
EFFECT OF ADOPTION AND USE OF INFORMATION AND COMMUNICATION TECHNOLOGY (I.C.T.) BY SMALL AND MEDIUM ENTERPRISES (SMEs) IN NIGERIA: A CASE STUDY OF KADUNA STATE

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Abstract

This study collected data from 155 SMES located in different parts of Kaduna State to investigate the important influencing factors affecting the adoption and use of ICTs. Tobit regression analysis was conducted to predict the adoption inhibiting factors by the measure of cost, accessibility to information management support, ICT infrastructure and Government Support. The result indicate that cost of new technology is a major barrier for SMEs in adopting ICT. Other negative factors also include ICT infrastructure Government support management support and accessibility to information in that order. Suggestions for solutions to these barriers has been offered as recommendations in the paper.

Keywords: *Effect, adoption, information, communication, technology and enterprises.*

Background to the Study

The present business world has been deeply influenced by information and Communication Technologies (ICT) and the application of ICT among business is widespread. Information and Communication Technology is rapidly changing global production work and business methods and trade and consumption patterns in and between enterprises and consumers. (Sayed & Moh'd, 2009). Demi (1996) stress that every business must bring ICT into their business operation and take advantage of the benefits they offer. In the developed countries including Australia and United Kingdom Small and Medium Enterprises (SMEs) account for more than half of all business and over half of all employment (Kazi, 2007). Small business are increasingly using and adopting information and communication technology these days due to the advent of personal computer, cost effectiveness and cheaper ICT products. Alberto and Fernando (2007) argued that the use of ICT can improve business competitiveness with internet providing numerous opportunities for SMEs to compete equally with large corporations.

Adoption of the ICT is considered to be a means to enable these business to compete in a global scale, with improved efficiency and closer customer and supplier relationships (Chong et al; 2001). In this respect SME should consider ICT as an important approach in their business to take competitive advantage from the global markets (Mutsaers et al; 1998). Some empirical studies by Bertelsmann and Dons (2000), Bryjolfsson and Yang (1996) Dedrick et al (2003), Kosili and Davaraj (2003) and Melville et al. (2004) confirm the positive effect of ICT on firm performance in terms productivity, market value and market share. This study also reveals that ICT has some effect in terms of intermediate performance measures, such as process efficiency, service quality, cost savings, organization and process flexibility and customer satisfaction. Infact there is need to accelerate the implementation of ICT to improve business performance. In order to do so, it is important to measure the key factors driving the growth of ICT and providing appropriate recommendation on this Study. This paper aims at investigating the factors that influence ICT adoption and use by small and medium enterprises in service enterprises of Kaduna and its environs. A variety of internal and external factors have been identified as preventing many SMEs from implementing ICT. The study which is reported in this paper, provides more in depth information about the reasons why Local SMEs are reluctant to adopt ICT for their business activities.

Research Questions

The following research questions were answered in the course of this study: What is the relative contribution of each of the above variables to the prediction of adoption and use of the ICT in SMEs in Nigeria?

What is the joint contribution of cost of new technology, Accessibility to information, ICT infrastructure, management support and Government support attitude to the adoption and use of information and communication Technology in Nigeria?

ICT in Nigeria

Nigeria with a population of over 150 million people; it is believed that it has one of the largest markets in Africa (Broad group, 2005). The GDP growth rate is estimated to be more than 6% per year. This gives opportunity for business to participate in various services, According to Asuolu (2006) in recent times, computers are deployed to every sectors of the economy. These are noticeable with the improvement in computer processing, applications and tools developed on regular basis. (Akpan and Obong, 2009) states that Nigeria is a major factor in the ICT Sector in Africa as a result of its policy approach to growing ICTs and the active roles of the SMEs. Nigeria has so far recorded significant achievements in ICT utilization, and has recorded higher growth rate in the penetration and diffusion levels of ICT. Akpan, Obong, (2009) further added that Nigeria could lead the way to harnessing ICT for Socio-economic growth. Also there are prospects for SMEs development and economic growth with the application of ICT despite the poor state of infrastructure in the country. Hence, there is a need for Nigeria SMEs to utilize ICT (Apulu & Ige 2011).

Contribution of SMEs to Nigeria Economy

The contribution of SMEs to Nigeria's economy are not contestable as about 10% of the total manufacturing output and 70% of the industrial employment are by SMEs (Aina, 2007). Through the utilization of Local resources, SMEs promote industrial and economic development and are responsible for the production of intermediate goods and the transformation of rural technology (Aina, 2007).

Nigeria SMEs not only provide employment and income for majority of its citizens but are also recognized as the breeding ground for domestic, entrepreneurial, capabilities, technical skills, technological innovativeness and managerial competences for private sector development (SMEDAN, 2005, & Aina, 2007).

The assistance of SMEs to any economy are obvious, as SMEs are known to contribute to the development of several economies in terms of output of goods and services and creation of jobs at relatively low capital cost (Apulu & Latham 2010). SMEs also improve forward and backward linkages between economically, socially and geographically diverse sectors of many economies (SMEDAN, 2005). The development of SMEs is an essential element in the growth strategy of many economies including Nigeria.

Table 1: Definition of SME

S/N	Size Category	Employment	Assets (N million) excluding land and building
1	Micro Enterprises	Less than 10	Less than 5
2	Small Enterprises	10-49	5 - less than 50
3	Medium Enterprises	50-199	50 - less than 5000

(SMEDAN, 2005)

In Nigeria, SMEs cover the entire range of economic activity within all sectors and Share a number of common problems that hinder them from the effective utilization of ICT. Those problems, as identified by SMEDAN include low market access to credit, poor information flows, discriminatory legislation, poor access to land, weak Linkages among different sectors, weak operating capabilities in terms of skills, lack of knowledge and attitude, lack of infrastructural facilities among others.

According to Chacko and Harris (2005), the reliance of the world economies on ICT increases every day either to receive, to process or to send out information. However, the small businesses within African which form a large part of the economies are yet to reap these benefits evenly. This is because the SMEs are unable to meet up with the prerequisite level of access to and utilization of ICT which in turn, deprives them from engaging in the regional or global business network. However, until these prerequisites are met, SMEs cannot integrate into the global supply chains and will be unable to bid for outsourcing business and increase their internal productivity and efficiency (Chacko & Harris 2005).

Literature Review

There are some problems militating against the development of the SMEs sector in Nigeria. These, according to Ugwushi, (2009) and Adelaja (2004) include; obsolete technologies and machineries, lack of access to modern technology, limited access to management support and technical advisory services, poor access to information on raw materials, infrastructural inadequacy and lack of social support, financial problems and poor economic conditions. Richard et al, (2006) outlined five main areas of ICT application in support of firm and rural development. These are: economic development of product, community development, research and education, SMEs development and media works. He suggested that SMEs can make use of ICT in the following ways; online for accessibility to information, monitoring and consultation and processing e-commerce.

The perceived cost of adoption of new technology is an important factor in the adoption and utilization of the web (Ernst & Young, 2001) Generally, the higher the costs of adoption of the innovation the slower the pace of innovation expansion is likely to be (Mansfield, 1968 & Davis, 1979). The cost factor was studied by various information systems researchers (Seyal & Rahin, 2006; Pingakumar et al, 1997; Drung & Fashoomad, 1996), found direct and significant relationship between cost and adoption of technology. The lower the cost of adoption the higher the new innovation such as the ICT will be adopted by the company and Vice Versa. The SMEs will less likely adopt ICT when its initial set up cost is high (Deion et al, 2002). (Poon & Swatman, 1996) and Renolds (1994) stated that small business often have difficulty in obtaining financial

resources. The epileptic supply of electricity in Nigeria has a major impact on SMEs Utilization of ICT. Baker (2008) in his study revealed that less than 20% of the Nigerian population have access to stable electricity supply. Similarly, Gnansounou (2008) stated in his research that the Nigeria demand for electricity is in deficit of about 80%.

This study shows the extent of the gap that exist for electricity requirement by Nigeria SMEs for ICT adoption and the actual supply. The insufficient provision of some major infrastructures needed for proper implementation of ICT are affecting the effective utilization of ICT. These include Network backbones, fibre optic backbone for Local Area Network amongst others that are essential for interconnectivity between SMEs (Apulu & Emmanuel, 2011). Arikpo et al (2009) in their research, also highlighted the high subscription and infrastructural costs couple with the poor quality of service by internal service providers (ISP) at inception as a major hindrance to the use of ICT in education research and development in Nigeria.

Large amount of researches have examined that management play a critical role in an organization innovation adoption (Cerpa & Verner, 1998 & Earl, 1993). Mabert et al (2006) found that senior executive were very involved throughout the Enterprise Resource Planning (ERP) implementation, from the outset to completion Basu et al (2002) took postal survey upon the impact on the achievement of strategies information systems planning (SISP) objectives from 105 corporate information systems planners. The result revealed that senior management involvement has a positive impact on SISP objective achievement. Nickell and Seado (1986) found that the senior managers tend to have a more positive attitude towards adoption of information technology.

The level of support from the Nigerian government is estimated to be 48.3% and banks 45% and is considered inadequate Apulu and Ige, (2011). Presently in Nigeria most banks do not give out loans to SMEs and some banks such as the Agricultural Development Banks that are mandated to give loans to SMEs require collateral such as landed properties, shares and capital but the inability of most SMEs to present collateral remains a major setback (Owoseye, 2010). Furthermore the government which is meant to be the backbone for SMEs do not fully support the development of SMEs in Nigeria in terms of policies and initiatives. Ling (2001), Rashid and Qirim, (2001), Tam and Teo (2000) argue that government policies are meant to assist SMEs to increase their competitiveness and also enable SMEs to have greater opportunities of using ICT. Hence the Nigeria government is expected to be a regulator of economic activities between SMEs and the banks.

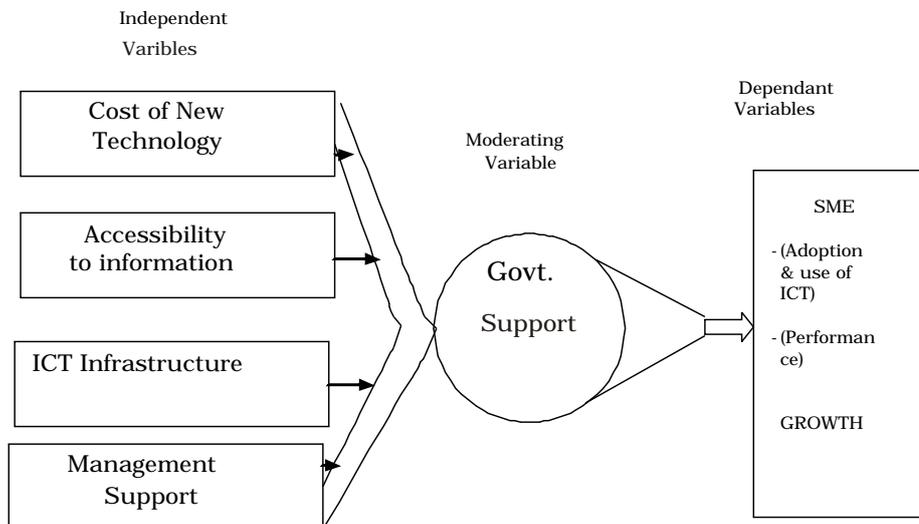


Fig 1: Conceptual Framework

Conceptual Framework

Based on the literature reviewed above and illustrated in figure 1 for the study the Conceptual Framework consists of five set of variables, cost of new technology, and accessibility to information, ICT Infrastructure, Management Support and Government Support. These are the independent variable. Government Support is the moderating variable moderating influences on independent variables and the dependent variable. They are hypothesized to influence the adoption and use of ICT hence the performance and growth of SMEs.

Analytical Methods

In this study, a number of Statistical tools were used in analyzing the data. These include descriptive statistics (Tables, Frequencies and Percentages) and Tobit regression model. While description statistics was used to analyze, describe and summarize respondents' Socio-economic characteristics, different ICT Facilities and SMEs available, the Tobit Regression Model was employed to ascertain determinants of ICT usage by SMEs owners in Kaduna and its environs. Also, the different livelihood activities and ICT facilities were ranked to determine their level of patronage by respondents. For the Tobit regression model according to Green (2003) takes the form:

$$y^i = x + \epsilon_i$$

Where ϵ_i is normally distributed with mean zero and constant variance (ie $N(0, \sigma^2)$)

y^i = Dependant variable (an index ranging between 0 and 1) = number of ICT Facilities used divided by the total numbers of ICT available in the study area.

$x_1 = x_{11}$ Explanatory variables

x_1 = Age of respondents (Years)

x_2 = Gender (Male = 1, Female = 10)

- x_5 = Current Capital Investment (Naira)
- x_3 = Level of Formal Education
- x_4 = Experience in business (Years)
- x_6 = Access to information
- x_7 = Cost of New Technology (Naira)
- x_8 = ICT Infrastructure
- x_9 = Management Support
- x_{10} = Government Support
- x_{11} = Number of SMEs
- $?i$ = Error term

Socioeconomic characteristics of Respondents

In this study, a number of SME owners' socioeconomic characteristics were considered to ascertain their influence on operations of SMEs in the study area. Some of the characteristics considered include age, gender, and household size educational attainment level of respondents and the results of the analysis are presented below:

Age of Respondents

Respondent distribution by age indicates that a sizeable number of the respondents are still in their active working age with an average age of 30 years. In other words, operators of SMEs in Kaduna and its environs are youths with over half of them (50.32 percent) ranging between 25 and 30 years. This therefore shows that owners these SMEs are young and can easily adopt ICTs since the youth have often been described as agents of change in many societies.

Table 2.1: Age Distribution of SMEs' Owner (Respondents)

	Frequency	Percentage %
18 - 25	14	9.03
26 - 35	78	50.32
36 - 45	42	27.09
46 - 55	13	8.39
56 and above	8	5.16

Source: Authors Computation from survey data.

Gender of Respondents

As shown in table 2.2, it is very clear that there are more male owners (64.52 percent) of SMEs in Kaduna State of Nigeria than female (35.48 percent) and this is not unconnected with the fact that most men prefer to diversify their income source so as to be able to cater for their family. In fact, it was revealed from the survey that over three quarter of the thriving SMEs in the study area are owned by men. Although this does not mean that there are no thriving SMEs owned by women but quite a good number of the women interviewed adduced increase in domestic responsibilities in the form cooking, washing, going to market and taking care of their children and other family members among others as reasons for their inability to face their business squarely.

Table 2.2: Distribution of owners of SMEs by gender

	Frequency	Percentage %
Male	100	64.52
Female	55	35.48

Source: Authors Computation from survey data.

Educational Attainment of Respondents

Distribution of respondents by educational status as depicted in table 2.3 shows that more than two third (70 percent) are educated up to tertiary level. This distribution generally shows that educational attainment in Kaduna and its environs is fairly high. This is so considering that Kaduna and Zaria cities are seats of tertiary education housing Universities, Polytechnic and Colleges of Education. This is an indicator that SME owners in this study will readily adopt and use ICTs in their enterprises, a booster for the SMEs growth in the rea.

Table 2.3: Respondent's Distribution by Educational

	Frequency	Percentage %
Primary	11	7.0
Secondary	21	13.55
OND/NCE	52	33.55
HND	44	28.39
B.A/BSC	16	10.32
MBA/MSC	11	7.09
Others Specify		

Source: Authors Computation from survey data.

Experiences in Business

From the table it can be seen that most of the respondents started business in less than ten years ago with 45.16% within the 5years bracket. About 28% are the more experience SME owners whom are expected to have adopted ICT in their business.

Table 2.4: Distribution of SME owners by years of Experience

	Frequency	Percentage %
Below 5 years	70	45.16
5 - 10 years	39	25.16
11 - 20 years	43	27.74
21 years and above	3	1.9

Source: Authors Computation from survey data.

Current Capital Investment on SMEs

From table 2.5 distribution of respondents capital investment on SMEs show that 48.39 percent of investors in the study area invested less the N5million on their business, only about 25 percent invested between N10million and N20million on their enterprises while negligible percentage invested above N30million or more on their businesses. This explains why adoption of ICT by SMEs in the Study area has been difficult due to scarcity of fund.

Table 2.5: Distribution of Respondents by current Capital investment on SMEs

	Frequency	Percentage %
Below ₦5million	77	48.39
5 - 10million	30	19.35
11 - 20million	23	14.83
21 - 30million	7	4.5
31 - 60million	13	8.39
61million and above	5	3.23

Source: Authors Computation from survey data.

Benefits of ICTS' USAGE IN SMES

There is no gainsaying the fact that usage of ICTs impacts on SMEs. As shown in table 2.6, owners of SMEs indicated cost reduction, ease of advertising and marketing, enhanced income, networking opportunities and reduction in losses arising from prolonged storage of manufactured goods as some of the benefits of using ICT facilities.

In fact more than one third (41.94 percent) indicated increased revenues from sales while about 35.48 percent reported wider market penetration as the gains of using ICT's. Also, about 8.7 percent indicated cost reduction in terms of money spent in conveying their products from the point of manufacture to the point of sale since most of these activities are performed either on phones or through engaging other ICT facilities available in the study area. Thus, it is clear that ICTs are drivers of growth in SMEs since a sizeable number were able to expand their businesses and even engage more hands as a result of ICTs usage.

Table 2.6: Distribution of benefits ICTs usage in SMEs

Benefit	Frequency	Percentage %
Market accessibility	55	35.48
Increased income	65	41.94
Ease of marketing	4	2.58
Cost reduction	15	9.67
Networking	5	3.22
Reduction in loss due to Storage	11	7.09

Source: Authors Computation from survey data.

Determinants of ICTs' usage in Kaduna State of Nigeria

In ascertaining what determines ICTs' Usage in the study area, the effect of a number of respondents socioeconomic characteristics and external factors were considered. From the result presented in Table 2.7, age, gender, levels of formal education, experience in business, access to information and cost of new technology were significant factors. While the coefficients of age ($P < 0.10$), gender ($P < 0.05$), educational level ($P < 0.00$) and access to information ($P < 0.05$) were positive, those of current capital investment ($P < 0.05$), ICT infrastructure ($P < 0.00$) and government support ($P < 0.10$) were negative.

For example, as age and educational level of respondents increase, their usage of ICTs is enhanced because of experience. Due to better exposure as a result of access to education creates an avenue to learn new ideas and get up-to-date information which invariably translates to better usage of ICTs. On the other hand due to paucity of fund there was inadequate money to purchase new ICT technology hence the usage of ICT will fall. Also those that are fully engaged in operations like tailoring and mechanics do not use ICTs as much as those engaged in full businesses activities. This could be the result of limited exposure on their part and lack of interest because of their scale of operations.

Table 2.7: Tobit Regression on determinants of ICT's Usage

Variable	Coefficient
Age	2.145* (1.265)
Gender	3.047** (0.023)
Level of formal Education	1.173*** (0.352)
Experience in business	0.921 (1.021)
Current Capital Investment	-0.065*** (0.029)
Access to Information	0.029 (0.032)
Cost of new technology	0.655*** (0.280)
ICT Infrastructure	-0.723*** (0.198)
Government Support	-1.196* (0.708)
Management Support	0.252 (0.144)
Number of SMEs	0.243 (0.152)
Constant	2.321 (0.623)

i. Coefficient significant at 10%** Coefficient Significant at 5%*** coefficient significant at 1%. Figures in parenthesis are standard errors. Number of observation = 155

Log Likelihood = - 103.48342; prob>chiz=0.0000

Source: Authors Computation from survey data.

Conclusion

It is a fact that usage of ICTs has serious implications on SMEs. Some of the notable positive implications of ICTs' usage in Kaduna and its environs include expansion, enhanced income, cost reduction and ease of advertising and marketing of produce. Educational Status, gender respondent's access to information, and cost of new technology were some of the significant factors explaining usage of ICTs in the study area.

Recommendations

Based on the findings of this study, it is recommended that:

1. Effort should be geared at building capacity of respondents especially women through education. Since education enhances adoption of new technology which invariably leads to increased income.
2. Improvement in infrastructural facilities especially power (electricity) is very vital to enhance the usage and performance of ICT facilities. Virtually all ICTs facilities rely on power to function. In fact most patronized ICT facility (Mobile Phones) require power to charge the batteries
3. Respondents in the study area should be encouraged to form associations since this makes access to information possible and easy. In fact, these associations even provide avenue to access credit in the form of cooperative society and this might help boost the operation of SMEs in the study area.

4. Finally, now that it has been established that ICT adoption and use helps an organization to grow, it is recommended that every SMEs should integrate the technology into their business practices and operations. It makes more sense to use the much your circumstance and financial capabilities can accommodate than staying away from taking advantage of these emerging technologies. The future survival of every business venture rest squarely on its ability to marry its human resources with its ICT resources.

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