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Original Research Article

Influence of Technology on Entrepreneurial Innovative ability and Sustainability in Nigeria

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Abstract

The influence of Information Communication Technology (ICT) on the innovative possibility and sustainability of entrepreneurship in Nigeria has been assessed. The Survey research design was employed using structured questionnaire administered on 158 respondents selected from three states within South-west geopolitical zone of Nigeria with the aid purposeful and judgemental sampling techniques. Data obtained were analysed using descriptive statistics and a simple regression model. The result showed a strong relationship between ICT and innovative capability of SMEs in Nigeria as revealed by the (p-value of $0.000 < 0.05$ and $\beta = 0.95$), clear indications that ICT will cause innovative capacity to go northward. Similarly, in the case of ICT and entrepreneurial sustainability, the (p-value of $0.000 < 0.05$ and $\beta = 0.78$). Again, there exists a strong association between ICT and sustainability of entrepreneurship in Nigeria. As such, it is recommended that entrepreneurs should embrace information technology as this will expose them more to new innovations and better ways of doing things as well as hasten transmission of vital information and reduce time and cost of operation. More so, access to the internet will enhance easy communication with potential customers and business partners. It is suggested that the government should further improve on the power supply to encourage entrepreneurial growth and sustainability. In all, adequate security measures should be put in place to regularly prevent hackers, malicious attacks and other disasters inherent in ICT based environment

Keywords: ICT, Innovative Ability, Sustainability, Entrepreneurship and Growth

JEL Classification Codes: N03 O03 O01

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1.0 INTRODUCTION

Technology has created significant changes in the world today through improvement in accessing information and has provided more robust communication infrastructure. These technologies have raised the importance and value of information and communications. As technology has affected many issues such as education, entrepreneurship undoubtedly has benefited well as other advantages of this technology. Technology, information technology (IT), technological innovation or information communication technology (ICT) seems to have similar characteristics and therefore will be used interchangeably in the study. The dawn of Information technology, as the distinctive invention contributed highly to various aspects of human endeavour (Saeid, 2011). Today this technology impacts on social, cultural and economic life aspects of individuals and communities so that it cannot be neglected. In the past two decades also advanced industrial countries with new technology, as the focus of development, have given so much. So that country's national and regional projects for the development of information technology has been implemented. Information communication technology (ICT) has the potential to penetrate underserved areas, facilitate the development of local capacity and provide faster transition of information

about technical assistance and human needs such as food, health, agriculture.(Arvin 2013). Information technology with various features and capabilities could have shown remarkable flexibility in the field of entrepreneurship. These features caused efficiency increase of this technology in entrepreneurial and job creation. In an overview some of these features can be noted: Increase speed, improve accuracy, and reduce the physical size of data repositories, elimination of administrative corruption, making it possible to work full-time, allowing remote collaboration, and reduction in the cost of the system.

Entrepreneurship also indeed played an important role in economic growth, job creation and social welfare. It has been noted that profound changes that occurred in the current era in the international environment, changes in the transition from an industrial society to an information society is said to owe to entrepreneurship and this makes it the engine of economic development. Entrepreneurship is the art or science of innovation and risk-taking for profit in business and also the quality of being an entrepreneur. New and unique combinations are the result of Entrepreneurship (Schumpeter, 1934). Successful and right futures are forecast by Entrepreneurship (knights, 1921).

Sustainable economic development does not occur without entrepreneurship and entrepreneurship is the practice of starting new organisations or revitalising mature organizations (Wikipedia, 2008 in Oyewale, Adeyemo, & Ogunleye, 2013). There is no reservation that increases in GDP, societal wealth and quality of life all follow amplified entrepreneurship (Khalil, 2000 in Oyewale et al).

Wikipedia (2008) defined entrepreneur as —a person who is willing and able to convert a new idea or invention into a successful innovation”. The readiness and willingness to innovate must be the hallmark of an entrepreneur in order to foster growth in business. Without doubt, identifying needs and proposing solutions without information is not possible. Thus information and knowledge like communications is the necessity of any entrepreneurial activity. Nevertheless, technological innovation has been shown to take many paths that reflect the multiple sources of knowledge upon which it is based (Belotti&Tunälv, 1999). Today’s global business environment, innovation and creativity are key ingredients in creating and sustaining strategic advantage. Among the main reasons for this renewal is the new way of thinking managers and economists from countries with a developed market economy and a new perception of economic opportunities. However, innovation cannot be sustainable until and unless it is in aligned with triple bottom line elements that are economic, social and environmental dimensions. In this perspective, a sustainable environment helps to generate innovations and knowledge, it also changes the knowledge characteristics and ecosystem (Hemsley & Mason, 2013). The entrepreneurial successes are the life blood to businesses around the world.

Over the years, Nigeria’s low absorptive capacity and underutilisation of existing capacity seem orchestrated by lack of technology innovation in entrepreneurship. Nigeria’s economic circumstances require bold entrepreneurship. However, institutions and policies are yet to adequately support and motivate inventors, creators, investors and researchers in mechanised equipment, improved irrigation, environmental conservation, manufacturing, renewable energy sources, communication technology and other services. There is a wide deficiency in the adoption of the outstanding technology by the entrepreneurs which is slowing down development with associated factors in Nigeria.

In the view of some scholars, the entrepreneur is seen in many ways, but mainly as an innovator who is responsible for the creation of new products, new methods of production and new processes, and who is also capable of identifying new markets (Schumpeter, 1949). The nature of the innovative process that affects enterprise survival and economic growth revolves around the active and inactive functions of the entrepreneur (McPherson, 1996). Extant literature revealed a dearth association between innovation and technology.(Hage, 1999).

Also, another aspect that is of great importance for the existence and perpetuation of the rise or decline of entrepreneurship in the economy of any country is their contribution to creating new value. Sooner or later, all nations will realise that initiating, developing, supporting even these individuals or organisations are not only indispensable but as a catalyst for economic efficiency by creating new jobs, maintaining permanent organizational

flexibility, stimulation of innovation and creativity (Oncioiu, 2013). As such, this study investigated the influence of technology on entrepreneurship innovative ability and sustainability in Nigeria

2.0. LITERATURE REVIEW

Entrepreneurship

Entrepreneurship can, therefore, be defined as the process that converts the business into venture or that increase and diversify the investments or business units with better growth potential (Ahmadpoor & Mahmoud, 2000). Entrepreneurship is the ability to differentiate business opportunity, create the business with innovative ideas by absorbing all associated risks and bring the action to reality for (profit). Whoever that acts in this regard is referred to as an entrepreneur. Entrepreneur innovates, takes the risk and combines all factors of production to the advantages of the society he is. An entrepreneur is a vital economic development of a nation. No wonder, Oyewale et al, affirmed that lack of industrialization of West African sub-region was due mainly to paucity of real entrepreneurship. For Hissich and Peters (2002), entrepreneurship entails that process of creating new things with value by devoting the necessary time and effort, assuming the accompanying financial, psychic, and social risks and receiving the resulting rewards of monetary and personal satisfaction and independence.

Technology/Information Technology

Science and Engineering Indicators (2002) referred to technology itself is an entity, both material and immaterial, created by the application of mental and physical effort in order to achieve some tasks. Technology refers to tools and machines designed to be used to solve real-life problems. It may include simple tools, like a crowbar or

wooden spoon, or more complex machines, such as a space station and or particle accelerator. Tools and machines need not be material; virtual technology; such as computer software and business methods fall under this definition of technology. Technology can be perceived as an activity that forms or changes cultural outlooks (Borgmann, 2006). Also, technology portrays the application of mathematics, science, and the arts for the benefit of life. A modern example is the rise of communication technology, which has curtailed barriers to human interaction, linkage and as a result has helped spawn modern subcultures; the upsurge in cyber culture has resulted in the development of the internet and the computer.

Information technology is well-defined by different scholars. For Odunfunwa (2002) in Saeid, (2011) technology was described as a body of tools, with the convergence of communication and computers. Saeid, (2011) sees information technology as a series of machines, capable of performing sequences instructions. The set of instructions is a programmed made particularly flexible and that is not rigid and can be changed depending on the information being processed. The Commonwealth secretariat explains that the phrase "information technologies" has been used to encompass a wide range of new technologies and their applications, including all aspects of the use of computers, micro-electronic devices, and satellite and communication technology. The above definition goes to show that communications technology is an aspect of information technology or technology. Various forms of studies in the literature in respect to the effect of information technology are abounding. For instance, Bailey (1989) in Saeid,

(2011)“confirmed that computers and other technologies are now found in all areas of business, industry, banking, education and government sector. The role of technology in entrepreneurship has been studied in some parts of the world.” Myriad of factors and traits have been flagged as being associated with entrepreneurship. Entrepreneurial individuals combine a good number of personality traits –such as innovation, risk taking, proactiveness in the sense of doing what is necessary to realize their ideas in addition to shoulder of responsibility for success or failure (Morris & Sexton, 1996). Technology systems influence a firm's products and services, markets, product cost, and product differentiation. As such, the successes of innovative firms vehemently rely on the implementation and creativity in the use of IT (Deans & Kane, 1992).

Technology and Entrepreneurship

The concept of entrepreneurship is a broader concept that plays a vital role within the market economy. Three independent variables that influence entrepreneurship are economic growth, modern technology and innovation. Advanced technologies provide quick access and higher quality of information. Email is the most common application of new information technologies that enable individuals and organizations to interact with each other at a cheaper cost. Another application of new information technologies is the World Wide Web which enables people to access information. According to Deans and Kane (1992) information technology (IT) plays a vital role in making an establishment successful under uncertain and harsh economic conditions.

Jonson and Wrycza (2015) confirmed a strong positive relationship between the use

of IT and entrepreneurship in Poland economy. Saeid (2011) also affirmed that computers recorded a significant impact on decision of the people in respect of their living condition; digital communication is not anymore limited to the confines of business dealings but also includes the simple information that families may wish to retrieve in the comfort of their homes. It was affirmed that members of teams could carry out their business and may be required to work on their projects regardless of the time limitation in order to accommodate the rising demands that are being required of them not only by their company but also with the fast-paced world market.

Present, technology assists the entrepreneurs to save time and capital during start-up process in e-business. In the present day, information and communication technology has enabled the present day entrepreneurs to excel more than the old entrepreneurs.

Technology and Entrepreneurship Innovative capability for Sustainability

The general belief is that entrepreneurship need not be taught and therefore, an entrepreneur is inborn. It should however be noted that there is need to learn the skill for one to be able to become a successful entrepreneur. (Griffin and Hammis 2001 in Oyewale et al 2013). Entrepreneur training is meant to teach the skills and knowledge needed to be known before starting on a new business venture. This would aid necessary identification of the risks and avoidance of many pitfalls that the beginners are liable compared with a well-trained and vigilant contemporaries. The study of Taiwo, Oladepo, Ilori, and Akanbi, (2002), on small scale food companies in Nigeria, confirmed that the one significant sources of technological change in companies are personnel (operators and

craftsmen). However, simplicity of the innovation processes to the work force; accurate and adequate information about the system of production; and the involvement of the workforce in the initiation and implementation of any technological changes were the cogent reasons given for these.

Another research findings showed that the key information sources for manufacturing small and medium firms include; production and innovation; machinery suppliers, exhibition and trade fairs, client firms, publications, repair workshops (foundries, heat treatment shops, staff of other firms, and social and professional associations, and consultancy firms within and outside the clusters (Oyeyinka-Oyelaran, 2001). Good numbers of studies perceived that increasing profit of organization is a function of change in technology (Verspagen, 1992 in Oyewale et al 2013). For instance, Ndubisi, and Kahraman (2005) confirmed that in many countries, the roles played by the government and the growing number of internet users have far-fetched impacts on SMEs as it enables use of internet-based ICT to get across to larger number of potential customers worldwide. The use of internet to conduct online business is quickly changing the old way of doing business among brick and mortar companies. Given the waves of globalization and liberalization across the world, it is believed that ICT is to be the most cost-efficient tool to assist companies in gaining bigger markets and such ability to compete with larger organizations in attracting customers to their products, services and information (Tan et al., 2009).

“Innovation is a research area within the Marketing and Entrepreneurship Interface is a growing area of enquiry” (Fillis &

McAuley 2000 in Oyewale et al 2013). Having identified the great support ICT could offer entrepreneurs and start-ups a new concept was devised called cyber-entrepreneurship. Cyber-entrepreneurship emergence highlighted the impact of Information and communication Technology toward entrepreneurs’ success. According to Malone and Laubacher (1998), the ICT is compelling good numbers of firms to review their traditional practices and take advantage of formidable information tools to handle commercial transactions on a much larger scale, create new partnerships and networks with customers and suppliers, and operate techno-watch systems capable of detecting new business opportunities and innovations. Thus, ICT further creates a firm that rest upon electronic commerce, with main activities of exploiting networks using Internet technologies, intranets, and extranets that enables whole entrepreneurial process to be executed through ICT facilitated process (Bret and Champeaux, 2000). Literature equally confirmed the existence of a strong relationship between ICT and business performance. In the same view, ICT solution may, therefore, have a strong impact on the entrepreneurial performance as it supported by enriching entrepreneurial climate within organizations by facilitating tools for innovation. According to Ndubisi & Kahraman (2005), there is a growing understanding of how businesses should operate using ICT to achieve optimal effectiveness.

The Theory of Innovation Diffusion

Rogers a Sociologist published the first edition of *Diffusion of Innovations* back in 1962 and the book, now in its fourth edition (1995), has become a classic in this field. Innovation diffusion is of the thought that adoption of innovation involves the

spontaneous or planned spread of new *ideas* and Rogers perceived an innovation as: "... an idea, practice, or object that is perceived as new." (Rogers 1995:11) stressed that only *perception* of change that is important; provided that the idea *seems* new to the potential adopter, then it should be seen as an innovation." The topic of innovation diffusion was considered in a variety of case studies on topics that include: control of scurvy in the British Navy, diffusion of hybrid corn in Iowa, diffusion of the news, feeding bottles babies in the third world, how the refrigerator got its hum, Xerox PARC and Apple computer, black music in white America, Minitel in France, the non-diffusion of the Dvorak keyboard, and causes of the Irish potato famine. The prime concern in all these studies is the identification of factors that affect the speed with which an innovation is adopted, or that cause it not to be adopted at all".

The existence of innovation is seen to cause uncertainty in the minds of potential adopters in the diffusion theory (Berlyne 1962), and uncertainty is synonymous to a lack of predictability and information. Diffusion relates to an information exchange process amongst members of a communicating social network, propelled by the need to minimise uncertainty (Rogers 1995). Along with the relative probabilities of each of these alternatives occurring, uncertainty is considered as the point to which several substitutes are perceived about the occurrence of some events. Those considering the adoption of the innovation are therefore expected to seek information so as to reduce inherent uncertainty (Rogers 1995). Diffusion theory is of the opinion that technological innovation is an embodiment of information, and so its adoption helps to reduce uncertainty. The new ideas upon which an innovation is

based are communicated over time, through various types of communication channels, among the members of a social system. There are therefore four main elements of the theory of innovation diffusion. Namely, feature of the innovation, the nature of the communication channels themselves, the time passage, and the social system through which the innovation diffuses (Rogers 1995). This study is therefore anchored on this theory because it concerns itself about innovation, technology and sustainability.

3.0. METHODOLOGY

Research Design

The Descriptive survey research design was employed with judgmental sampling techniques to select the sample from the study population. However, this study targeted five hundred SMEs who are ICT and non-ICT based entrepreneurs, though their activities are ICT related, located in popular computer village in Ikeja, Lagos State; Akure, Ondo State; Ado-Ekiti in Ekiti State and its environs. The respondents were those that are feasible and accessible to the researchers; this comprising the ICT entrepreneurs, small scale business owners and Software developers. In determining the sample size, the researcher used Yamane(1967) formula to determine the size that was used for the study.

$$\text{The sample size } n = \frac{N}{1 + N(e)^2}$$

Where: N = the population size
e = estimated error of 5%

Applying the formula

$$\text{Sample size} = \frac{500}{1 + 500(0.05)^2} = 220$$

However, two hundred and twenty two copies of questionnaire were distributed

when one hundred and fifty eight (158) questionnaires were returned distributed as follows;

Apportioning Sample size as follows;

- Lagos State Computer Village,
Lagos = 64
- Ondo State, Akure= 26
- Ado-Ekiti, Ekiti State = 46
- Software developing
Professionals = 22
158

Copies of structured questionnaires designed on two point attitudinal scale were administered on the respondents of one hundred and fifty eight (158) selected ICT SMEs to obtain study data. We ensured Face and Content validity before proceeding to the field. Regression analysis was employed and analysed the data while t-test was used to test the hypotheses formulated to depict the influence of the dependent variables on the independent variable and to show the association inherent between the variables of the study.

4.0.ESTIMATION RESULTS AND DISCUSSION OF FINDINGS

Objective 1: Influence of technology on Innovative entrepreneurship ability in Nigeria

Table 1: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Valid N (listwise)	158	10.00	20.00	15.7975	4.61893

Table 1 shows that the respondents agreed that Technology has an influence on innovative Entrepreneurship ability in Nigeria with a mean of 15.7975 and a standard deviation of 4.61893; this suggests that entrepreneurship will be better off with innovative Technology.

Hypothesis 1:Technology has no significant influence on innovative entrepreneurship ability for sustainability in Nigeria

Table 2: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.950 ^a	.902	.902	.15555

a. Predictors: (Constant), Technology

The regression model summary shows that the coefficient of multiple determinations is 0.950 which indicates that technology accounts for 95% change in innovative entrepreneurship ability in Nigeria.

Table 3: Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	.113	.041		2.781	.006
Technology	.944	.025	.950	37.932	.000

a. Dependent Variable: Entrepreneurship Innovative ability for Sustainability

The table of coefficients reveals using standardized Beta shows that the influence of Technology on Entrepreneurship Innovative ability for Sustainability Nigeria is increasing by 95% based on the analysis. The t-test value of 37.932 with the probability value of 0.000 show that technology has significant positive influence on Entrepreneurship innovative ability for Sustainability in Nigeria. This is in consonance with Jonson and Wrycza(2015); Saeid(2011) and Bret and Champeaux submission(2000).

Objective 2: Influence of Technology on Entrepreneurship sustainability in Nigeria

Table 4: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Valid N (listwise)	158	10.00	20.00	13.1835	3.91118

Table 6: Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	.444	.077		5.787	.000
Technology	.778	.051	.775	15.329	.000

a. Dependent Variable: Entrepreneurship Sustainability

The table of coefficients reveals using standardized Beta shows that the influence of Technology on Entrepreneurship Sustainability in Nigeria is increasing by 77% based on the analysis. The t-test value of 15.329 with significant value of 0.000 shows that Technology has significance influence on Entrepreneurship Sustainability in Nigeria;

Table 4 shows that the respondents agreed that Technology has influence on Entrepreneurship sustainability in Nigeria with a mean of 13.1835 and a standard deviation of 3.91118, this suggests that without technology, sustainability of entrepreneurship might not be impossible.

Hypothesis 2: Technology has no significant influence on Entrepreneurship Sustainability in Nigeria

Table 5: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.775 ^a	.601	.598	.31578

a. Predictors: (Constant), Technology

The regression model summary shows that the relationship between Technology and Sustainability in Nigeria is 0.775 indicating that change in technology contributes only 78% change in the Entrepreneurship Sustainability in Nigeria.

5.0. CONCLUSION AND

RECOMMENDATIONS

Information technology exerted strong influence on entrepreneurship innovative capability as depicted by the result of analysis above more so that good number of entrepreneurs interacted with affirmed that

their constant interaction use of internet exposed them to more improved methods of doing business even availed them the opportunity to meet new associates that bring in improved way of going about their daily vocations. This is in tandem with Jonson and Wrycza (2015); Saeid (2011) and Bret and Champeaux submission (2000). Besides, with their exposure to ICT, even where no associate is met, they find write-ups that are self-explanatory best capable of improving their innovative capability. In the case of ICT and entrepreneurial sustainability, the study confirmed that deployment of ICT would cause a significantly influence and enhance the sustainability of entrepreneurs from the Nigerian context. Failure to embrace ICT may not kill entrepreneurship anyway but may retard growth and escalate the cost of operation. It is therefore recommended that entrepreneurs should try as much as possible to embrace information technology as this will expose them the more to new innovations and methods of doing things as well as hasten transmission of vital information and this will reduce the time and cost of operation; enhance expansion and growth. The government should also improve on power supply to encourage entrepreneurial growth and sustainability.

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