

ASSESSMENT OF THE IMPACT OF ICT ON RESEARCH ACTIVITIES IN NIGERIA: A CASE STUDY OF NCAM

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ABSTRACT

The study examined assessment of the impact of information and communication technology (ICT) on research and development activities in Nigeria: a case study of National Centre for Agricultural Mechanization (NCAM). Data were collected from ninety four (94) purposively randomly selected researchers using a structured questionnaire which were analyzed using descriptive statistics, regression analysis and Likert rating scale. The findings from the study (N=94) revealed that Research and Development in the Centre belongs to different areas of specialization with engineers having the highest 41.5%. Also observed from the study, are 88.3%, 58.5% and 84% researchers in the Centre uses internet, desktop PC and laptop respectively. However, for dissemination of research findings to larger audience 71.32% and 61.7% uses radio and television media respectively. Above 90% of the respondents were acquainted with internet surfing meanwhile 97.9% were able to operate computer irrespective of their area of specialization. The multiple regression result indicates that the coefficients of marital status, educational level, working experience and career path are statistically significant at 5% level indicating that these variables have great influence on the use of ICT for research and development by the respondents. It was also established from the study that irregular power supply, bad network coverage, and inadequate training on ICT usage are major constraints affecting the uses of ICT in the Centre. The study therefore recommended improvement in the use of alternative power supply (Solar Energy), training of researchers and provision of more ICT tools to enhance effective and accurate conduct of research and this will ultimately increase NCAM researcher's productivity.

KEYWORDS: ICT Facilities, ICT Utilization, Agricultural Mechanization, Research and Development, and NCAM Ilorin.

1. INTRODUCTION

Information and communication technology (ICT) has become crave of the moment in global socio-economic affairs. There is scarcely a field of human activity today that has not been touched by the dramatic changes in ICT that have taken place in the last 10-15 years (Agwu, A.E et al, 2008). Generally, ICT is a tool that any sector can use to deliver its services. The ICT revolution has turned the whole planet into a 'Global Village' where communication among people has become independent of physical distance and time.

The revolution of ICT globally has opened greater opportunities for efficient information sharing. ICTs have become a driving force in

development, providing means of narrowing the information gap between developed and developing countries and among their communities. Several definitions have been given to explain and interpret the acronym ICT and the one given below seems to be the closest. ICT is a generic term referring to technologies that are used for collecting, storing, editing and passing on (communicating) information in various forms.' The above definition separates distinct fields of ICTs and at the same time links them together so as to operate as an entity. Adeya (2002), simplified the definition by describing ICT as an 'electronic means of capturing, processing, storing and disseminating information'.

In research, ICT has brought considerable improvement in information provision. It has become cheaper to digitally store, process and access large amounts of information at greater speed. ICT has controlled the information explosion 'bomb' to such an extent that it is now possible to obtain information from any library anywhere in the world regardless of the geographical location of the user and the library. There is no need for any library to attempt to acquire all publications. This is because, with suitable computer software, telecommunication equipment, memory facilities and input-output devices, a researcher in a remote outpost of civilization would be able to search the comprehensive electronic databases in the advanced developed economies, and be able to obtain needed information in electronic or hard copy format (Effah, 2002).

With reference to the effects of ICT use on research activities, Obioha (2005) stated that some of the achievements that could be ascribed to ICT tools' usage include quick search and easy access to information, varieties of information, ease and speed in processing information, and increased knowledge. She stated that some achievements recorded by the Nigerian Institute for Oceanography and Marine Research in its research activities are partly credited to ICT use, which has played an immense role for the researchers of the Institute in seeking out information through the Internet, the World Wide Web, and CD-ROM databases. However, some problems cited that militate against the effective use of ICT include inadequate funding; lack of adequate and stable power supply; constant breakdown of computers; Internet problems, inadequate training and inadequate ICT Centers among others (Okunade, et al, 2019; Awhareno and Nndai, 2017; and Aworanti, 2016).

Bamiro and Liverpool (2002) also observed that computer (ICT) has already invaded and dominated Universities and Research Institutes

in the developed world, while in Nigeria it has been painfully slow. More so, most researchers are yet to acquire the requisite ICT skills, and where opportunities exist for them to do so, they shun them because of the phobia some of them have developed for the ICT.

Information Communication Technology (ICT) is on the lips of every nation on earth because it brings innovation into information seeking and knowledge acquisition. However, lack of adequate training and skills to enable research officers' access and use ICT facilities and services available to them has been on increase as reported by Obioha (2005). In addition, some of the research officers cannot, by themselves, search the various online and CD-ROM databases to retrieve required information necessary for their work. It is on this premise that this study is embarked upon to identify the roles ICT plays in information seeking and use among researchers and technicians of the National Centre for Agricultural Mechanization.

Therefore, the findings of this research will be helpful to NCAM, academicians and researchers in assessing the underlying reasons contributing to the poor uses of ICT. The broad objective of this study is assessment of the Impact of ICT Utilization on Research, using Researchers and Technicians of National Centre for Agricultural Mechanization (NCAM) as Case Study. The specific objectives of the study are to:

- i. To determine the awareness level of NCAM's researchers and technicians to ICT; and
- ii. To identify the constraints affecting the use of ICT among researchers and technicians of the Centre.

2. RESEARCH METHODOLOGY

This study was carried out in National Centre for Agricultural Mechanization (NCAM), Ilorin, Kwara State. NCAM is on 3896° N and 4.6905° E on KM 20, Ilorin-Lokoja Highway. The Centre occupies a land area of about 950 hectares.



Figure 1. National Centre for Agricultural Mechanization (NCAM), Ilorin, Kwara State, Nigeria.

The population for the study comprises of researchers and technicians of the Centre. A total of 94 respondents were purposefully selected for the study. This formed the sample size of the study. The primary data used for the study were collected from the respondents with aid of structured open and closed ended questionnaire. These were supplemented where necessary with interviews, discussions and direct observations. Data collected were subjected to qualitative and quantitative analysis. The analytical tools used are descriptive statistics, cross tabulations, regression analysis and a 4 point Likert rating scale. A Multiple regression model was used to ascertain the determinants of effect of ICT on research and development. The regression model is specified as follows:

$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, \mu)$. Where:

Y = ICT effect on research and development.
(Dependent variable)

Where:

X_1 = age: (measured in years)

X_2 = gender; (male = 1, female = 0)

X_3 = marital status, (1 for being married and 0 for none)

X_4 = education; (measured by the number of years spent in formal education)

X_5 = experience (measured in years)

X_6 = area of specialization

X_7 = career path

μ = error term

3. RESULTS AND DISCUSSION

The results of the analysis are presented in the Table 1.

Table 1. Socio-Economic Characteristics of the Respondents (N = 94)

Variables		Frequency	Percent	Cumulative Percent
Age	18 - 35	41	43.6	43.6
	36 - 45	32	34.0	77.7
	46 - 50	17	18.1	95.7
	51 - 60	4	4.3	100.0
	Total	94	100.0	
Gender	Male	68	72.3	72.3
	Female	26	27.7	100.0
	Total	94	100.0	
Marital Status	Single	17	18.1	18.1
	Married	74	78.7	96.8
	Divorced	1	1.1	97.9
	Widowed	1	1.1	98.9
	Separated	1	1.1	100.0
	Total	94	100.0	
Educational Qualification	Trade Test	2	2.1	2.1
	O Level	1	1.1	3.2
	A Level	2	2.1	5.3
	OND	4	4.3	9.6
	HND	21	22.3	31.9
	B,Sc	43	45.7	77.7
	M,Sc	18	19.1	96.8
	Ph.D	3	3.2	100.0
	Total	94	100.0	
Work Experience	0-10	52	55.3	55.3
	11-20	32	34.0	89.4
	21-30	8	8.5	97.9
	31-35	2	2.1	100.0
	Total	94	100.0	
Professions /field of study	Engineers	39	41.5	41.5
	Scientist	27	28.7	70.2
	Technicians	14	14.9	85.1
	Technologist	4	4.3	89.4
	Architect	1	1.1	90.4
	Farm power and machinery	6	6.4	96.8
	General Agriculture	1	1.1	97.9
	Food science and technology	2	2.1	100.0
	Total	94	100.0	

Source: Field Survey data, 2019

The result in Table 1 revealed that majority of the respondents 43.6% fell between 18 and 35 years of age. Another 34% fell between 36 and 45 years while 18.1% fell between 46 and 50 and 4.3% were above the age of 50 years. This generally indicates that most of the respondents were in their productive age which is in line with the study of Agwu and Chah (2007), Muhammed and Yakubu (2013) which suggested that the elderly shows less interest in using hi-tech devices and prefer oral or printed channels which may be less efficient.

The study further revealed that majority 72.3% of research and development activities in the Centre were in the hands of male while 27.7% were female. This agrees with the findings of Adedoyin et al. (1999), who reported that males dominate the work in Nigerian agricultural research sector. It may be also connected with the gender disparity found in the public civil service in Nigeria. This may be connected to the socio-cultural factors that restrict contacts between gender in some communities (Arokoyo, Chikwendu, and Ogunbameru, 2002). Majority of the respondents 78.7% were married while 18.1% and 1.1% were respectively single and divorced. The response pattern in Table 1 indicated that research and development activities in NCAM are carried by researchers with various educational backgrounds. Majority of the respondents 45.7% had BSc, 19.1% MSc and 3.2% PhD respectively. These findings show that level of education have great implications on quality of research output in the Centre.

According to the data in Table 1, majority of the respondents 89.3% had less than 20 years of experience. Those with between 21 and 30 years of experience were 8.5%, while those with more than 30 years of experience were only 2.1%. Table 1 further revealed that

NCAM staff that uses ICT for research and development activities belongs to different areas of specializations with engineers having the highest 41.5%, followed by scientist 28.7% and technicians 14.9% and others respectively.

Awareness of ICT Facilities

Table 2 shows the respondents awareness level of ICT for research and development. The result from Table 2 further revealed that majority of the respondents (93.6%) are acquainted with internet surfing, 90.4% and 97.9% respectively were able to network computers and use e-mail while 97.9%, 93.6% and 72.3% were able to use computer for word processing, e-library and on-line control experiment respectively. It is important to recognize that awareness among policy makers on the potentials of ICT is a critical element for its development as reported by Agwu et al. (2008).

Table 2. Awareness of ICT Facilities

Awareness of ICT Facilities (N=94)			
Awareness	Opinion		Total
	Aware	Unaware	
Internet Surfing	93.6	6.6	100.0
Networking	90.4	9.6	100.0
E-Mail	97.9	2.1	100.0
Internet Chats/Video Conferencing	92.6	7.4	100.0
Word Processing/Documentation	97.9	2.1	100.0
Webinar (Online Seminar)	81.9	18.1	100.0
E-Library	93.6	6.4	100.0
Remote Sensing (Online Control of Experimental Research)	72.3	27.7	100.0

Source: Field Survey data, 2019

Analysis of Variance (ANOVA) on the Effect of ICT on Research and Development

The ANOVA result in Table 3B shows the relationship in terms of coefficient of multiple determination (R^2) value, sign of coefficients and their level of significance.

The positive coefficients of age, gender, educational qualification and working experience implies that the productivity of the

respondents increases in the use of ICT for research and development while on the other hand the negative coefficient of marital status, area of specialization and career path does not translate to increase in productivity of the respondents in research and development. However, marital status, educational level, working experience and career path are statistically significant at 5% level indicating that these variables have great influence on the use of ICT for research and development by the respondents. The effect of ICT on research and development by the respondents is statically significant at 5%, this implies that ICT has contributed immensely in aiding the respondents to carry out their research activities efficiently and effectively.

Table 3A. Analysis of Variance on the Effect of ICT on Research and Development.

ANOVA						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1.966	7	.281	3.118	.006
	Residual	7.746	86	.090		
	Total	9.713	93			

Table 3B. Regression Coefficients on the Effect of ICT on Research and Development

Model		Coefficients		T	Sig.
		Unstandardized Coefficients	Standardized Coefficients		
		B	Std. Error	Beta	
1	(Constant)	1.112	0.346		0.002
	Age of the respondent	0.008	0.054	0.023	0.156
	Gender of the respondent	0.076	0.072	0.105	0.877
	Marital status of the respondent	-0.126	0.064	-0.220	0.052
	Highest Educational qualification of the respondent	0.011	0.034	0.041	0.316
	Working experience of the respondent	0.108	0.057	0.248	0.059
	Area of specialization of the respondent	-0.003	0.023	-0.018	0.894
	Career path of the respondent	-0.273	0.114	-0.365	0.019

Source: Field Survey data, 2019

Challenges and Constraints of ICT Tool

The challenges and constraints faced by researchers in using ICT is as shown in table 4. Results in table 4 revealed that bad network coverage fall in the category of “very severe” with mean score of 3.09. unstable power supply,

high cost of bandwidth/bundles and slow internet speed with respective mean scores of 2.94 and 2.89 were in the category of “severe”, while inadequate computer and internet searching difficulties were considered “not severe” with mean scores of 2.45 and 2.32 respectively. The implications of these is that bad network and irregular power supply tend to cripple and hinder the progress of research activities generally.

Table 4. Challenges and Constraints in Use of ICT Tools (N= 94)

Constraints	4 Very severe	3 Severe	2 Fairly severe	1 Not severe	X	Rank	Remarks
Unstable Power Supply	32(34.0)	34(36.2)	19(20.2)	9(9.6)	277	2.94	2 nd Severe
High Cost of Hardware	23(24.5)	45(48.9)	15(16.0)	10(10.6)	267	2.84	5 th Severe
High Cost of Software	29(30.9)	25(26.6)	30(31.9)	10(10.6)	261	2.77	6 th Fairly severe
Bad Network Coverage	39(41.5)	33(35.1)	14(14.9)	8(8.5)	291	3.09	1 st Very severe
Inadequate Training on ICT Use	23(24.5)	23(24.5)	32(34.0)	16(17.0)	241	2.56	10 th Fairly severe
Internet Searching Difficulties	14(14.9)	28(29.8)	27(28.7)	25(26.6)	219	2.32	13 th Not severe
High Cost of Bandwidth/Bundles	28(29.8)	37(39.4)	20(21.3)	9(9.6)	272	2.89	3 rd Severe
Frequent Breakdown of ICT Facilities	23(24.5)	27(28.7)	30(31.9)	14(14.9)	247	2.62	9 th Fairly severe
Slow Internet Speed	35(37.2)	23(24.5)	27(28.7)	9(9.6)	272	2.89	3 rd Severe
Lack of Required Software	21(22.3)	30(31.9)	35(37.2)	8(8.5)	252	2.68	7 th Fairly severe
Inadequate Computers	19(20.2)	24(25.5)	32(34.0)	19(20.2)	231	2.45	12 th Not severe
Inadequate Scanners/Camera	23(24.5)	23(24.5)	30(31.9)	18(19.1)	239	2.54	11 th Fairly severe
Inadequate Printer	24(25.5)	26(27.7)	31(33.0)	13(13.8)	249	2.64	8 th Fairly severe

Source: Field Survey data, 2019. Parentheses are in percentages

4. CONCLUSION AND RECOMMENDATIONS

The findings from the study revealed that Research and Development in the Centre is carried out by engineers having the highest percentage of 41.5%. Also observed from the study, are 88.3%, 58.5% and 84% researchers in the Centre uses internet, desktop PC and laptop respectively. However, for dissemination of research findings to larger audience 71.32% and 61.7% uses radio and television media respectively. Above 90% of the respondents were acquainted with internet surfing meanwhile 97.9% were able to

operate computer irrespective of their areas of specialization. The multiple regression result indicates that the coefficients of marital status, educational level, working experience and career path are statistically significant at 5% level indicating that these variables have great influence on the use of ICT for research and development by the respondents.

Access to ICT implies access to channels and modes of communication that are not bound by language, culture or distance. The face of research in the Centre has changed as ICT have become increasingly accessible to researchers. Therefore in order to consolidate on the gains achieved by researchers in using ICT for efficiency and productivity and based on the major findings from the study, it is recommended that access to ICTs implies not only the physical availability of the facilities but also the provision of the right infrastructure. Provision of alternative power supply as generators and solar power. Researchers should be sent on regular training and workshops on ICT applications.

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