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Influence of Information and Communications Technology on Performances of Small and Medium Enterprises (SMEs) in Northern Nigeria

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Abstract
This study was undertaken to find out whether technology is a factor influencing Small and Medium Enterprises performance for rural development in Northern Nigeria. The descriptive survey design was adopted for the conduct of this study. The random sampling technique was employed to select 300 SMEs from the manufacturing sector in three states (Kaduna, Bauchi and Niger) of northern Nigeria. A researcher designed questionnaire was used to gather data for the study bothering on demographic and organisational characteristics of respondents and their SMEs respectively. ITC adoption of respondents has effect on the performance of SMEs in general. In determining the instruments reliability estimate, a coronach alpha of 0.081 was obtained .The study found that ICT has significant influence on the performance of SMEs at the local government level in northern Nigeria and this influence accounts for 48.9% of the variations in their performances. From the findings of this study and similar others, it was therefore concluded that ICT is a key driver of SMEs performance in northern Nigeria. In this context, a well focused SMEs development programme in an investment friendly environment can be achieved. It was recommended therefore that seminars and workshops which will improve SMEs usage of ICT be emphasised by all stakeholders for rural development.

Keywords: *ICT, SME, Infrastructure, performance and Nigeria.*

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Background to the Study

Since independence, promoting small and medium scale enterprises as the foundation of economic progress has been recognized in Nigeria by every regime (SME, 2004). This is because of its perceived relevance in ensuring sustained increase in per-capita income and output, as well as, employment generation and promotion of effective utilization of available resource(s). Technological advancement of SMEs will ensure their performances and subsequently economic development, Nigerian government have been developing various reforms, programs that will see to enhanced performance of SMEs and has spent immense amount of money with the primary goal of developing these enterprises (SMEDAN, 2005)

It has been observed that information communication technology adoption affects small and medium enterprises performances. In northern Nigeria however, SMEs employ outdated processes thus it is seen as a sign of technological backwardness. Indeed, their rapid decline became an apex of industrial progress (Owualah, 2001). Lately, however, this view has changed, as the importance of small scale industries in promoting industrialization and economic growth and transformation of any nation has been recognized globally.(Odah,2005).Nigeria is blessed with vast natural resources, including oil, gas and solid minerals already confirmed to exist in commercial quantities. with also enormous electric power resources, a large human population, forming a big market, and substantial idle capacity in all industrial sectors (CBN, 2000).it is in light of the above that industrial information technology era could assist SMEs towards rural development of northern Nigeria in view of the advantages.

Literature Review

Sustenance of interest in SMEs in the developed economies is due to technological as well as social reasons more so as those economies are currently driven by knowledge, skill and technology as opposed to material and energy-intensiveness This is also as a result of a paradigm shift to new processes of manufacturing that are based on flexible systems and processes of production driven by sophisticated software on robust hardware platforms The social reasons include the need for generation of more employment and poverty reduction through self-employment ventures and decentralized work centres.

Foreign direct investment and the acquisition of technology are indispensable elements for economic transformation these countries require to achieve sustainable economic growth and poverty alleviation. Although SMEs in developing countries and countries with economies in transition are regarded as the engine of economic growth, they face enormous challenges in attracting investors and accessing modern technology. Other barriers which SMEs in developing economies face include the lack of effective investment and technology promotion policies, inappropriate legal and regulatory frameworks, inadequate capabilities of investment promotion and technology support institutions and the lack of access to potential investors and sources of new technology, limited technical and managerial skills, difficulty in obtaining financing and insufficient Knowledge about laws and regulations Others are inability to achieve economies of scale through integration or linkages, problems of size and relative isolation such as the

difficulties in entering into national and global value chains driven by large multinational corporations Research indicates that several factors influence business performance includes among many others: their professional background, their entrepreneurship capabilities and preferences, cultural and religious beliefs, as well as the technology and micro –environment (Buttner, 2001, Makhbul, 2011).There are number of studies that discuss adoption of information technology in SMEs in developed and developing countries (Lucchetti & Sterlacchini, 2004), (Love et al, 2004), (Beheshti, 2004), (Jean et al, 2006), (Ritches and Brindley, 2005) and (Marikawa, 2004). Beheshti (2004) in his study of the impact of ICT on SMEs in United States of America discovered that Information Technology can be used to create competitive opportunities for the organization. In similar vein Ritches and Brindley (2005) studied the significance of Information and Communication Technology (ICT) in the growth of SMEs in Australia. They concluded that adoption of ICT increases the efficiency of the organization.

Duan et al (2002) identified lack of ICT skills and knowledge in SMEs as one of the major challenges faced by all European countries, particularly in the UK, Poland and Portugal in their study. Houghton and Winklhofer (2004) have reported a slow response of SMEs relating to adoption of ICT. Shiels *et al* (2003) found that characteristics of the firm and industry sector are contributory factors to the adoption and exploitation of ICTs by SMEs. Kapurubandara *et al* (2006) have categorized internal and external barriers that impede adoption of ICT by SMEs in a developing country. The internal barriers include owner / manager characteristics, firm characteristics, cost and return on investment, and external barriers include, infrastructure, social, cultural, political, legal and regulatory. Lal (2007) investigated the adoption of ICT in SMEs in Nigeria and found that one of the major factors inhibiting ICT diffusion and intensive utilization is poor physical infrastructure. In developing countries some of the ICT challenges include legal and regulatory issues, weak ICT strategies, lack of research and development, excessive reliance on foreign technology and ongoing weaknesses in ICT implementation (Dutta *et al* 2003). Ashrafi and murtaza (2008) agree that information and communication technologies have positive effect on firm performance in productivity.

Technology acceptance model (TAM) proposed by Davis (1989) and Venkatesh et al (2003) developed the unified theory of acceptance and use of technology which combines eight theoretical models including the TAM and TPB. Technology adoption research has been studied for well over two decades (Vankatesh et al, 2003). Most of the recent studies on technology adoption are unavoidably context. Specific, making the knowledge on innovation in SMEs is still limited.

Conceptual/Theoretical Framework

Concept of Performance

GEM, (2004) defined Performance as the act of performing; of doing something successfully; using knowledge as distinguished from merely possessing it. However, Performance seems to be conceptualized, operationalised and measured in different. Performance of small and medium enterprises is influenced by a number of factors, one of which could be the constant technological changes abound..According to Ouguiya

(2004), since independence, promoting small and medium scale enterprises as the foundation of economic progress has been recognized in Nigeria by every regime (SME, 2004). This is because of its perceived relevance in ensuring sustained increase in per-capita income and output, as well as, employment.

Generation and promotion of Effective Utilization of Available Resource (s)
Technological advancement of SMEs will ensure their performances and subsequently economic development, have been developing various reforms, programs that will see to enhanced performance of SMEs and has spent immense amount of money with the primary goal of developing these enterprises (SMEDAN, 2005) Nigeria is blessed with vast natural resources, including oil, gas and solid minerals already confirmed to exist in commercial quantities. she also has enormous electric power resources, a large human population, forming a big market, and substantial idle capacity in all industrial sectors(CBN,,20).it is in light of the above that industrial information technology era could assist SMEs towards rural development of northern Nigeria in view of the advantages.

Concept of Entrepreneurship
According to Hisrich and Peters (2002) entrepreneurship is the process of creating something new of value by devoting the necessary time and effort, assuming the accompanying financial psychic and social risks and receiving rewards of monitory and personal satisfaction and independence. Tijjani-Alawiye (2004) describes entrepreneurship as the process of increasing the supply of entrepreneurs or adding to the stock of existing small, medium and big enterprises available to a country by creating and promoting many capable entrepreneurs, who can successfully run innovative enterprises, nature them to growth and sustain them, with a view to achieving broad socio-economic development goals.

Literature Review
Technology Adoption Theory
Khasaweh, (2008) defines the meaning of technology adoption as the first use or acceptance of a new technology or new product. Some researchers identify that the adoption process starts from election procedures when a firm is aware of the need of purchase a technology. While other scholars focus more on real usage when the technology is about to be utilized or implemented. Technology adoption is a voluntary individual behaviour that is explained by behavioural theories such as the theory of reasoned action (TRA) proposed by Fishbein and Ajzen (1991)Technology acceptance model (TAM) proposed by Davis (1989) and Venkatesh et al (2003) developed the unified theory of acceptance and use of technology which combines eight theoretical models including the TAM and TPB. Technology adoption research has been studied for well over two decades (Vankatesh et al, 2003). Most of the recent studies on technology adoption are unavoidably context. Specific, making the knowledge on innovation in SMEs is still limited. In this paper, Technology is focused upon as the variable whose effect on SMEs performance for rural development is being investigated. Also, in this work, an entrepreneur is taking to be an investigator of entrepreneurial event for so long

as the occur (Kanothi, 2009).

Methodology

Research Design

A survey study is a type of research design used to collect information using a highly structured questionnaire or interview guide(cooper and schindler, (2011). the descriptive survey design was adopted for the conduct of this study. this design, which are used in preliminary and exploratory studies (creswell, 2003), was considered appropriate for this study due to its worth and strengths in gathering information, summarizing, presenting and interpreting data for the purpose of arriving at valid conclusion(Kothari,2011)further explained that a research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure.

Sample and Sampling Technique

According to (O leary,2001)a sample is a subset of the population to be studied. The random sampling technique was employed to select 300 SMEs in three states (Kaduna, Bauchi, and Niger) from the manufacturing sector of Northern Nigeria.

Instrumentation

A researcher designed questionnaire was used to gather data for the study. The questionnaire consists of three sections. The first section sought information on demographic and organizational characteristics of respondents and their SMEs respectively. While second and third section sought information communication technology aspects that have effect on the performance of SMEs. Demographic characteristics focused on include respondent's business Location, sex, age, marital Status, educational qualification, position / Grade in the firm, working experience (in the business), type of enterprise and length of time firm has been in operation. Capabilities focused upon were corporate planning ability, monitoring and evaluation ability and networking ability while funding aspects investigated were ability to Finance, interest rate and access to Credit.

Items in the first section were of the multiple choice response formats where respondents were requested to tick the correct response option that best describes the feature being assessed. Items in the second and third sections were of the likert scale format with five response options, via: SA for Strongly Agreed, A for Agreed, U for Undecided, D for Disagreed and SD for Strongly Disagreed. For analysis sake, SA was scored 5points, A 4points, U 3points, D 2point and SD 1point.

The respondents' level of agreement / disagreement with items in the second and third sections of the instrument was used as the basis for determining the extent to which the independent variables (ICT) influences the dependent variable (i.e Performances of SMEs). The mean of the scores on each item was computed and used for interpretation of the respondents' level of agreement / disagreement. A mean score that is approximately

between (i) 0.0 – 0.9 was regard as very low; (ii) 1.0 – 1.9 was regarded as low, (iii) 2.0 – 2.9 was regarded as medium, (iv) 3.0 – 3.9 was regarded as high and (v) 4.0 – 5.0 was regarded as very high.

The instrument was subjected to face, content and criterion validity by three experts n the field of English language and entrepreneurship. Thereafter, necessary modifications were carried out before the instrument was pilot-tested on 30 SMEs in three locations (i.e. Kano, Katsina and Nasarawa) different from where the final research was undertaken. This was to make its reliability estimate determination possible. A coronach alpha of 0.81 was obtained, indicating that the instrument was quite reliable for the study. It is a reliability coefficient that indicates how well the items in a set are positively correlated to one another.

Preliminary Resurelt

Response Rate

100 questionnaires were distributed in each of the three locations where the study was conducted of which 278 (i.e. 83, 98 and 85) were returned, giving a response rate of about 92.7%. This implies that in each of these locations, none of the response rate was below 75%. (Nworgu,1991) posits that where all the response rates are less than 70%, the result could differ considerably. Therefore the response rates obtained for this study was considered adequate for valid analysis.

For this objective, performance of SMEs, Y shall be regrets on technology in terms of ICT usage, research and development, and technology adoption. The resulting regression model shall be given by

$Y = Bo + B_{1X1} + B_2X_2 + B_3X_3 + e$

Where

Y = performances of SMEs

X_1 = ICT usage.

X_2 = research development

X_3 = technology adoption

B_o is the intercept

$B_{1,}$ $B_{2\,and}$ B_3 show the manner in which X_1 X_2 and X_3 relates with Y e is an error term which is assumed to be normally distributed with mean O

Types of the SMEs

50.4% of the SMEs were of the sole ownership type, 21.9% were of the partnership type, 10.1% were of the cooperative venture type, 10.8% were of the limited liability company type and 5.0% were in the “Others” category. Though 1.8% did not indicate their type of firm, it could be seen that a slight majority of the SMEs were of the sole ownership type.

Years of Operation of SMEs

15.5% of the firms had been in operation for less than 2 years, 26.6% had been in operation between 2 – 4 years, 18.7% had been in operation between 4 – 7 years, 21.9% had been in operation between 8 – 10 years and 14.4% had been in operation for over 11years. Though

3.6% did not indicate their firm's years of operation, it could be seen that majority of the SMEs had been in operation between 2 – 4 years.

Number of Shareholders SMEs

32.4% of the SMEs had between 2 – 5 shareholders, 15.8% had between 6 – 10 shareholders, 10.4% had between 11– 15 shareholders and 5.0% had between 16 – 20 shareholders. Though 36.3% did not indicate their firm's number of shareholders, it could be seen that majority of the SMEs had had between 2 – 5 shareholders.

Initial and Current Capital Base

52.9% of the SMEs sampled had their initial capital base to be below one million naira but as at the time of the study only 37.1% of the SMEs current capital base was one million naira; 10.8% had their initial capital base to be between 1 – 2million naira but as at the time of the study, the proportion of SMEs with this amount of capital base had increased to 14.0%; 7.2% had their initial capital base to be between 3 – 5million naira but as at the time of the study, the proportion of SMEs with this amount of capital base had increased to 9.7% and 25.5% had their initial capital base to be 5million naira but as at the time of the study, the proportion of SMEs with this amount of capital base had increased to 35.6%. Notwithstanding the fact that 3.6% did not indicate their firm's initial and current capital base, it could still be seen that majority of the SMEs had both their initial and current capital bases to be below one million naira.

Influence of information and Communication Technology on the Performance of SMEs in Northern Nigeria

In order to achieve this objective, three questionnaires items were used to source information.

Research Question.

To what extent does ICT adoption influence SMES performances in northern Nigeria?

The extent to which information and communication Technology influence the performance of SMES in northern Nigeria was assessed in terms of I.C.T usage, research and development and technology adoption willingness. Descriptive statistics for questionnaire items on its influence was computed.

Table 1: Descriptive Statistics for Questionnaire Items on the influence of SMEs Technology Adoption on the Performances of SMEs in Northern Nigeria

Variable	Questionnaire Item	N	Mean	SD	Interpretation
Influence of SMEs technology adoption on the performances of SMEs in northern Nigeria	ICT Usage	275	3.02	1.07	High Extent
	Research and Development	275	3.21	0.97	High Extent
	Technology Adaptation Willingness	275	3.27	2.19	High Extent
	Grand Mean		3.17		High Extent

From Table1, it could be seen that the grand mean for items assessing the extent to which SMEs technology adoption influence the performances of SMEs in northern Nigeria was 3.17. In line with the yardstick for interpretation of mean as given in Table 1, it implies that the respondents are believed that SMEs technology adoption influence the performances of SMEs in northern Nigeria to a high extent. This could have been attributed to the fact that the respondents are believed that the extent to which each of the items assessing the influence of SMEs technology adoption on the performances of SMEs in northern Nigeria is high. In this regard, it could be seen that while the respondents believe that (i) ICT usage influences the performances of SMEs in northern Nigeria to high extent (mean = 3.02, SD = 1.07), (ii) Research and Development influences the performances of SMEs in northern Nigeria to high extent (mean = 3.21, SD = 0.97) and (iii) technology adaptation willingness influences the performances of SMEs in northern Nigeria to high extent (mean = 3.27, SD = 2.19).

Hypothesis

There is no significant relationship between SMEs information and communication technology adoption and the performances of SMEs in northern Nigeria.

To determine the relationship between SMEs information communication technology adoption and the performances of SMEs, the Pearson's Product Moment Correlation coefficient was computed. Table2 gives a summary of the results obtained.

Table2: The Relationship between SMEs information and Communication Technology Adoption and the Performances of SMEs

		Performance of SME	SMEs Technology Adoption
Performance of SME	Pearson Correlation	1	.701(**)
	Sig. (2-tailed)		.000
	N	273	273
SMEs Technology Adoption	Pearson Correlation	.701(**)	1
	Sig. (2-tailed)	.000	
	N	273	275

Correlation is Significant at the 0.01 level (2-tailed).

From Table2, it could be seen the relationship between SMEs technology adoption and the performances of SMEs is positive, high and significant (r= 0.701, Sig = 0.000). It therefore means that the null hypothesis is rejected and the alternative rejected. This implies that SMEs information and communication technology adoption has significant influence on the performances of SMEs in northern Nigeria.

Table 3: The Regression Analysis between the SMEs and Information and Communication technology adoption (Independent variable) and Performances of SMEs (Dependent variable)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	0.701	0.491	0.489	1.621	0.491	261.656	1.000	271.000	0.000

a. Predictors: (Constant), SMEs Technology Adoption

The regression analysis results of the study as revealed in Table 4 indicate that the factors that determine SMEs information and communication technology adoption account for 48.9% of the variations in the performances of SMEs (adjusted $R^2 = 0.489$). It could be seen that this variation in SMEs technology adoption does significantly affect the variations in the performances of SMEs (F = 261.656, Sig = 0.000). This might mean that the other factors being considered in the study and possible others not considered could explain the remaining 51.1% variations in the level of performances of SMEs.

Discussion

In the findings of this study, information communication Technology has significant influence on the performance of SMEs at the local government level in northern Nigeria. It accounts for 48.9% of the variations in the performances of SMEs in northern Nigeria. (adjusted R^2 =0.489) this finding agrees with studies undertaking by Ashrafi and Murtaza(2008) agrees that information and communication technologies have positive effect on firm performance in productivity profitability and market value. SMEs were seen as belonging to the past out dated and a sign of technological backwardness. Indeed, their rapid decline became an apex of industrial progress (owualah, 2001) Digital technology increases productivity. A country has to be fast in adopting these technologies in order to have a fast growth of the economy as a whole (okwuonu, 2003). In the work of Amara,N. Landry,R.Becheikh, N. and Ouimet,M (2008). on factors influencing innovation and competiveness in service sector in Nigeria: a sub-sect oral approach, the result showed that oil and gas servicing firm in Nigeria that are all SMEs. Demonstrates low level of innovation capabilities.

Conclusion

Digital technology increases productivity. a country has to be fast in adopting these technologies in order to have a fast growth of the economy as a whole (okwuomu, 2013). Government objective in promoting the technological development of SMEs is primarily to ensure that small businesses survive and flourish as units of efficient economic activities in the process of industrialization in addition to being the sources of supply of potential entrepreneurs. The development in telecommunications has impacted enormously on the application of ICT and their uses. The primary purpose of this study is

to identify the most important factors that affect the adoption of Information and Communication Technology in Small and Medium Enterprises in Nigeria. This research was empirically evaluated using data from 300 industrial Small and Medium Enterprises located in different Niger, Bauchi and Nassarawa states. They were randomly selected from the directory of Nigerian businesses compiled by Manufacturers Association of Nigeria (MAN) which contained information on businesses from all sectors of Nigerian economy. Several important findings can be drawn from the research.

Recommendations

1. There is need for cooperation between small and medium enterprises and research institutes with a view to making research and development activities more demand driven.
2. There is need for the nations engineering infrastructure to be established in order to facilitate the fiscal production of machinery and equipment, and strengthen industrial development and growth.
3. To enhance the innovation capability of indigenous firms and ensures that this capability become more expressive, it is particularly important to drive interaction among educational/research institutions and industrial firms with appropriate policies.
4. Development of network of local team in conjunction with the universities is required to make small and medium enterprises more aware of changes in their industries.

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