness are prerequisites for sustainable extension delivery. It is opined that the information technology types to be available to Extension Managers and Supervisors should as much as possible be user driven for better adaptability to Information Technology applications.

Based on the findings of the study, the following recommendations are made:

1. Training in various areas of Information Technology should be enforced to further enhance the performance of extension managers in the discharge of their duties. The training should specifically be in the use of Internet, sending and receiving e-mails, surfing the web, using

chat rooms, newsgroups. This is to make the recipients ready to meet challenges in the contemporary global network of Information Technology.

2.   Government through the Ministry of Science and Technology, and also the National Agency for Information Technology Development should as a matter of policy ensure that an adequate structure is put in place for Information Technology usage in the various Agricultural extension organizations. However, the authorities of the Non-Government organizations should liaise with the same establishments to provide similar structures where they are lacking or inadequate.

3.   Extension Managers and Supervisors should be encouraged to belong to Professional Associations in their various disciplines. This should be made compulsory and possibly a condition for promotions so that it can be adhered to. Allowances should however be made available and regularly too, for such activities.

4.   Extension Managers and Supervisors should be given available opportunity to use and apply Information Technologies regularly. This will expose them significantly and encourage a fuse into the global community.

5.   There is need to make available The Essential Electronic Agricultural Library (TEEAL) as a means of getting adequate access to agricultural information by Extension Mangers and Supervisors in both private and public extension organizations.

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