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Effect of Information and Communication Technology (ICT) Adoption on the Performance of Technology Based Small and Medium Scale Enterprises (SMES) in Maiduguri Metropolitan Area, Borno State, Nigeria

Hajja Gambo Ahmodu
[1]Department of Marketing, School of Management
Ramat Polytechnic Maiduguri P.M.B 1070, Borno State, Nigeria

Abstract: *Information and Communication Technology (ICT) has a strategic and significant effect on the transformation of entrepreneurial business for a higher performance index. This study intends to investigate the effects of ICT adoption on the performance of Technology based SMEs in Maiduguri Metropolitan Area, Borno State, Nigeria. The study adopted a descriptive and causal research designs that is made up descriptive research techniques. The population of the study is made up 1,595 ICT based businesses out of which a sample of 350 respondents were selected using convenience sampling technique. Primary data was collected using an instrument made up of 5 point Likert scale with both open and closed-ended questions. The data collected from 335 respondents were analysed using both descriptive and inferential statistics with the aid of SPSS version 24. Descriptive statistics (mean and standard deviations) were used to describe the characteristics and research questions of the study variables. Multiple linear regression was used to assess the relationships between independent and dependent variables of the study using a P-value <0.05 to evaluate statistical significance. The result of the analysis reveals that Information and Communication Technology (ICT) adoption has significant effect on the Performance of Technology Based Small and Medium Scale Enterprises (SMEs) in Maiduguri Metropolitan Area, Borno State, Nigeria. The study also revealed that ICT Security, ICT Infrastructure, Management support and ICT skills have significant effect on the Growth and Expansion of Technology Based Small and Medium Scale Enterprises (SMEs) in Maiduguri Metropolitan Area, Borno State, Nigeria. The study concludes that there is urgent and profound need for governments across all levels to support the adoption of ICT by SMEs by enhancing and providing ICT infrastructure like internet access and other ICT related loan schemes be adopted as a strategy for motivating SMEs to adopt ICT as a matter of legislation without reservation. These policies and laws should create an enabling environment for the smooth and effective operations of SMEs to enjoy continued increase in their performance.*

Keywords: *Technology; Enterprises; Entrepreneurship and Regression.*

1.0 Introduction

The global economy is undergoing a massive structural change driven by the globalization of business and the increased revolution in information and communication technology. These monumental changes lead to the development of New Economy characterized with superior economic structure that is expected to arise as an outcome of these two forces of change (Mattii, 2002). The ICT revolution in the emerging economies is tremendously making more, better, cheaper and faster exchange of information globally, thereby reducing the effect of country-specific risks related with the development of new products and services (Rao, 2001). The contemporary business world has been deeply immersed and influenced by Information and

Communication Technologies (ICT) and consequently the application of ICT among business is widespread. The increasing toll of ICT is rapidly changing the margin of global production, work, business methods, trade and consumption patterns between enterprises and consumers. In the developed countries to be precise Australia and United Kingdom Small and Medium Enterprises (SMEs) account for more than half of all business and all employment (Kazi, 2009). In this technological age, small businesses are increasingly using and adopting information and communication technology because of its associated cost-effectiveness and affordability. Alberto and Fernando (2007) remarked that the use of ICT can improve business competitiveness with internet providing numerous opportunities for SMEs to compete equally with large corporations at a reduced cost. Information and Communication Technology (ICT) has a pervasive effect on the entrepreneurial businesses. It introduces a new standard for shaping entrepreneurial activities radically changing the approach to technology for development (United Nation Conference on Trade and Development, 2007). Informational technology is a component of ICT that includes gadgets like telephone; analog, digital or GSM; television, radio, fax and all other emerging technologies that make it possible to communicate even more conveniently across borders and cultures. The ICT revolution is an all-purpose revolution that has been described by Blinder (2006), as the third industrial revolution. Like the effects of the two previous industrial revolutions that were driven by stimulated entrepreneurial business activities in generally all facets of business interactions. ICT has led to the massive development of entrepreneurial skills and abilities, which have changed the notion of "entrepreneurship" from a time and space limited entity to a rather more pervasive concept involving the use and modification of intangibles such as ideas and experiences in the creation of equally virtual and intangible enterprises. ICT has created a platform for ease of exchange of information and ideas between people. The internet for instance, has provided a virtual environment where anybody can set up a business without the stress of seeking out a particular location and/or physical facilities. The rapid growth and expansion of ICT has become a phenomenon that touches every aspect of human activities. From the home front to the work place, ICT have had a tremendous effect on the way things are done. For the worker, ICT has made it possible for his service to be available and accessible at virtually any time thus making it possible to work at a considerable pace. With the click of a button on a phone or device connected to the internet, you can buy and sell with ease from the comfort of your home or office. With the proliferation of new technologies such as super computers, the internet and satellites, a communication revolution has been unleashed on the world which gradually became a smaller village of a conglomerate of cultures and nationalities. This has been termed "globalization", that is, a global village where borders and boundaries are continually being eroded by factors beyond the control of any singular government or cartel. With this trend also comes a new generation of risk takers, innovators and enterprise builders. These are the new generation of entrepreneurs whose calculated risk-taking is built upon the ICT revolution. Mobile telephony has become the most important mode of communication in developing countries. While internet access has become a reality for many businesses and public institutions, and for individuals with higher levels of education and income, for the vast majority of low-income population mobile telephony is likely to be the sole tool connecting them to the information society in short to medium term. Nigeria was not left out of the ICT blitz with the launch of the Global System for Mobile (GSM) in the country in 2001. The rate of acceptance of the new technology in the country bewilders the analysts and other observers. GSM as a factor of ICT brought about marked improvement in the way many things are done in the country. ICT

manifests in all aspects of lives, be it health, education, etc, and it is a pathway to achieving the Millennium Development Goals (MDG), which are consistent with Nigeria's National Economic and Empowerment Development Strategies (NEEDS) instituted in 2004 (Alumanah, 2005). Most public services in advanced countries are ICT-oriented. Most offices, even homes are equipped with computers. These are expensive in terms of cost of materials, installation and maintenance in low per capita income countries like Nigeria. Irregular power supply and the relatively underdeveloped communication system, among other poorly developed infrastructures, are also sources of worry in a country like Nigeria to make efficient and effective use of ICT. In addition, the cost of basic ICT training has been overwhelming, considering the fact that computer literacy is at the core of most types of training and has continued to positively influence many forms of training at basic and advanced education levels. Entrepreneurship however, is the recognition of an opportunity to create value, and the process of acting on this opportunity, whether or not it involves the formation of a new entity. While concepts such as "innovation" and "risk taking" in particular are usually associated with entrepreneurship, the Australian Government's Department of Family and Community (FaC) does not consider them necessary in defining the term. Therefore, there is need for the current study examine the effect of Information and Communication Technology (ICT) Adoption on the Performance of Technology Based Small and Medium Scale Enterprises (SMEs) in Maiduguri Metropolitan Area, Borno State, Nigeria.

2.0 Materials and Methods

2.1 Study Area

The study area is Maiduguri metropolis Areas of Borno State lies within latitudes 10-14^{o}N and longitudes 11^{o}30'E and 14^{o}45'E. It occupies a total land mass of 50,778sq.km (Ministry of Land and Survey, 2008). It shares common boundaries with Konduga Local Government Area to the North and North-west and Jere Local Government Area to the South. Maiduguri Metropolis has an estimated population of 521,492 million people with annual growth rate of 2.8% (National Population Commission, 2006).

2.2 Population of the Study

The population of this study constitutes one thousand five hundred and ninety-five (1595) ICT based business owners that were registered with Borno state Ministry of Commerce and Industry as well as with corporate affairs commission in the state (Borno State Board of Internal revenues, 2019). The ICT based business owners are actively operating business in Maiduguri and Jere. However, it was cumbersome and unrealistic to cover all ICT based business owners in the whole of Maiduguri; therefore, due to large area of this study, there arouse a need to select reasonable sample size which can adequately capture the views of the entire population necessary for this research work.

2.3 Sample Size and Sampling Techniques

Taro Yamani`s formula was used in determining the sample size of this study.

$$n = \frac{\mathrm{N}}{1 + N(e)^2}$$

Where: n=sample size
N=Population
e =significance level
1=constant

$$n = \frac{1595}{1 + 1595(0.05)^2}$$

$$n = 320$$

This study employ the survey research design and ICT based entrepreneurship business owner

2.4 Method of Data Collection

Data for the study was collected through primary source. The primary data was collected using structured questionnaire that was administered to the respondents, which were ICT based business owners in the study area. The primary data was collected using structured questionnaires that were administered to 350 ICT based business owners in the study area. The choice of using the q**uestionnaire was based on the fact that it is more objective and convenient for both the researcher and the respondent as it was administered directly through give and pick method**.

2.5 Data Collection Instruments

This study used a questionnaire designed with relevant, unambiguous, and clear questions to collect primary data. The study used semi-structured questionnaires where the respondents selected answers that reflected their views and opinions in closed questions, as well as, give their opinions in the open-ended questions. The rationale for using semi-structured questionnaire was that the researcher was able to gather standardized responses for meaningful comparison as well as get respondent's opinions on the variables of the study. Second, closed questions provided data that could easily be coded, computerized, and analysed as it collected quantitative data. Conversely, the open-ended questions allowed the researcher to gather qualitative data.

3.0 Result and Discussion

3.1 Data Presentation

As presented in table 1 A total number of 350 questionnaires were administered to the respondents in five (5) wards from each of the two Local Government Areas of Maiduguri Metropolis making a total of 10 wards. These wards are Maisandari, Hausari Zango, Bolori 1, Old Maiduguri and Dalwa Masba wards, others are Kadamari, Maiduri, Gongulan, Maimusari and Mairi. The wards were purposively selected based on the presence of businesses activities while respondents were randomly selected in each of the wards.

Table 1: Analysis of Response Rate

Categories of Businesses	Questionnaires Issued	Questionnaires Retrieved	Questionnaires Missed
ICT Facilities Users	82	78	4
Data Agent	44	41	3
ICT Facilities Repairers	87	84	3
ICT Facilities Sellers	48	45	3
Others ICT related Enterprises	89	87	2
Total	**350**	**335**	**15**

Source: *Field Survey, 2019*

Table 2 shows that three hundred and fifty (350) questionnaires were administered to the respondents and three hundred and thirty-five (335) questionnaires were retrieved, while only fifteen (15) were missing, as such the researcher used 335 questionnaires for this study, which implies more than 95% data was retrieved and used for the study.

3.2 Demographic Characteristics of Respondents

The demographic characteristics of interest to this study were age, gender and monthly income level. Other demographic information exempted are educational qualification, marital status, years of operations with the bank etc. The frequency distribution and percentage of the respondents' demographic information is shown in Table 2.

Table 2: Demographic Information

Gender	Frequency	Percent(%)
Male	203	60.6
Female	132	39.4
Total	**335**	**100.0**
Age(Years)		
20-30	179	44.6
31-40	115	28.7
41-50	72	18.0
More than 50 years	35	8.7
Total	**335**	**100**
Educational Qualification		
Primary School	77	23.0
Secondary School	111	33.1
Bachelor's Degree	138	41.2
Master's Degree	9	2.7
Total	**335**	**100.0**
Working Experience		
Less than 5 Years	236	70.4
5-10 Years	94	28.1
11-15 Years	4	1.2
16-20 Years	1	.3
Total	**335**	**100.0**

Type of Business		
ICT Facilities Users	78	23.3
Data Agent	41	12.2
ICT Facilities Repairers	84	25.1
ICT Facilities Sellers	45	13.4
Other ICT Related Enterprises	87	26.0
Total	**335**	**100.0**
Years in Business		
Less than 2 Years	77	23.0
2-5 Years	111	33.1
5-10 Years	142	42.4
10 years and Above	5	1.5
Total	**335**	**100.0**
Position in Business		
Proprietor	140	41.8
Employee	170	50.7
Family Member	25	7.5
Total	**335**	**100.0**
Monthly Income (₦.)		
Below 10,000	96	28.7
10,000-30,000	89	26.6
31,000-50,000	32	9.6
51,000-70,000	40	11.9
71,000-100,000	47	14.0
Over 100,000	31	9.3
Total	**335**	**100.0**

Source: Field Survey, (2019).

Table 1, shows that majority of the respondents investigated are male (203) equal to 60.6% while female respondents are 132 (39.4%) implying that there are more males in the ICT based SMEs investigated when compared to their counterparts. The classification of the respondents by age also reveals that majority of the respondents were aged between 20 and 30 years with a percentage of 44.6 percent. The second largest category was between the age brackets of 31 to 40 years equivalent to 28.7 percent while those between 41 to 50 years were 72 with a proportion of 18 percent of the respondents. The remaining respondents are those with more than 50 years of age were 8.7 percent. The age is not significant factor because most organizations do not have age preference the policies governing their employment. The results on table 42 exhibits that the largest proportion of the respondents have a bachelor's degree at 41.2 percent followed by 111 secondary school graduates equal 33.1 percent of the respondents. 77 respondents equal to 23 percent have primary school certificates and the minority of the respondents are 9(3.7%) having doctoral degree. The findings reveal that most of the respondents have good education background which is one of the requirements needed for the adoption and working with ICT. This study assessed the working experience of the respondents because the longer one works in an organisation, the more experience they acquire about the ICT adoption. The results depicted on table 4.2 show that most of respondents 236(70.4%) have been working in the organisation for less than five years. 28.1% proportion of the respondents have worked in the organisation for 5 to 10 years, while 4 respondents equal to 1.2 percent are those group that have worked for 11

to 15 years.1 respondent, which represent .3% of the respondents have worked 16 to 20 years and none of the respondents have worked for more than 20 years Hence, these results show that all the respondents had good knowledge of their organisation that would enable them to respond to the research questions. The study also sought to determine the type of businesses that the respondents are running because every business has its own ICT requirements and that merit also gave them the opportunity to have relative points of view about ICT adoption in SMEs. The results indicate that most of the respondents 87(26%) are in the other ICT Related Enterprises followed by 84(25.1%) of the respondent who are ICT Facilities Repairers. 78 respondents equal to 23.3 percent are the ICT Facilities Users while the ICT facility sellers are only 45 equivalents to 13.4 percent and the minority of the respondents equal to 41(12.2%) are Data Agents. According to the findings in table 4.2 most of the respondents 142(42.2%) have been in business between 5 to 10 years followed by 33.1% of the businesses aged 2-5 years, and 77(23.0%) have their businesses established in less than 2 years. The last category 5(1.5%) operated their businesses for 10 years and above. The findings in Table 4.2 also show that most of the respondents (53.7%) were employees, followed by 45.0% who are business owners and the remaining 1.3% are family members. The analysis on the table 4.2 shows that the classification of the respondents by monthly their monthly income shows 96(28.7%), 89(26.6%), 32(9.6%), 40(11.9%) and 47(14%) earned below the monthly income of ₦10,000, ₦30,000, ₦100,000, ₦70,000 and ₦50,000 respectively, while only 31(9.3%) earned above ₦100,000 per month.

3.2.1 **Reliability Test of the Instrument**

The researcher established the reliability of the scale used by internal consistency test using Cronbach's alpha (α) coefficient (Yates, 2010).

Table 3: Reliability Statistics

Variables	N of Items	Cronbach's Alpha
ICT Security	5	0.702
ICT Infrastructure	4	0.705
Management Support	5	0.767
Employee ICT Skills	5	0.720
ICT Adoption	19	0.905
Growth and Expansion	8	0.776
Overall	27	0.924

Source: Survey Data, (2019)

The Cronbach alpha value of all the scales is above 0.924 and that of the ICT adoption (α=0.905). The results, also show the following coefficients; Growth and expansion (α= 0.776), Management support (α= 0.767), employee ICT skills (α= 0.720), ICT Infrastructure (α= 0.702). This implies that all the variables were reliable since they were above 0.7 the recommended threshold and it is in accordance with the suggestion given by Yates (2010), that when Cronbach's alpha coefficient is closer to 1.0, the reliability of items is considered to be greater.

4.0 Conclusion and Recommendation

4.1 Conclusions

Based on the findings of this study, it has confirmed that Information and Communication Technology (**ICT) adoption has significant effect on** the Performance of Technology Based Small and Medium Scale

Enterprises (SMEs) in Maiduguri Metropolitan Area, Borno State, Nigeria. The study also confirmed that all the predictors; ICT Security, ICT Infrastructure, Management support and ICT skills have significant effect on the Growth and Expansion of Technology Based Small and Medium Scale Enterprises (SMEs) in Maiduguri Metropolitan Area, Borno State, Nigeria. The positive effect of these variables is an indicator that as a unit of the variables are added there are simultaneous increase in the performance of the ICT based SMEs.

4.2 Recommendations

Base on the findings of this study, the following recommendations were made for ICT based entrepreneurs' and businesses to be efficient and vibrant;

i. There is urgent and profound need for governments across all levels to support the adoption of ICT by SMEs by enhancing and providing ICT infrastructure like internet access and other ICT related loan schemes be adopted as a strategy for motivating SMEs to adopt ICT as a matter of legislation without reservation. These policies and laws should create an enabling environment for the smooth and effective operations of SMEs.
ii. Governments and the organisation should coexist as partners to formulate laws and policies that would forestall towards enhancing ICT security breach by unauthorised users. Both the internal and external users of the systems should also be given orientation on the dire consequences of security breach. The orientation programmes would also educate and eradicate the fear for information security since statistical and empirical evidence have shown that improved ICT security would lead to increased performance.
iii. The management of the organisations should as a matter of fact maintain if not increase their present level of support especially for the adoption of ICT because this positive posture and attitude is the bedrock for the sustenance of ICT policies and consequently its development as a whole.

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