

An Investigative Study Of The Factors Affecting The Adoption Of Information And Communication Technology In Small And Medium Scale Enterprises In Oyo State, Nigeria.

¹ADEBAYO O. S , ² BALOGUN O. J, ³KAREEM T. S

¹Department of Accounting and Management Science

LadokeAkintola University of Technology, Ogbomosho, Nigeria

²Department of Accountancy Osun State Polytechnic, Iree, Nigeria

³Department of Purchasing and Supply The Polytechnic, Ibadan, Nigeria

ABSTRACT : This research paper investigated the factors affecting the adoption of information and communication technology in small and medium scale enterprises in Oyo State, Nigeria. The study made use of 75 industrial Small and Medium Enterprises located in different part of Oyo state. 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. Structured questionnaire was administered to the owner or member of staff that can provide useful information from Ibadan, Oyo, Ogbomosho and Isheyin respectively. Multiple regression was used to analyze the data and result showed that the independent variables (i.e cost, funds, infrastructure, skills and training, management support and government support attitude) were significant joint predictors of ICT adoption in SMEs with $(F(6, 68) = 95.375; R^2 = 0.894; P < .05)$. The independent variables jointly explained 89.4% of variance of ICT adoption in SMEs. Subsequently, recommendation was to government that adequate ICT infrastructure should be provided in the country, so that it will be very easier for SMEs to adopt it rather than running away from it. Also, government should invest largely in the SMEs sector by making more funds available to SMEs and establish computer training centres across the country.

KEY WORDS: ICT, SMEs, Infrastructure, Organization, Government, Nigeria

I. INTRODUCTION

In recent years the adoption of Information Communication Technology by SMEs operators in developed countries has greatly transformed the mode of its operation. Globally, Small and Medium Enterprises play critical roles in every economic growth and development and Nigeria inclusive. SMEs are recognized as the main source of economic growth and a major factor in promoting private sector development and partnership. Ongori (2009) agreed that the use of ICT would help to change the way business operate in this era of globalization by changing business structures and increasing competition, creating competitive advantage for business operations. Ireferin, Abdul- Azeez and Tijani (2012) are of opinion that many organizations of all types are currently utilizing Information and Communication Technology (ICT) around the globe, not only for cutting costs and improving efficiency, but also for providing better customer services. They agreed that Governments world over are adopting ICT to provide better services to their citizens.

Asgarkhani and Young (2010) asserted that many organisations tend to rely heavily on ICT solutions in order to develop and grow their businesses. According to Spanos et al. (2002), ICT has the ability to enhance, coordinate and control the operations of many organisations and can also increase the use of management systems such as Customer Relationship Management (CRM) amongst others. Therefore, ICT is regarded as a vital tool for the efficient administration of any organisation and in the delivery of services to its clients. However, there is considerable evidence to show that Small and Medium Sized Enterprises (SMEs) in developing countries, particularly those in Sub-Saharan Africa (SSA), are yet to reap the full benefits offered by ICT as compared to their counterparts in the developed countries, especially in Nigeria. Although the contribution of SMEs' is of notable importance to many countries' economy, yet those in developing countries lag far behind (Apulu, 2012). And Apulu agreed that For SMEs to survive and remain competitive in the current highly competitive business environment there is a need to adopt and use ICT effectively, in order to attain some level of competitive advantage. It is on this note that this research paper wishes to examine the factors

preventing ICT usage by SMEs operators with special reference to selected Small and Medium Enterprises in Oyo State, Nigeria.

II. LITERATURE REVIEW

2.1 Definition of SMEs

In a global context, a general definition of SMEs using size and scale of operation is not easy, but within the fixed co-ordinates of national boundaries, it might be relatively easier. At the 13th Council meeting of the National Council on Industry held in July, 2001, Small and Medium Enterprises (SMEs) were defined by the Council as follows: Small-Scale Industry is an industry with a labour size of 11-100 workers or a total cost of not more than N50 million, including working capital but excluding cost of land. While Medium Scale Industry is an industry with a labour size of between 101-300 workers or a total cost of over N50 million but not more than N200 million, including working capital but excluding cost of land. The National Association of Small and Medium Scale Enterprises (NASME) defines a small scale enterprise as a business with less than 50 people employed by the enterprise and with an annual turnover of N100,000,000 (100 million Naira). NASME further defines a medium scale enterprise as a business with less than 100 employees and with an annual turnover of N500, 000,000 (500 million Naira). Also, the Central Bank of Nigeria (CBN) and the Small and Medium Enterprises Equity Investment Scheme (SMEEIS) define SMEs as any enterprise with a maximum asset base of N200, 000,000 (200 million Naira) excluding land and working capital with the number of staff employed by the enterprise expected to be not less than 10 and not more than 300 (Lal, 2007).

Previous research (Asgarkhani and Young, 2010; Apulu, 2012; Irefin, Abdul- Azeez and Tijani, 2012;) agreed that SMEs is widely recognized because of its contribution to economic growth and job creation in both developed and developing countries. Researchers argued that SMEs play a major role in poverty alleviation in developing countries and also stimulated domestic and regional economic growth in national and regional economies (Apu, 2012; Apulu and Emmanuel, 2011; and Berisha-Namani, 2009). In Nigeria, SMEs also play a significant role in terms of economic development as they provide the cornerstones on which Nigeria's economic growth and stability rests (Ojukwu, 2006). The Federal Office of Statistics reveals that about 97% of the entire enterprises in Nigeria are SMEs and they employ an average of 50% of the working population as well as contributing up to 50% to the country's industrial output (Ihua, 2009).

2.2 Information And Communication Technology (ICT)

ICT refers to a wide range of computerized technologies. ICT is any technology that enables communication and the electronic capturing, processing and transmission of information (Ashrafi and Murtaza, 2008). Technologies include products and services such as desktop computers, laptops, handheld devices, wired or wireless intranet, business productivity software such as text editor and spreadsheet, enterprise software, data storage and security, network security and so on (Ashrafi and Murtaza, 2008 as cited in Apulu and Emmanuel, 2011). Herselman and Hay (2003), describe ICT as technologies that support the communication and co-operation of "human beings and their organizations" and the "creation and exchange of knowledge. Furthermore, Yu (2010) considers ICT as a range of technologies that allow the gathering, exchange, retrieval, processing, analysis and transmission of information. In other words, ICT can be described as any tool that facilitates communication, process and transmit information and share knowledge through electronic means. Rwashana and Williams (2006) advocate that ICT encompasses a range of electronic digital and analog devices such as radio, television, telephones (fixed and mobile), computers, electronic-based media such as digital text and audio-video recording, and the internet, but excludes the non-electronic technologies. In Nigeria, commonly used ICTs include Internet, Personal Digital Assistants (PDAs), Automated Teller Machines (ATMs), mobile phones and smart cards. SMEs usage of ICT ranges from basic technology such as radio and fixed lines to more advanced technology such as email, e-commerce, and information processing systems. Using advanced ICT to improve business processes falls into the category of e-business (UNDP, 2007).

2.3 Roles Of ICT In SMES

There are number of studies that discuss the roles of information technology in SMEs in developed and developing countries (Udo and Edoho, 2000; Ion and Andreea, 2008; Sajuyigbe and Alabi, 2012; Apulu, 2012 and Irefin et al, 2012) asserted that Information and Communication Technology can be used to create competitive opportunities for the organization. Sajuyigbe and Alabi (2012) agreed that ICT play an important role in SMEs by cutting costs through improving internal process and product, fast communication with their customers, and better promoting their products through online presence. They believed that ICT allow SMEs to have access to global market. Ojokuku and Sajuyigbe, (2012) also argued that SMEs have the opportunity to achieve a competitive advantage from the advances in ICT through innovation, marketing, efficiency gains, better quality and customer responsiveness. Jiménez-Zarco et al. (2006) also added that ICT plays an important

role in acquiring, creating and managing knowledge as it enables the diffusion of organisational data that can be crucial for effective decision making and control at all levels. Likewise, ICT helps in organisational planning and improves organisational flexibility. Apulu and Latham (2011) comment that with ICT, organisations can exchange real-time information and build closer relationships with their customers, suppliers and business partners. Also, customers can receive immediate feedbacks that allow companies to react faster to customers' changing demands and to recognise new market niches.

Ojokuku and Sajuyigbe, (2012) also agreed with other researchers view that the usage of ICT, will impact positively on business performance and will enhance customer relationship satisfaction tremendously. Melvive *et al* (2004) found out that SMEs that use more advanced forms of ICT have on average a higher labour productivity and a higher growth rate. Information technology (IT) has indeed changed the dynamics of running businesses. Lal (1996) observed higher profit margins, skill intensity and export and import intensities for firms using IT. There are also some evidences that export performance of SMEs is related to ICT adoption (Lal 2007). Also Buhalis (2003) is of opinion that the application of ICT in businesses cause fundamental changes that can provide powerful strategic and tactical tools for organizations if properly applied and used. This could have great impact in promoting and strengthening organizational competitiveness. The proper application of information technology and the use of information systems may offer opportunities for SMEs to improve their survivability in a competitive environment (Apu, 2012).

2.4 Factors Affecting ICT Adoption In Nigerian 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). Adenikinju, (2005); Irefinet *al*, (2012); Sajuyigbe and Alabi (2012); Lal (2007); Apulu and Emmanuel, (2011) and Apulu and Latham (2011) amongst others, identified more factors that affect the adoption of ICT by SMEs in Nigeria. These factors include: lack of infrastructural facilities, lack of funds, cost of implementation, lack of awareness, lack of appropriate government policies, lack of skills and training, cultural factors, electricity constraints, corruption, low levels of education, illiteracy, lack of proper information, and so on. Adenikinju (2005) advocates that problems relating to the SMEs sector in Nigeria and its development have been handled inappropriately by the government and highlight problems such as infrastructural and cultural factors, as acting against the effective development and exploitation of ICT in Nigeria. Irefinet *al* (2012) also pointed out that the major factors that affect the adoption of ICT are infrastructure, cost of purchasing computer equipment, government support and management support respectively. Sajuyigbe and Alabi (2012) asserted that lack of finance, lack of electricity, lack of computer skill personnel and lack of government support are the major factors that hinder adoption of ICT by SMEs. (Shiels *et al* 2003) also found that characteristics of the firm and industry sector are contributory factors to the adoption and exploitation of ICTs in SMEs.

III. MODEL SPECIFICATION

Based on the literature discussed above, the research model illustrated in Figure 1 for this study consists of six set of variables: Cost, Infrastructure, Government Support and Management Support, Skills and Training and Funds. These variables are hypothesized to affect the adoption of ICT in SMEs.

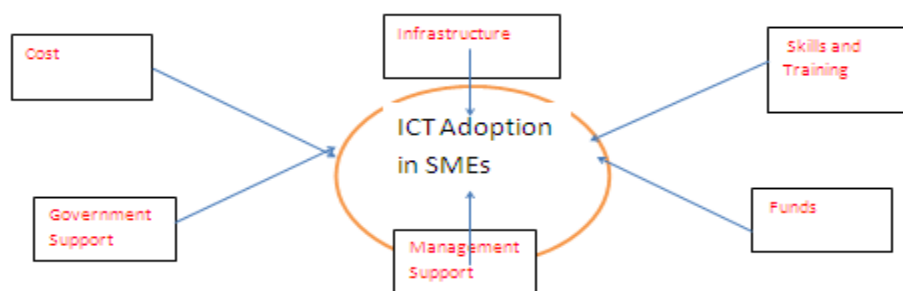


Figure I: Research Model
Source: Designed by Researchers.

The general form of the model was as follows: $ICTA = \alpha + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + e$ Where, ICTA = Information and communication adoption, X1 = Cost, X2 = Infrastructure, X3 = Skills and Training X4 = Funds, X5 = Management Support, X6 = Government Support. And α is constant and $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5,$ and β_6 are coefficient to estimate, and e is the error term.

3.1 Research Questions

The following research questions were answered in the course of this research; **What is the relative contribution of each of the above variables to the prediction of adoption of ICT in SMEs in Nigeria? What is the joint contribution of Cost, Infrastructure, Skills and Training, Funds, Government Support and Management Support attitude to the adoption of Information and Communication Technology (ICT) in SMEs in Nigeria**

IV. METHODOLOGY

4.1 Survey Procedure and Sample

The study made use of 75 industrial Small and Medium Enterprises located in different part of Oyo state. 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. The companies’ names were confirmed by telephone to ensure that they exist and operating. Structured questionnaire was administered to the owner or member of staff that can provide useful information from Ibadan, Oyo, Ogbomoso and Isheyin respectively. The instrument used was subjected to a test and re-test process in order to establish the reliability of the instrument. Also to ascertain the validities of the instrument, face and content validities were ensured. The instrument was given to professionals for scrutiny and evaluation. Multiple Regression analysis was used to analyze the data.

4.2 Data Analysis

Table 1

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.945 ^a	.894	.884	.19436	2.332

a. Predictors: (Constant), Government Support, Infrastructure, Cost, Skills and Training , Management Support, Funds

b. Dependent Variable: ICT Adoption

Table 2

ANOVA^a

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	21.618	6	3.603	95.375	.000 ^b
	Residual	2.569	68	.038		
	Total	24.187	74			

a. Dependent Variable: ICT Adoption

b. Predictors: (Constant), Government Support, Infrastructure, Cost, Skills and Training , Management Support, Funds

Table 3

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.392	.217		-1.801	.076
	Cost	.044	.057	.044	.771	.443
	Funds	.230	.089	.224	2.578	.012
	Infrastructure	.402	.074	.403	6.046	.000
	Skills and Training	.324	.057	.325	5.695	.000
	Management Support	.308	.070	.304	4.381	.000
	Government Support	.177	.065	.185	2.730	.008

a. Dependent Variable: ICT Adoption

4.3 Interpretation Of Result

Table 2, 3 and 4 show that the independent variables (i.e Cost, Funds, Infrastructure, Skills and Training, Management Support and Government Support attitude) were significant joint predictors of ICT adoption in SMEs. ($F(6, 68) = 95.375; R^2 = 0.894; P < .05$). The independent variables jointly explained 89.4% of variance of ICT adoption in SMEs. Furthermore, Cost ($\beta = 0.044; Ns$); Funds ($\beta = 0.224; P < .05$); Infrastructure ($\beta = 0.403; P < .05$); Skills and Training ($\beta = 0.325; P < .05$); Management Support ($\beta = 0.304; P < .05$) and Government Support ($\beta = 0.185; P < .05$) were significant independent predictors of ICT adoption in SMEs. These results are in line with (Sajuyigbe and Alabi, 2012; Apalu and Emmanuel, 2011; Adenikinju, 2005; Irefinet *al* 2012; Lal, 2007; and Apulu and Latham, 2011) who discovered that infrastructural facilities, accessibility to funds, cost of implementation, appropriate management and government policies and levels of ICT education are the major determinants of ICT adoption in SMEs in Nigeria.

4.4 Discussion Of Research Findings

This study revealed that cost of purchasing computer equipment is one of the major determinants of ICT adoption in SMEs with ($\beta = 0.044, Ns$) but surprisingly is not significant. This result is contrary to the finding of Irefinet *al.* (2012) who pointed out that the cost of purchasing computer equipment is most major factor that affects the adoption of ICT in SMEs. It was discovered from this study that access to funds has significant effect on ICT adoption in SMEs with ($\beta = 0.224; P < .05$) and this is in line with Sajuyigbe and Alabi, (2012); Ojokuku and Sajuyigbe, (2102); and Apalu and Emmanuel, (2011) who asserted that finance is a major factor that determine the ICT adoption in SMEs especially in developing countries. The study pointed out that infrastructure is most important factor that predict the adoption of ICT in SMEs with highest beta ($\beta = 0.403; P < .05$). This implies that the availability of infrastructural facilities such as electricity and physical infrastructure have significant impact on the ICT adoption in SMEs. This result agreed with Lal (2007) and Irefinet *al.* (2012) who investigated the adoption of ICT in SMEs in Nigeria and found that one of the major factors inhibiting ICT diffusion and intensive utilization are poor electricity and physical infrastructure. The study also revealed that skills and training have significant impact on ICT adoption with ($\beta = 0.325; P < .05$). This implies that the level of ICT education will predict the ICT adoption in SMEs. This result is in line with Duanet *al* (2002) who identified that lack of ICT skills and knowledge in SMEs as one of the major challenges faced by developing countries. The study discovered that management and government support have significant impact on ICT adoption in SMEs with ($\beta = 0.304; P < .05$) and ($\beta = 0.185; P < .05$) respectively. These results agreed with Shiels *et al* (2003) who found that characteristics of the firm and industry sector are contributory factors to the adoption and exploitation of ICTs by SMEs. Also, Caldeira and Ward's (2003) study confirming that positive attitude of top management has brought about the relative success of IS/IT adoption in SMEs, especially in manufacturing ones. In addition, it is argued that greater intention to adopt IT solutions is directly attributable to the more positive attitude of small minority business owner's toward IT adoption (Qureshi and York, 2008). Consequently, if the CEO perceives that benefits of IT adoption outweigh its risks, then the business is more likely to adopt IT (Thong and Yap, 1995)

V. CONCLUSION AND RECOMMENDATIONS

This research paper investigates the factors affecting the adoption of information and communication technology in small and medium scale enterprises in Oyo State, Nigeria. On the basis of the findings of this research paper, it can be concluded that all variables i.e cost of purchasing of computer equipment, infrastructure, skills and training, accessibility to funds, management and government support were jointly predict the ICT adoption in SMEs. The current study also reveals that infrastructure is most important factor that determines the level of ICT adoption in SMEs. For Nigeria SMEs to effectively use ICT, technological infrastructures should be put in place by the government to support ICT use. ICT skills and knowledge is another important factor that inhibits the adoption of ICT by SMEs. Management and government support should be considered as one of the factors militating against the adoption of ICT by SMEs in Nigeria. It is widely believed that ICT adoption and utilization is predicated on availability of physical infrastructure, legal and regulatory issues, adequate research and development, and proper policy. The research identify access to finance by SMEs has another factor that prohibit the adoption of ICT in SMEs but the cost of purchase computer equipment found to be insignificant. The study has shown clearly the factors affecting the adoption of ICT in Nigerian Small Scale Industries and the level at which it affect them. The government is advised to provide adequate ICT infrastructure in the country, this will be easier for SMEs to adopt it rather than running away from it. Nigeria government should invest largely in the SMEs sector by making more funds available to SMEs and establish computer training centres across the country.

REFERENCES

- [1] Adenikinju, A. (2005) Analysis of the cost of infrastructure failures in a developing economy: the case of the electricity sector in Nigeria. Department of Economics and Centre for Economics and Allied Research, University of Ibadan, Nigeria. *AERC Research Paper* 148 African Economic Research Consortium, Nairobi.
- [2] Apulu, I. (2012). Developing a Framework for Successful Adoption and Effective Utilisation of ICT by SMEs in Developing Countries: a Case Study of Nigeria. *Unpublished PhD Thesis* of the University of Wolverhampton.
- [3] Apulu, I. and Emmanuel O.I (2011). Are Nigeria SMEs effectively utilizing ICT? *International Journal of Business and Management*. Vol. 6, No. 6Pp 208 – 210.
- [4] Apulu, I. and Latham, A. (2011) The Benefits of ICT Adoption: An empirical study of Nigerian SMEs. 2nd *International Conference on Information Management and Evaluation*. Ted Rogers School of Management, Ryerson University, Toronto, Canada. 27-28 April 2011.
- [5] Asgarkhani, M., and Young, A. (2010) Industry view of ICT roles and skills in Canterbury. *1st Annual Conference of Computing and Information Technology Research and Education*, New Zealand.
- [6] Ashrafi, R. and Murtaza, M. (2008). Use and impact of ICT on SMEs in Oman. *Electronic Journal of Information Systems Evaluation*, 11(3), 125-138.
- [7] Berisha-Namani, M. (2009). The role of information technology in Small and Medium sized Enterprises in Kosova, *Fulbright Academy Conference* 2009.
- [8] Buhalis, D. (2003). eAirlines: strategic and tactical use of ICTs in the airline industry *Information and Management*, 41, 805–825.
- [9] Caldeira, M. M., and Ward, J. M. (2003). Using resource-based theory to interpret the successful adoption and use of information systems and technology in manufacturing small and medium-sized enterprises. *European Journal of Information Systems*, 12(2), 127-141.
- [10] Dutta, S. and Coury, M. E. (2003). ICT Challenges for the Arab World”, Chapter 8, in Dutta, S., Herselman, M. E., & Hay, H. R. (2003). *Challenges Posed by Information and Communication Technologies (ICT) for South African Higher Education Institutions*. *Informing Science*, 931-943.
- [11] Ihua, U. B. (2009) SMEs Key Failure-Factors: a comparison between the United Kingdom and Nigeria. *Journal of Social Sciences*, 18 (3), pp. 199-207.
- [12] Ion, P., & Andreea, Z. (2008) Use of ICT in SMEs management within the sector of services. Irefin I.A, Abdul- Azeez I.A and Tijani A.A (2012). An Investigative Study Of The Factors Affecting The Adoption Of Information And Communication Technology In Small And Medium Scale Enterprises In Nigeria. *Australian Journal of Business and Management Research* Vol.2 No.02 pp 01-09
- [13] Irvine, W. & Anderson, A. R. (2008). ICT (information communication technology), peripherality and smaller hospitality businesses in Scotland. *International Journal of Entrepreneurial Behaviour & Research*, 14(4), 200 –218.
- [14] Jiménez-Zarco, A. I., Martínez-Ruiz, M. P., & Llamas-Alonso, M. R. (2006). Analysis of ICTs Opportunities on Firm's Success: An Innovation Process. *Problems and Perspectives in Management*, 4(4), 84-94.
- [15] Kapurubandara, M. and Lawson, R. (2006) Barriers to Adopting ICT and e-commerce with
- [16] SMEs in developing countries: An Exploratory study in Sri Lanka, University of Western
- [17] Sydney, Australia.
- [18] Lal, K. (2007). Globalization and Adoption of ICTs in Nigerian SMEs, *Science, Technology Society*, 12 (2), 217-244.
- [19] Melville, N., Kraemer, K. L., and Gurbaxani, V. (2004) Review: Information technology and organizational performance: An integrative model of IT business value. *MIS Quarterly*,
- [20] 28(2), pp. 283-322.
- [21] Ojokuku R.M and Sajuyigbe A.S (2012). The Impact of Electronic Banking on Human Resources Performance in the Nigerian Banking Industry. *International Journal of Economic Development Research and Investment* Vol. 3, No 2. Pp 61-69.
- [22] Ojukwu, D. (2006) Achieving sustainable growth through the adoption of integrated business
- [23] and information solutions: A case study of Nigerian small medium sized enterprises. *Journal of Information Technology Impact*, 6(1), pp. 47-60.
- [24] Ongori, H. (2009) Role of information communication technologies adoption in SMES: evidence from Botswana. *Research Journal of Information Technology*, 1(2), pp.79-85.
- [25] Qureshi, S., and York, A. S. (2008). *Information technology adoption by small businesses in minority and ethnic communities*. Paper presented at the Proceedings of the Annual Hawaii International Conference on System Sciences, Big Island, HI.
- [26] Rwashana, A. S., & Williams, D. W. (2008). Enhancing Immunization Healthcare Delivery through the Use of Information Communication Technologies. *International Journal of Education and Development Using ICT*, 4(2), 144-156.
- [27] Sajuyigbe A.S and Alabi E, (2012). Impact of information and communication technology in selected small and medium enterprises in Osogbo metropolis, Nigeria. *Journal of school of communication and information technology*, Federal Polytechnic, Offa. Vol. 3 No.1
- [28] Shiels, H., McIvor, R. and O'Reilly, D. (2003). Understanding the Implications of ICT adoption: Insights from SMEs”, *Logistics Information Management*, 16(5), 312-326.
- [29] Spanos, Y. E., Prastacos, G. P. and Poulymenakou, A. (2002). The relationship between information and communication technologies adoption and management. *Information and Management*, 39 (8), pp. 659-675.
- [30] Thong, J. Y. L. and Yap, C. S. (1995). CEO characteristics, organizational characteristics and information technology adoption in small businesses. *Omega*, 23(4), 429-442.
- [31] Udo, G. J. and Edoho, F. M. (2000) Information technology transfer to African nations: an economic development mandate, *Journal of Technology Transfer*, 25(3), pp. 329-342.
- [32] United Nations Development Programme (2007) The role of governments in promoting ICT access and use by SMEs: considerations for public policy. APDIP e-note 12/2007
- [33] Yu, E. (2010). Information and communications technology in food assistance. [online] Available: <http://home.wfp.org/stellent/groups/public/documents/newsroom/wfp225972.pdf> (July 26, 2013).