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DETERMINANTS OF E-READINESS OF PUBLIC EXTENSION PERSONNEL FOR SERVICE DELIVERY IN EBONYI STATE, NIGERIA

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Abstract
This study assessed the determinants of e-readiness of public extension personnel in Ebonyi State, Nigeria. Data were collected from seventy-five (75) extension personnel randomly sampled across the three agricultural zones of Ebonyi State working in the public sector. Frequency counts, percentages and mean scores were used to summarize the data collected while binary logistic regression was used to assess possible factors that were significant determinants of e-readiness among these extension workers. The result revealed that majority (62.7%) of extension personnel were male, and their average age was 46.89 years. Almost all (98.7%) these extension workers were aware that the use of Information Communication Technology (ICT) was important in the performance of their duty. The study found that only about 7% of these extension workers were e-ready. On the socioeconomic determinants of e-readiness, age was found to be significant (P=0.035), while, ICT Skills (p=0.004) was found to be a significant determinant of e-readiness of these extension workers in Ebonyi State. The study also discovered that ICT knowledge, and years of ITC trainings were not significant determinants of e-readiness. The study recommends the in recruitments younger extension personnel and trainings should focus on skill improvement of the extension workers.
Keyword: e-readiness socio-economic determinants, ICT in agriculture, ICT skills

Introduction

In our world today, everything is digitalized. The analog system of doing things are only practiced by a few that is why E-Readiness is highly important. E-Readiness according to Zaied, Khairalla and Al-Rashed (2007) is the extent to which a community is prepared to enter into a digital economy or information age. It is also defined as the readiness of a community or economy for the use of Information and Communication Technology (ICT). ICT can be defined as a media technology which provides retrieval, storage, transmission and distribution of information across the world through the use of internet networking. It is used in various sector of the society. The diagram below illustrates it.

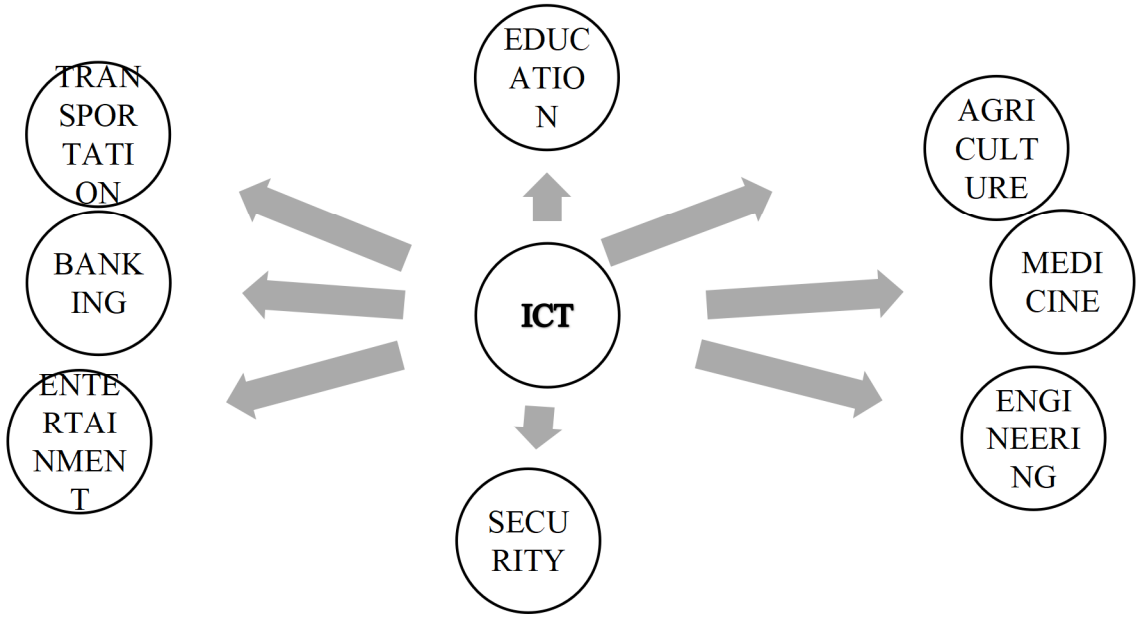

Figure 1: The Uses of ICT in the Society (sourced Ifueko, 2011)

ICT is essentially important in agricultural growth and development. ICT incorporated in agriculture which is the national priority sector, will bring about economic transformation. Communication in agriculture is very important because the use of ICT provides technological change in agriculture which needs to be communicated before it is adopted. Agricultural extension services play a crucial role in enhancing food security and improving the livelihoods of rural families. Recent literature emphasizes that these services aim to address the four dimensions of food security: availability, access, utilization, and stability. By evolving from traditional top-down approaches to more participatory and market-led systems, extension services have become more effective in boosting agricultural productivity and ensuring food security (Ranjan et al, 2024). Furthermore, agricultural extension contributes significantly to achieving food security and improving rural livelihoods by providing training and practical support to farmers. This assistance enables farmers to adopt best practices, thereby increasing their productivity in a sustainable manner (World Research Library, 2024). Agricultural Development Programme (ADP) is an agricultural agency that engages extension agents in passing innovations to farmers. Extension agents are individuals who directly communicate innovations to farmers, often using demonstrations as a primary method. Traditionally, these demonstrations rely on face-to-face interactions. However, the COVID-19 pandemic—a communicable respiratory disease caused by a new strain of the coronavirus—has significantly disrupted these practices. The virus spreads through respiratory droplets from infected individuals, such as those released during sneezing or coughing, and through contact with contaminated surfaces. To prevent its transmission, measures such as social distancing, the use of hand sanitizers, and wearing face masks have been implemented (Africa CDC, 2020). These preventive actions have severely hindered the ability of extension agents to maintain direct, in-person communication with farmers.

Also, the ratio of extension agents to rural families is very low. According to Davis, Lion & Arokoyo, (2019) the current ratio of extension agents to farmers is between 1: 5,000 to 1: 10,000 with a total workforce of about 7,000 public agents which makes it's so limited and very cumbersome for the personnel. With the raising demand for extension services today and limited or low availability of extension workers the readiness by these few extension workers could go a long way in reaching more farmers per worker thus the use of these e-platform will depend on the e-readiness of these extension personnel. For ICT to be effective, an organization should be electronically ready (e-ready) were ICT can be used to reach out to ready farmers. This therefore means that for ICT to make any significant impact on enhancing research, agricultural production and extension services which in turn can further contribute to poverty reduction, the agricultural extension agencies must be e-ready. This situation brings about the need to know the e-readiness of extension agents and the use of ICT resources to carry out extension delivery services and the ability of the Ebonyi State Agricultural Development program (EBADEP) to provide infrastructures and able resources for this delivery to take place. In South East Ebonyi State is known for 'Abakaliki rice or Ebonyi rice' it also produces certain agricultural produce commercially such as cassava, palm oil potatoes, vegetables and several other crops. That is why e-readiness needs to be measured so as to check the extent of ICT use and how it can contribute by providing better coordination of the information facilities developed in government and various institutions and also in the exchange and access of information within themselves. It also helps them in information update as well as the development of information, its sharing, and improvement of communication skills among workers and users (Ayushi, Dharminder & Dhaliwa, 2020). Additionally, the "Digital Agriculture Technology Adoption & Attitudes Study" reflects on how farmers view digital technologies, their usage patterns, and the barriers they face in accessing the necessary technology and skills. This underscores the need to evaluate farmers' electronic connectivity and their proficiency with ICT tools (Irish Farmers' Association (IFA) (2020).

The overall objective of the study was to determine the e-readiness level of the extension personnel in EBADEP. Specifically, the study aimed to: identify the socio-economic characteristics of the extension personnel; determine the e-readiness of the extension personnel; and assess the determinants of e-readiness of these extension personnel for extension service delivery.

Research Methodology

This section is sub sections as study are; study design; sampling and data management.

The Study Area

Ebonyi State is the study area. It is located in the south eastern geopolitical zone of Nigeria (SEDC, 2017). It has three senatorial zones such as Ebonyi north, Ebonyi south and Ebonyi central. It has thirteen local government areas such as Abakaliki, Afikpo South, Afikpo North, Ebonyi, Ezza South, Ezza North, Ikwo, Ishielu, Ivo, Ohaukwu, Ohaozara, Izzi and Onicha (Ebonyi State Government, 2021). It has a projected population of 3,242,500 Population [2022] by the national population commission (National Population Commission of Nigeria (web), National Bureau of Statistics (web)). The major Public Extension outlet in the State is the Ebonyi State Agricultural Development Programme. This agency of government is the major driver of extension services in the State. Ebonyi State was purposefully selected for this study because this research has not been carried out in this area before and to check their level of ICT development.

Study Design

The study is a survey design with a cross-sectional approach

Sampling

This study used a survey research design to get the required information. It focuses on the population by using a representative sample from the subset of the population because it is hard to study the whole subject. A multistage sampling technique was used to draw samples for the study. At the first Stage, a purposive sampling procedure was adopted in the selection of all the three Agricultural Zones in the State which are Ebonyi North, Ebonyi South and Ebonyi Central. In the Second stage, each block was sampled from each of these zones. In Ebonyi South and Ebonyi Central, there were eight blocks and in each of these blocks have three extension agents each while in Ebonyi North there were four blocks and each of the blocks had six extension agents each. Stage three entailed using random sampling of Extension Agents (EAs) from each block which gave a total of 24 extension agents in each zone having a total of 72 extension agents. At the State level three staff of the Programme being the three zonal extension officer was sampled for the study, having a total of 75 respondents sampled for the study.

Data analysis

Data was obtained with the aid of a structured questionnaire. Objective (1) and objective (2) were achieved using descriptive statistics which includes percentages, mean score, standard deviation and frequency. Objective (3) was achieved by inputting each respondent's e-readiness index using the knowledge score, attitude score, skill score and availability of ICT tools. Knowledge score was derived from a list of knowledge questions where respondents was required to answer based on their knowledge of the use of ICT for their service provisions as extension personnel. Attitude score was obtained from a five-point Likert-type Scale. Skill score was obtained from a five-point Likert-type Scale. As for e-readiness, the various scores were computed based on percentages of the correctly answered questions. When the scores are 60% and above, they are considered as both knowledgeable, have a positive attitude and are skillful. A respondent's assessment of being e-ready was based on having 60% and above in at least two (knowledgeable, positive attitude and skillful and having access to ICT tools that function) otherwise, the respondent is not e-ready as used by Raksha, Rao & Meera (2015).

Objective (4) was achieved using Logit regression analysis.

$$y = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + b_7x_7 + b_8x_8 + b_9x_9 + u \quad (2)$$

(in explicit form)

The Logit regression analysis was used to analyse two set of variables such as the socio-economic characteristics which has this variables below;

Y = E- readiness (Dependent variable) (1 if e – ready otherwise 0)
X_1 = Sex
X_2 = Age in years
X_3 = Marital status
X_4 = Household Size
X_5 = Working experience
X_6 =Number of ICT training received for work
X_7 = Awareness of use of ICTs in performance of their duties
a = Regression constant
b = Regression coefficient or slope
U = unexplainable variable

The other variables are the ICT disposition which has three variables such as the knowledge score, attitude score and skill score.

Results

Table 1: Socio-Economic Characteristics of the Extension Personnel (N= 75)

Variables	Frequency	Percentage	Mean (S.D)
Age (Years)			46.89(4.89)
Below 40	5	6.7	
40-44	18	24.0	
45-49	29	38.6	
50-54	18	24.0	
55-59	5	6.7	
Sex			
Male	47	62.7	
Female	28	37.3	
Educational level			15.33(2.76)
BECE (Junior secondary)	1	1.3	
WAEC (Senior secondary)	2	2.7	
HND/OND	27	36.0	
Bachelor degree	43	57.3	
Post graduate degree (PGD/MSC/PhD)	2	2.7	
Marital status			
Married	74	98.7	
Widowed	1	1.3	
Total	75	100.0	
Household size			6.12(2.77)
1-6	37	49.4	
6-10	36	48.0	
11-15	1	1.3	
Above 15	1	1.3	
Working experience			15.00(4.11)
1-10	1	1.3	
11-20	68	90.7	
21-30	5	6.7	
31-40	1	1.3	

The results presented on Table 1 shows that the age of the greater proportion of the extension agents (38.7%) were in an active age of 45-49 years with a mean age and standard deviation of 46.89 years and 4.89 respectively. Majority of them were males (62.7%). and were bachelor degree holders (57.3%) with an average number of educational years of 15.33 and a standard deviation of 2.76. The majority of the agents (98.7%) were married while, 49.3% of the extension agents had a household size of 1-6 persons. Also, the results show that the extension agents have a (90.7%) working experience of 11-20 years with a mean and standard deviation of 15.00 and 4.11 and all the respondents are extension officers with a percentage of 100.0%.

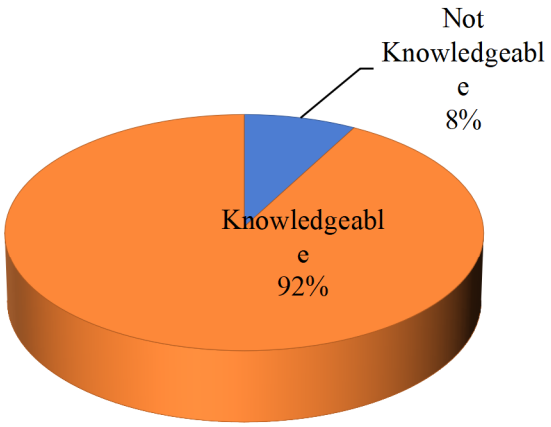

Figure 2: Percentage distribution of respondent in EBADEP (Ebonyi State Agricultural Development Programme) Based on their Knowledge ability of ICT (field work, 2023).

The pie chart above represents the percentage knowledge score distribution. The results show that the majority (92%) are knowledgeable about ICT while only 8% are not knowledgeable about ICT as presented on figure 2. This implies that these extension workers are well vast in their knowledge of ICT though this may not imply readiness to use it in their use of ICT for the delivery of extension services. This results is also in tandem with the study conducted by Ajayi, Alabi & Akinsola (2013), where they found that half (50.0%) of the EAs were highly aware of the various ICT while 50.0% had high knowledge on ICT use with a majority (72.0%) of the EAs being indifferent in their perception towards ICT use.

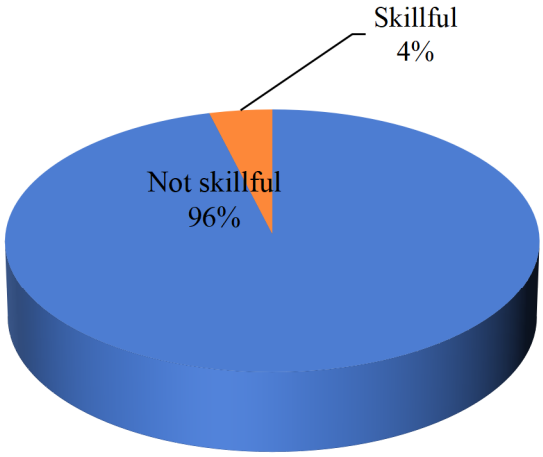

Figure 3: Percentage distribution of respondent in EBADEP (Ebonyi State Agricultural Development Programme) Based on their ICT Skillfulness (Field Work 2023)

The results presented on figure 3 shows that level of skillfulness of in the use of ICT, the results on the pie chart presented shows that the majority of the extension workers (96%) are not skillful with ICT while only 4% are skillful with ICT, this shows that though the extension worker were knowledgeable on the ICT there were not skillful, this further shows that though the respondents could be knowledgeable it does not translate to been skillful in the subject. This finding is really in agreement with the findings of Aja, Asiabaka, Ani & Matthews-Njoku, (2024) where their study found that that though there exists a high digital skill gap among agricultural extension personnel in South-East, Nigeria, their socioeconomic characteristics are capable of supporting the implementation of digital extension services in the area. Their study recommended that the

management of Agricultural Development Programs in South-East, Nigeria, should provide digital training for extension personnel to close the digital skill gap that currently exists among the personnel.

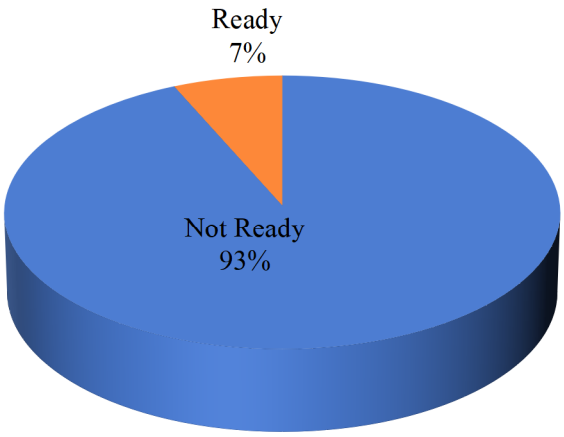

Figure 3: Percentage distribution of Respondent at EBADEP (Ebonyi State Agricultural Development Programme) Based on their E-Readiness (Field work 2023)

The results presented on Figure 3 the result shows that the majority (93.0%) of these agents in extension service delivery were not ready to explore the benefits available in the e- space with only 7% of them being found to be e-ready, this result implies that there is much to be done to maximize the e-resources in the delivery of their duties as extension personnel. This results implies much to be done on these extension personnel. These findings seem to differ from the study by Potluri & Vajjhala (2021), where they found that even with an endless number of problems like low literacy rate, language, and cultural restrictions, the farmers and extension workers in the South eastern region of Nigeria has received great support and cooperation from the federal, state, and local governments in providing better access to natural resources, improved agricultural practices, effective production strategies, persistent training facilities, awareness programs on technology adoption, latest techniques of farming, markets, banking, and financial services by addressing the numerous infrastructure constraints, which e-readiness measures in its entirety thus should have improved e-readiness.

Table 3: Knowledge score, Attitude Score and Skill Score of the Extension Personnel

Variables	Mean	S.D
Knowledge score	8.44	1.86
Attitude score	37.37	4.21
Skill score	15.89	5.83

Table 3 shows that averagely the respondents scored 8.44 from the knowledge questions, 37.37 from the attitude questions and 15.89 from the skill questions. This implies that their average knowledge score was above the half of the total scores and their attitude scores also shows that they were well disposed towards ICT but with low scores in skills which is in agreement with the test of skillfulness in ICT.

From the result, the percentage distribution below showed only 6.7% are e-ready and 93.3% are not e-ready. This shows that the extension personnel at EBADEP are not E-Ready in carrying out extension delivery services.

Table 4: Socio-economic Determinant of E-readiness among the Extension Agents

Socio-economic Characteristics	B	S.E.	Wald	df	P-values
Age	-2.376	1.127	4.444	1	0.035*
Sex	-3.268	1.814	3.247	1	0.072
Number of Years Spent in Education	-0.129	.170	0.574	1	0.449
Being Married	18.995	40192.977	0.000	1	1.000
Household size	0.190	1.390	0.019	1	0.891
Working Experience	0.097	2.746	0.001	1	0.972
Number of ICT training received for work	-1.255	1.503	0.696	1	0.404
Awareness of importance of ICT to discharge of Duty	14.105	40192.963	0.000	1	1.000
Constant	-25.646	56841.404	0.000	1	1.000

*Significant P<0.05; Chi-square= 14.301, R^2= 0.174, 2 Log likelihood=22.438

Table 4 presents the Logit regression analysis of the socio-economic determinants of e-readiness among the extension agent. Out of seven variables presented, only one variable (age, 0.035) was found to significantly to be the determinant of E-Readiness of the extension personnel in EBADEP.. This shows that age is an important factor to determine the E-Readiness of the extension personnel EBADEP. The age of the respondent can affect their preparedness into the digital world. Dire, Ndaghu, Giroh, Onu & Dauna (2017) agreed with the findings of this result of having age as a determinant of E-Readiness.

Table 5: ICT Disposition Determinant of e-readiness among the Extension Agents

ICT disposition	B	S.E.	Wald	Df	P-values
Knowledge score	0.253	0.372	0.463	1	0.496
Attitude score	-0.097	0.122	0.638	1	0.424
Skill score	0.195	0.068	8.338	1	0.004*
Constant	-4.872	5.004	0.948	1	0.330

*Significant P<0.05; Chi-square= 10.373, R^2= 0.129, 2 Log likelihood=26.366

As presented on Table 5 the logistic regression analysis examines how ICT disposition factors—knowledge, attitude, and skills—affect the e-readiness of extension agents. Among the variables, skill score stands out as a significant determinant of e-readiness, with a positive relationship (b = 0.195, P = 0.004). This finding indicates that higher levels of ICT-related skills significantly enhance the likelihood of extension agents being e-ready. On the other hand, knowledge score (B = 0.253, P = 0.496) and attitude score (B = -0.097, P = 0.424) do not show statistically significant effects on e-readiness. The knowledge score has a weak positive association, while the attitude score has a slight negative relationship, but neither achieves significance.

The model itself explains a modest portion of the variability in e-readiness, with an R^2 value of 0.129, suggesting that 12.9% of the variation is accounted for by the predictors. The Chi-square statistic of 10.373 indicates the model is a reasonable fit, though the constant term (B = -4.872, P = 0.330) is not statistically significant. In all the results highlight the importance of ICT skills as a key determinant of e-readiness among extension agents, whereas knowledge and attitude scores do not appear to play a significant role.

Conclusion

Based on the variables used to determine the E-Readiness of the respondent, they were found not to be E-ready which therefore means that they are not ready to participate into the digital world of using ICT to carry out extension delivery services. The result of the analysis showed that Age and Skill Score where the major determinants of e-readiness of EBADEP and the null hypothesis was rejected which means that socio-economic characteristics do affect E-Readiness of EBADEP.

Recommendations

This study therefore recommends the following:

1. Extension agents should be encouraged to participate in ICT trainings which will involve the use of ICT tools (hardware and software) and to also train ICT human personnel managers amongst them.
2. Provision of ICT tools at EBADEP is highly encouraged since the extension agents only lack skills and availability of

ICT tools and this can be done by the help of government. Government should carry out intervention on technological change in extension delivery services so as to be prepared when there are emergencies.

3. Staff should learn how to communicate amongst themselves using ICT so as to ensure fast learning and adaptability for example, E-mails, video conferencing among others.
4. Since age is a determinant of e-readiness, they training on ICT and use of ICT should target strata of age groups and age based. Also trainings should focus on enhancing their skills as this was also a factor that was a key determinant of their e-readiness.

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