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### 19-21 NOVEMBER 2018

#### **Conference Proceedings**

Maiden Conference on Good Governance,  
Entrepreneurship, and Grantsmanship for  
Sustainable Development

**Southern University Baton Rouge, Louisiana, USA**



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# Good Governance, Entrepreneurship and Grantsmanship for Sustainable Development

19 – 20 Nov 2018; SUBR Louisiana, USA.



**Prof Victor Mbarika**, Founder ICITD, Southern University USA – Chief Host: Delivering Welcome Address



**Prof Misra Sanjay** (Covenant University) One of the Keynote Speakers



**Prof Fungod** (Rep of Minister of Higher Education, Cameroon) Delivering a Lecture



**Mr Brian McNabb** (Rep of Senator Bill Cassidy of US Congress) Speaking at the Conference



**Prof Shehu A.** (Chairman of Council, KASU Nigeria) Responding to the Keynote Speech



Some Participants at the GIS Lab, SUBR USA



The Keynote Speaker, **Prof Waswa Balunywa** (Principal, Makerere University Business School UGANDA); Delivering His Lecture



**Mr Isaiah Bulus** (One of the Conference Organizing Team) Presenting His Conference Paper



**Dr Hindu A.; Prof Fungod & Dr Hauwau** Participants from Africa, at the Conference



**Dr Yunusa Idu** (Registrar, Kogi State Uni, Nigeria) Being Honored With a Honorary Certificate at the Conference



Panel Discussion on The Role of Artificial Intelligence on Sustainable Development



**Prof M Tanko** (VC Kaduna State University Nigeria) being honored with Honorary Mayor President of Baton-Rouge during the Conference



**Dr ThankGod A.** (Director Entrepreneurship, Niger Delta University) being honored



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## **Entrepreneurship as a Strategic Tool for Ensuring Sustainable Development in Nigeria**

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### **Abstract**

The paper examines how entrepreneurship could be used as a strategic tool for sustainable development in Nigeria. Qualitative and quantitative methods were used in the study. Fifty (50) entrepreneurs were used as the sample size out of the one Hundred and fifty (150) entrepreneurs in Abuja based on convenient sampling. Statistical Package for Social Sciences, (SPSS) was use to evaluate the degree of relationships between the variables. The study discovered that inadequate infrastructure; like poor road network, poor electricity supply, insecurity and high interest rate have been hampering entrepreneurship in Nigeria. It concludes that Nigerian government should provide enabling environment for entrepreneurs to strive. Financial institutions should also reduce interest rate to enable entrepreneurs to access bank loans. The crux is that innovation, creativity of entrepreneurs is the only sure way to sustainable development in Nigeria.

**Keywords:** Creativity, Development, Entrepreneurship, Innovation and Strategic tool

### **Introduction**

Innovation and creativity is the road map to sustainable development in the global South. Creativity is the mother of invention. Government need the support of her citizenry to develop a sustainable development. The sure way to achieve faster and a formidable sustainable development is through entrepreneurship. Entrepreneurship is the function of an entrepreneur, who perceives business opportunities and takes the advantage of the available resources to create something new. Entrepreneurship is the vehicle that carries innovation and creativity. Innovation is the specific instrument of entrepreneurship; it creates resources (Drucker, 1993:30).

Norbert,M.I,(2003:6)defines creativity as the generation of a new idea and innovation as the translation of a new service. Nigeria as a developing country is in dire need of creativity and innovation to be able to maximize the need of its robust population. Entrepreneurship can turn a country from developing to develop in a short period of time. China is an industrialize nation in few decades back because of entrepreneurship. Many Nigerians are striving to be creative and innovative; though the environment is not conducive to thrive.



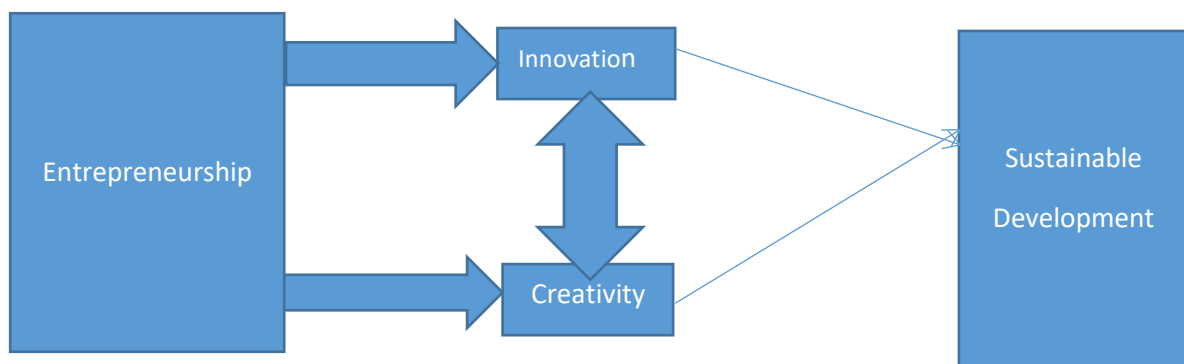
There are some challenges that have been confronting entrepreneurs in Nigeria. The issues of insecurity, poor road network, and inadequate electricity supply high interest rate and so on. These problems had been hindering the entrepreneurship advancement in Nigeria.

The objective of the study is to determine the correlation between entrepreneurship and sustainable development; to examine the effect of creativity and innovation on sustainability development.

Hypothetically, we want to determine the null hypotheses that states that there is no significant relationship between entrepreneurship and sustainable development; there is no significant relationship between creativity, innovation and sustainable development.

## Literature Review

**Fig: 1 Conceptual Framework of Entrepreneurship and Sustainable Development**



**Source: Author's Design the Entrepreneurship and Sustainable Development.**

Entrepreneurship is incomplete without Innovation and creativity. The mediating effect of Innovation and creativity is the road map to sustainable development. Where an entrepreneur could create something new through innovation, sustainable development is sure. What people call entrepreneurship in most places is small business they started in a corner without creativity and innovation. The lasting effect of entrepreneurship could only be achieved where the mediating effects of innovation and creativity are incorporated. This is the sure and fastest route to sustainable development. It is the ability of satisfying the needs of the present generation without compromising the ability of future generation to meet their needs. (The Brundtland Report, 1987) China is one of the leading economies in the world because of their innovation and creativity. Presently, China is now known as an industrial Nation because of their ability to create and recreate. Nigeria's economy needs a boost to get to the expected

height in economic development. Therefore, innovation and creativity should be the watchword for every entrepreneur.

### **Literature Review**

Many researchers have studied the concept under study to find out the way forward. Many have developed their own models and brought up their suggestions and contributions. Some Theorists like Peter Drucker, Richard Cantillon, Max Weber, Everett Hagen, Thomas Cochran, Frank Young, John Kunkel and so on, saw entrepreneurship in various ways. The creativity and Technological innovation Theory of Everett Hagen is in line with this study. An Entrepreneur is a problem solver, who tries to develop his or her environment socially and economically. Entrepreneurs try to innovate new things and ideas to develop his or her environment. In Nigeria the sustainability of the development could only be attained through innovation and creativity. The internal challenges like unemployment, poverty and brain drain are demanding the urgent attention of entrepreneurs to solve these problems.

Some of the fast-growing economies in the world like china turned their economy around with innovation and creativity. Today China is one of the industrialized economies.

Drucker ( 1993:255) in his book Innovation and Entrepreneurship ,he is of the view that for any economy to develop the society should be innovative. For any society to become entrepreneurial, innovation and entrepreneurship have to be the integral life sustainable activity in the organizations and the economy.

Ukpata and Onyeukwu (2012), in their study; reviewed that for Nigeria to reach to her peak of development through entrepreneurship, entrepreneurial education should be enshrined in the academic curriculum from primary to higher institutions. The study suggested the theory of meritocracy thesis and the ant business model. Another study of Onyeukwu and Akanegbu (2018), revealed that social entrepreneurship is the sure way to bring about employment and self-reliance in Nigeria. The study recommend that Nigerian entrepreneurs should borrow leaf from other countries like the USA, UK and Asian tigers that used entrepreneurial economy to jump out of poverty.

## **Entrepreneurship and sustainable development**

Jeremy K. Hall, Michael and J. Lenox did a study on sustainable development and entrepreneurship: past and future direction. Their contributions see entrepreneurship as the engine for products and processes. Other researchers like; (Jordi Bacaria; 2014; Wim Naude; 2014 and others) stress that certain countries under the Asian continent reduced their poverty and unemployment level through entrepreneurial- wise economy.

## **Creativity and innovation on sustainability development**

Innovation and creativity work in synergy to bring forth the beauty of Entrepreneurship. The crux remains that when you subtract the two concepts from Entrepreneurship, the result will amount to small business venture. Innovation and creativity is the neck that carries sustainable development in any country. The study of many researchers like, ( Paul Keursten, 2013; Onyeukwu and Akanegbu, 2018; Joseph Maria Coll, 2014; Mariona Isabel Vidal, 2014; Ukata and Onyeukwu, 2014) support the debate. Creative thinking is the key to recent economic development all over the world, Nigeria inclusive. Most of the leading economies today rose to the top because of innovation and creativity. Today China is moving powerfully in the international trade because of industrialization. Therefore for Nigeria to reach the expected height that will lead to sustainable development, creativity and innovation must be the road map.

## **Methodology**

Relevant data were collected from both the business owners and employees of some selected small and medium scale enterprise. A sample size of fifty (50) was considered. Five per cent (5%) more of the required sample size of the questionnaire forms was administered to take care of lost, damaged and misplaced questionnaires by the respondents. The data collected from the respondents were analysed using descriptive and inferential statistics. Two (2) null hypotheses were generated and tested at 0.05 alpha level of significance. This section therefore, presents the results obtained from the analysis of data and the interpretation of the findings on the study. The results are presented in three sub-sections. The first section was analysed with the use of inferential statistics (correlational and regression analysis). The results obtained with the two (2) null hypotheses postulated are presented. The third section

of the section presents a summary of the findings. Statistical Package for Social Sciences (SPSS) version 23.0 and Microsoft Excel 2013 was used for the analysis.

### **Instrumentation**

The instrument used in collecting relevant data for this research was a self-developed instrument tagged entrepreneurship, development, creativity, and innovation Questionnaire (EDCI). This questionnaire is a series of 20 relevant item questions that are used to elicit information (on the research variables) from respondents drawn from the target population of the study. Some of the items of the questionnaire were also drawn from the review of relevant literature. The instrument consists four sections:

Section A: This has four items drawn to elicit the following personal data: gender, age group, marital status and nature of employment.

Section B: entrepreneurship Sub-Scale (ENT)

Section C: development Sub-Scale (DEV)

Section D: creativity Sub-Scale (CRE)

Section E: innovation Sub-Scale (INN)

Sections B, C and D consisted of items which have 4 questions each and participants were to indicate their relative agreement with the statements by using a four-point Likert-type of:

SA - Strongly agree (4 points)

A - Agree (3 points)

D - Disagree (2 points)

SD - Strongly disagree (1 point)

### **Description of Entrepreneurship, Development, Creativity, and Innovation Sub-Scale:**

The twenty (20) items in the subscales were modifications from *Entrepreneurship Questionnaire* (EQ) developed by N. Isaga (2012). Each scale is made up of 4 items with a 4-point likert response format of from '1'strongly disagree to '4'strongly agree to which respondents' indicated and revealed their relative agreements by a tick.



## Procedure for Scoring the Instrument and Data Analysis

The highest possible score for sections B, C, D and E for any item was '4' and the lowest was '1'. Hence the highest score obtained was 16 (i.e.  $4 \times 4$ ), while the lowest score was 4 (i.e.  $1 \times 4$ ). Therefore, the range was 12 (i.e.  $16-4$ ). The mid-point of range was 6 (i.e.  $2 \div 2$ ). The cut-off point was therefore  $16-6$  (i.e. maximum score minus the mid-point of the range) or  $4 + 6$  (i.e. the minimum score plus the mid of the range), in which either way is 10. Thus, respondents who may obtain scores from 10 to 16 were considered as reporting higher levels on entrepreneurship, development, creativity, and innovation; while those who scored below 10 were considered as reporting less on entrepreneurship, development, creativity, and innovation respectively.

## Procedure for Data Administration and Collection

The administration of the questionnaire was done by the researcher with the help of research assistants. This facilitated the ease of administration and retrieval of the instrument afterwards. A total of 60 copies of questionnaire were administered and 50 was successfully retrieved. The respondents were allowed to ask questions to clarify the questionnaire items from the researcher. No time was set for the completion of instrument and no confidential questions like names, addresses of respondents were asked. They were assured of the confidentiality with which the information obtained would be treated.

## Methods of Data Analysis

### Estimation of Study Variables

From the topic of this study "... the following variables was deduced:

**Independent Variable:** Creativity and Innovation are the independent variable and being the input variable, it is also known as the 'X' variable.

**Dependent Variables:** The dependent variables otherwise known as 'Y' variables are the Sustainable Development. The Sustainable Development depends on the input or the dependent variables as the name implies, depend on the independent variables.

We test the dependent variable (Sustainable Development) to see how they respond to the change made to the independent variable or if there is a direct link between the two types of variables (independent and dependent variables).

### Method of Data Analysis

Ordinary least square regression analysis will be applied to the data as a method of estimation. Ordinary least square regression is an approach which is suitable for analysing a dependent variable that is dichotomous. A similar technique has been applied by Ayangeadoo and Zungwe (2018) in their studies related to economy and sustainable development. The general model intended to be employed in our study to test the null hypotheses can be specified as follows.

$$DEV = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \epsilon_i$$

Where

DEV = Sustainable development

$\beta_0$  = Intercept

$X_1$  = entrepreneurship

$X_2$  = creativity

$X_3$  = innovation

$\epsilon_i$  = error term.

## RESULTS

**Correlation Coefficient Table**

	ENT	DEV	CRT	INN
ENT	1.000			
DEV	0.801	1.000		
CRT	0.377	0.262	1.000	
INN	0.567	0.262	0.542	1.000
	entrepreneurship development		ENT	
	creativity		DEV	
	innovation		CRT	
			INN	

Table above, presents the correlation coefficient (dependent and independent variables) for the degree of association measure within the variables considered in this thesis. Correlation values ranges from -1 to +1, where 0.75-0.99 signifies a very strong relationship between the intersecting variables, 0.5-0.74 implies strong relationship within the intersecting variables, 0.35-0.49 implies a weak relationship among variables as presented above.

Noticeably from the correlation table above, development and entrepreneurship are of produces a correlation coefficient of 0.801 which signifies a very strong relationship. It implies that entrepreneurship is a strong factor in getting sustainable development. Also, the innovation and creativity produce a strong relationship with correlation coefficient of 0.542. This is thus, implying that creativity and innovation explain or predict each other as variables.

## Hypotheses Testing

Two (2) research hypotheses were formulated and tested with the use of inferential statistics. The hypothesis was tested with ordinary linear regression analysis at 0.05 level of significance: which states that;

**Hypothesis 1:** There is no significance relationship between entrepreneurship and sustainable development.

**Table 1a Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.497 <sup>a</sup>	.247	.231	1.71688E5

a. Predictors: (Constant), Entrepreneurship

**Table 1b1: Regression Output for the relationship between Entrepreneurship and Sustainable Development.**

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	135202.285	27574.062		4.903	.000
Entrepreneurship	.078	.020	.497	3.966	.000

a. Dependent Variable: Sustainable Development

The regression analysis results in Table 1b indicate that “Entrepreneurship” which yielded a beta ( $\beta$ ) value of 0.078, t-value of 3.966, and a p-value of 0.000, was significant since p-value is less than 0.05 level of significance. This implies that a unit change in the level of the Entrepreneurship activities (a unit increase or decrease) will significantly have a corresponding effect on the Sustainable Development by a factor of 0.078. Also, from Table 1a,  $R^2$  of 0.497 indicates that up to 49.7% as the extent of the variability in the Sustainable Development of the country is accounted for by the independent variables “Entrepreneurship”, it follows that other extraneous variables could be responsible for the remaining 50.3% variability in Sustainable Development. Hypothesis 1 was therefore rejected and we conclude that there is a significance relationship between entrepreneurship and sustainable development in Nigeria.

**Hypothesis 2:** There is no significance relationship between creativity, innovation and sustainable development.

**Table 2a Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.697 <sup>a</sup>	.485	.475	37.66172

a. Predictors: (Constant), Creativity, Innovation

**Table 2b2: Regression Output for the relationship between Creativity & Innovation and Sustainable Development.**

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	16.605	6.049		2.745	.008
Creativity	2.914	1.912	0.697	6.728	.000
Innovation	1.309	0.974	0.447	3.211	.021

a. Dependent Variable: Sustainable Development

The regression analysis results in Table 2b indicate that “Creativity” which yielded a beta ( $\beta$ ) value of 2.914, t-value of 6.728, and a p-value of 0.000, was significant since p-value is less than 0.05 level of significance. This implies that a unit change in the level of the Creativity (a unit increase or decrease) will significantly have a corresponding effect on the Sustainable Development by a factor of 2.914. Similarly, “Innovation” which yielded a beta ( $\beta$ ) value of 1.309, t-value of 3.211, and a p-value of 0.021, was significant since p-value is less than 0.05 level of significance. This implies as seen from Table 2a,  $R^2$  of 0.697 indicates that up to 69.7% as the extent of the variability in the Sustainable Development of the country is accounted for by the independent variables “Creativity and Innovation”, it follows that other extraneous variables could be responsible for the remaining 30.3% variability in the Sustainable Development, hypothesis 2 was therefore rejected and we conclude that, “There is a significance relationship between creativity, innovation and sustainable development”.

### Discussion of the Findings

The analysis above revealed some important issues to be taken seriously, such as, that there is a significance relationship between entrepreneurship and sustainable development in Nigeria. The result of the analysis shows that “Entrepreneurship” which yielded a beta ( $\beta$ ) value of 0.078, t-value of 3.966, and a p-value of 0.000, was significant since p-value is less than 0.05 level of significance. This implies that a unit change in the level of the Entrepreneurship activities (a unit increase or decrease) will significantly have a corresponding effect on the Sustainable Development by a factor of 0.078. This implies that Nigerian entrepreneurs should increase their effort in enhancing entrepreneurial activities. This will ensure sustainable development, for example, the A report by Global Entrepreneurship Index (GEI) 2016-2017 shows the overall GEI (Global entrepreneurial index, 2018) score for India is 26% and ranked 69 out of 137 while Nigeria is 19.7% and ranked 101 out of 137 countries globally. Nigeria has and must increase her entrepreneurial activities to move to higher level on the entrepreneurial global ranking.

The analysis also disclosed that “There is a significance relationship between creativity, innovation and sustainable development”. The regression analysis results in Table 2b indicate



that “Creativity” which yielded a beta ( $\beta$ ) value of 2.914, t-value of 6.728, and a p-value of 0.000, was significant since p-value is less than 0.05 level of significance. This implies that a unit change in the level of the Creativity (a unit increase or decrease) will significantly have a corresponding effect on the Sustainable Development by a factor of 2.914. Similarly, “Innovation” which yielded a beta ( $\beta$ ) value of 1.309, t-value of 3.211, and a p-value of 0.021, was significant since p-value is less than 0.05 level of significance. This implies that Nigeria should inculcate the spirit of Innovation and creativity in their entrepreneurial activities. In the study of (Audretsch, 2012), the importance of Innovation was stressed as the key to trigger economic development and growth. This will in turn ensure sustainable development that will create employment for now and future generation.

### **Conclusions and Recommendations**

In line with the findings, few conclusions were made as enumerated below;

1. One of the most important driver to sustainable development is entrepreneurship. This is in support with the study of (Jordi Bacaria; 2014; Wim Naude; 2014 and others) stress certain countries like Asian countries reduced their poverty and unemployment level through entrepreneurial- wise economy. The unemployment level in Nigeria is at 18.80 per cent as at 2017/2018. Therefore entrepreneurship processes will reduce the challenges of unemployment to barest minimum.
2. Creativity and Innovation are mediating factors in entrepreneurship drive. Skill acquisition is an element of innovation and creativity that could lead to sustainable development. The point is in support of the study of, Onyeukwu. Ukpata and Akanegbu, 2018) The study of many researchers like, ( Paul Keursten, 2013; Onyeukwu and Akanegbu, 2018; Joseph Maria Coll, 2014; Mariona Isabel Vidal, 2014; Ukata and Onyeukwu, 2014) support the debate. Creative thinking is the key to recent economic development all over the world, Nigeria inclusive. Most of the leading economies today rose to the top because of innovation and creativity. The findings also supported the Theoretical frame work of the study, The Creativity and Technological innovation Theory of Everett Hagen.

In line with the findings and conclusions the following recommendations were put forward;

1. Nigerian government should provide enabling environment for entrepreneurs to strive. Financial institutions should also reduce interest rate to enable entrepreneurs to access bank loans. This will help entrepreneurial activities and processes.
2. Nigerian entrepreneurs should borrow leaf from the countries like Asian Tigers who reduce their poverty and unemployment level though innovation and creativity.

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## Good Governance, Entrepreneurship and Grantsmanship for Sustainable Development

19 – 20 Nov 2018; SUBR Louisiana, USA.

### **The Role of Entrepreneurship on Inclusive Growth in Nigeria**

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#### **Abstract**

Globally, entrepreneurship is generally seen as a socio-economic phenomenon. It is one of the major economic variables that has attracted the attention of governments and researchers both in the developed and developing countries. Whatever be the form of economic and political set-up of the country, entrepreneurship is essential for economic growth and development. To this end, this study investigated the role of entrepreneurship in inclusive growth in Nigeria between 1981 and 2016. Owing to the absence of a long-run relationship between output growth and its possible determinants in Nigeria, only the short-run estimates were reported. Results of ARDL model estimation showed that entrepreneurship financing (measured by commercial banks' loan to sectors) appeared as a positive and significant driver of inclusive growth over the short term. Other significant short-run determinants of inclusive growth were identified as financial depth (measured by liquid liabilities) and gross capital formation. Trade openness however had no significant impact on inclusive growth in Nigeria. It is therefore suggested that the Nigerian government and policy makers re-strategize efforts in tapping the employment potential of entrepreneurship by making funds available at the lowest possible cost to genuine business owners across the various sectors of the economy.

**Key words:** Entrepreneurship, Inclusive growth and ARDL

#### **Introduction**

Globally, entrepreneurship is generally seen as a socio-economic phenomenon, it is one of the major economic variables that attract the attention of governments and researchers both in the developed and developing countries. Whatever be the form of economic and political set-up of the country, entrepreneurship is essential for economic growth and development. In other words, entrepreneurship is increasingly being recognized as a significant conduit for fostering sustainable development. Various programmes and initiatives are being made by governments, private institutions and non-Governmental Organizations (NGOs) to support venture creation and growth in order to promote entrepreneurship and contribute to the

overall economic growth and development. Poverty rate and unemployment have significantly decline in countries such as Asian tigers and BRICS that have taken the advantage of applying an entrepreneurial-wise economic and policy environment. Entrepreneurship development is positively correlated to innovation and economic growth, two key recipes for economic growth and development. Focus on business growth and entrepreneurial development continue to be in the forefront of policy formulation, in the developing countries, especially recently in Nigeria.

Private sector has now dominated the entrepreneurial development policies globally, according to Baig (2007) private sector can contribute to economic growth, job creation, and national income and hence to national prosperity and competitiveness. She further opines that, the private sector contributes substantially and significantly to the gross domestic product (GDP), and thus unleashing domestic resources (financial and entrepreneurial) is likely to create a more stable and sustainable pattern of growth and development. Moreover, the major component of private sector, micro, small and medium enterprises (SMEs) is essentially considered as the engines of economic growth, cornerstones for creativity and innovation, and seedbeds of entrepreneurship development (Baig, 2007; Charles, 2011). Hence, SMEs has been recognized as main sustenance of the economy because of their capacity in promoting the economy productivity and enhancing standard of living (Akingunola, 2011). Similarly, Sanusi (2010) states that SMEs are critical components of economic growth and development as they account for more than 50 percent of GDP of developing economies. He further said, SMEs are the main source of entrepreneurship and enterprise, and also the main source of innovation and technological development; they provide the required human capital and raw materials to larger businesses.

In her efforts at encouraging entrepreneurial initiatives, Nigeria has experienced exponential growth in the number of private firms. Nevertheless, majority of these businesses are very small when their operations are measured in terms of capital, employment and revenues (Attahir and Minet, 2000). In addition to the above is difficulty confronted by small businesses in accessing bank credits, but the most challenging obstacle threatening the state of entrepreneurship in Nigeria is a lack of government interest and support for micro, small

enterprises (Ariyo, 2005; Chu et al., 2008). Furthermore, entrepreneurship, and small and medium enterprises development is hampered by plethora of challenges like bad roads, bribes by government officials, multiple taxes, epileptic power supply and rising overhead costs on transportation and communication (Abdul-kemi) .More evidently, sustainable development has eluded Nigeria owing to the poor utilisation of its numerous oil wealth for economic growth and development, as current socio-economic indicators; poverty, unemployment, hunger and malnutrition suggest that the nation's mineral wealth has become worthless and a source of misery (Alan, 2007).

In consequent of the above, various governments especially in less developed countries and Nongovernmental Organizations are becoming more sensitive to the need to create a climate for entrepreneurship and a friendly business environment, supportive of the needs of the SMEs, particularly in the developing nations like Nigeria. The creation of such friendly business environment depends on the one hand, on building social and financial institutions which make possible objectively the practice of independent individual's enterprises, and on the other hand, on the maturation and development of personalities whose dominant orientation is the direction of productivity, working and creative integration. In regard of the above, various schemes and institutions have been introduced and/or established in Nigeria since independence to finance and provide credits to SMEs; these include among others, Nigerian Industrial Development Bank (NIDB) in 1964, Nigerian Agricultural and Cooperative Bank (NACB) in 1973, Peoples Bank of Nigeria (PBN), Community Banking Scheme in 1990 Nigeria Agricultural Cooperation and Rural Development Bank (NACRDB) by the merger of FEAP, NACB and PBN in 2000; and more recently the establishment of the Micro Finance Bank (MFB) Scheme on 16th December, 2005.

The socio-economic impact of entrepreneurship on the economic growth and development of the Nigerian economy is difficult to accurately measure or estimate, but it is believed to be highly dynamic and significant (Chu, Kara, Benzing, 2010). While entrepreneurship has long been seen as a significant avenue for socioeconomic transformation, especially as economy moves from one technological epoch to another (Schumpeter, 1934, 1942), there is little understanding of how entrepreneurs will discover and develop those opportunities that lie beyond the pull of existing markets. While the case for entrepreneurship having a central

role in a transition to a more sustainable society has been proposed by many, there remain major gaps in our knowledge of whether and how this process will actually unfold. To date, the academic discourse on sustainable development within the entrepreneurship literature has been sparse. Relatively few rigorous studies exploring the relationship between inclusive growth and entrepreneurship have been published in mainstream entrepreneurship journals. The purpose of this paper is to begin to address this gap. This paper, therefore, discusses how Nigeria can attain an inclusive economic growth through various effort at promoting entrepreneurship development in the country. Thus, the main objective of this paper is examine the impact of entrepreneurship financing on inclusive growth.

## **Review of the Literature**

### **Conceptual Clarifications**

Entrepreneurship is generally seen as simply “starting a business” it is much more than that. It is a process through which individuals identify opportunities, allocate resources, and create value. This creation of value is often through the identification of unmet needs or through the identification of opportunities for change. Entrepreneurship is known as the capacity and attitude of a person or group of persons to undertake ventures with the probability of success or failures. It demands that the individual should be prepared to assume a reasonable degree of risks, be a good leader in addition to being highly innovative. In business management, entrepreneurship is regarded as the “prime mover” of a successful enterprise just as a leader in any organization must be the environmental change agent.

Tijani-Alawiye (2004) defines 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, nurture them to growth and sustain them, with a view to achieving broad socio-economic developmental goals. One of these goals is sustaining employment.

Similarly, Schnurr and Newing (1997) justified the need for promoting entrepreneurship culture on the ground that youth in all societies have sterling qualities such as resourcefulness, initiative, drive, imagination, enthusiasm, zest, dash, ambition, energy, boldness, audacity



and courage which are all valuable traits for entrepreneurship development. In agreement with the above assertion, Bennell (2000) explained that governments, NGOs and international bodies seeking to improve youth livelihoods could best pursue their empowerment objective by tapping into the dynamism of young people and build on their strong spirit of risk-taking through entrepreneurship development.

Simply put, inclusive growth means economic growth that come along with employment opportunities and helps in alleviating poverty, by having access to essential services in health and education by the poor segment of the society. It entails providing equality of opportunity and empowering people through skill acquisition and education. Meaning to say, it is an economic growth that is distributed fairly across societies and create opportunities for all.

UNDP Nigeria's approach in alleviating poverty is deeply rooted in inclusive sustainable framework that focuses on both the institutions and the people. Put differently, inclusive growth programmes aims to provide support for the government's efforts at promoting sustainable human development by creating more economic opportunities for the people and reduction in inequality through various interventions in some key areas; support for development planning and statistics, support for expanded services to micro, small, and medium enterprise (MSMEs), support for youth empowerment and livelihoods as well as support for value chain development in agriculture, among others.

### **Theoretical Literature**

The view of development has been consistently changing over the years in a rapid fashion to accommodate changing needs and perception of the people and the economies. The earlier development theories emphasized Growth National Product (GNP) or per capita GNP and their growth rates, and considered the benefits of economic growth to automatically trickle down to the poor so that they may achieve better standard of living without any direct intervention from the state. In fact, meeting of the basic needs of the people, especially the poor, has come to be an important focus of rural development efforts in the developing countries or third world. The basic needs theory is now considered as the most comprehensive and integrated approach to development. The basic need theory provides the basis for a quality of life that is acceptable as non-poor, hence, the need for economic activity that can

provide the means of moving out of the predicament and wretchedness arising from the vicious cycle of poverty. Therefore, entrepreneurial financing as an economic activity has the potentials of reducing poverty through the provision of employment opportunities and income generations.

Among the famous and popular theories of economic growth and development is Keynesian theory, it centres on the sustainable economic development and the role of economic policy in the achievement of macroeconomic objectives.

Different scholars advocates the use of Keynesian policy of public investment to promote and achieve a higher standard of living and to provide increasing employment opportunities in less developing countries. In other words, macroeconomic policies should involves setting monetary and fiscal variables in each time period at the values which are thought necessary to achieve the government's objectives (Abata, Kehinde, & Bolarinwa, 2012). Although the theory is of the view that the private sector is inherently unstable, it is subject to frequent and quantitatively important disturbances in the components of aggregate demand. Therefore, it is the role of stabilization policies to offset these disturbances and so keep real output close to its market-clearing equilibrium time path (Omitogun and Ayinla, 2007).

Keynesian unemployment largely applies to the situation in Nigeria. It can be established that one of the factors accounting for the ugly trend in unemployment is the unpatriotic taste of many Nigerian consumers including government that indirectly exports jobs abroad at the expense of the domestic economy. By way of uncontrolled foreign tastes for virtually all commodities, the domestic producers are faced with the problem of low demand that naturally forces them to lower output and reduce workforce. This experience continues in some firms especially the small scale ones till they are push out of the market resulting in loss of more jobs. Thus, drawing from Keynesian economic growth model, financing SMEs should be part of macroeconomic policies of government in which both the fiscal and monetary policies should be recognize to achieve the desired levels of economic growth and development of Nigeria.

## **Some Empirical Evidences on the Link between Entrepreneurship and Inclusive Growth**

Friday (2012) investigated the impact of Microfinance credit on small and medium scale enterprises in Nigeria using survey design. The findings reveal that substantial number of the SMEs benefitted from the credits even though only few of them were capable enough to secure the required amount needed. Quaye (2011) conducted a study of the effects of Microfinance Institution (MFIs) on the growth of businesses (SMEs) in the Kumasi Metropolis. The findings also indicates that MFIs have had a positive and significant effect on the growth of businesses. The research suggested that in order to promote a sustained and accelerated growth in the operations of SMEs credits should be client-oriented and not product- oriented and also proper and extensive monitoring activities should be provided for people who are granted loans.

Muritala, Awolaja and Bako (2012) using survey method, investigated small and medium enterprises as a veritable tool in economic growth and development. The findings from the results reveal that the most common constraints hindering small and medium scale business growth in

Nigeria are lack of financial support, poor management, corruption, lack of training and experience, poor infrastructure, insufficient profits, and low demand for product and services. Similarly, Diagne and Zeller (2001) argue that insufficient access to credit by the poor just below or just above the poverty line may have negative consequences for SMEs and overall welfare. The findings further reveals that access to credit further increases SME's risk-bearing abilities; improve risk-copying strategies and enables consumption smoothing overtime. Rhyme and Otero (1992) found out that microfinance institutions that are financially sustainable with high outreach have a greater livelihood and also have a positive impact on business creation and development because they guarantee sustainable access to credit. Moreover, Zeller and Sharma (1998) opine that microfinance can aid in creation and growth of family enterprise, potentially making the difference between alleviating poverty and economically secure life. However, Burger (1989) argues that microfinance tends to stabilize rather than increase income and tends to preserve rather than create jobs. On the other hand, Buckley (1997) submitted that there was little evidence to suggest that any significant and

sustained impact of microfinance services on clients in terms of SME development, increased income flows or level of employment.

### **Methodology and Model Specification**

This study adopts the framework of non-linear autoregressive distributed lag model (ARDL) for the following reasons. *First*, ARDL model (see eq. 2 below) allows for both the static and dynamic effect(s) of the independent variable(s) on the dependent variable unlike a static model that accounts for static or fixed effect(s) only. *Also*, ARDL framework offers a technique for checking the existence of a long-run relationship between variables, and that is referred to as the *Bounds test*. Bounds test is flexible as it accommodates both stationary and integrated series unlike other tests of cointegration, such as, Engle-Granger and Johansen tests, which considers only non-stationary series that are integrated of the same order.

Before model estimation using the ordinary least squares (OLS) technique, it is important to check the time-series properties such as unit root and cointegration to avoid estimating spurious regression. To achieve this, the present study adopts the Augmented Dickey-Fuller (ADF) and Phillip-Perron (PP) unit root tests, and the Bounds test for cointegration. The ADF and PP unit root tests are conducted to check if series are stationary or not. The null hypothesis in both cases is that a series has a unit root or is nonstationary. If the test statistic is greater, in absolute terms, than the critical values at any chosen level of significance, the null hypothesis is rejected; otherwise, we will fail to reject the null hypothesis of a unit root. Similarly, the Bounds test for cointegration tests the null hypothesis that there is no cointegration between output growth and its possible determinants (including, commercial banks' loan to sectors, liquid liabilities, gross capital formation, and trade openness) in Nigeria. To conclude the presence or absence of cointegration, there is need to compare the computed F-stat with the critical bound values, that is, I0 bound (the lower bound) and I1 bound (the upper bound) at any chosen level of significance. If the F-stat is less than the I0 critical value at any chosen level of significance, then there is no cointegration. However, if the F-stat is greater than the I1 critical value at any chosen level of significance, then there is cointegration. However, if the F-stat lies between the I0 and I1 critical values at all levels of significance, then the test result is inconclusive.



The present study modifies the model of Farabiyi (2016). The model for this study is therefore stated as follows:

$$LRPCI_t = \beta_0 + \beta_1 LLOAN_t + \beta_2 LLT_t + \beta_3 GCF_t + \beta_4 TOP_t + \varepsilon_t \quad (1)$$

Following Pesaran et al (2001), the ARDL version is written as:

$$\begin{aligned} \Delta LRPCI_t = & \gamma_1 LRPCI_{t-1} + \gamma_2 LLOAN_{t-1} + \gamma_3 LLT_{t-1} + \gamma_4 GCF_{t-1} + \gamma_5 TOP_{t-1} + \\ & \sum_{i=1}^{p-1} \delta_i \Delta LRPCI_{t-i} + \sum_{j=0}^{q_1-1} \theta_j \Delta LLOAN_{t-j} + \sum_{j=0}^{q_2-1} \mu_j \Delta LLT_{t-j} + \\ & \sum_{j=0}^{q_3-1} \pi_j \Delta GCF_{t-j} + \sum_{j=0}^{q_4-1} \varphi_j \Delta TOP_{t-j} + \epsilon_t \end{aligned} \quad (2)$$

The error correction representation is generated below:

$$\begin{aligned} \Delta LRPCI_t = & \gamma_1 (LRPCI_{t-1} - \left[ -\frac{\gamma_2}{\gamma_1} LLOAN_{t-1} - \frac{\gamma_3}{\gamma_1} LLT_{t-1} - \frac{\gamma_4}{\gamma_1} GCF_{t-1} - \frac{\gamma_5}{\gamma_1} TOP_{t-1} \right]) + \\ & \sum_{i=1}^{p-1} \delta_i \Delta LRPCI_{t-i} + \sum_{j=0}^{q_1-1} \theta_j \Delta LLOAN_{t-j} + \sum_{j=0}^{q_2-1} \mu_j \Delta LLT_{t-j} + \\ & \sum_{j=0}^{q_3-1} \pi_j \Delta GCF_{t-j} + \sum_{j=0}^{q_4-1} \varphi_j \Delta TOP_{t-j} + \epsilon_t \end{aligned} \quad (3)$$

By letting,

$$ECT = LRPCI_{t-1} - \rho_1 LLOAN_{t-1} - \rho_2 LLT_{t-1} - \rho_3 GCF_{t-1} - \rho_4 TOP_{t-1} \quad (4)$$

$$\text{Where, } \rho_1 = -\frac{\gamma_2}{\gamma_1}, \rho_2 = -\frac{\gamma_3}{\gamma_1}, \rho_3 = -\frac{\gamma_4}{\gamma_1}, \rho_4 = -\frac{\gamma_5}{\gamma_1} \quad (5)$$

Eq. (3) therefore becomes:

$$\begin{aligned} \Delta LGDP_t = & \gamma_1 ECT + \sum_{i=1}^{p-1} \delta_i \Delta LRPCI_{t-i} + \sum_{j=0}^{q_1-1} \theta_j \Delta LLOAN_{t-j} + \sum_{j=0}^{q_2-1} \mu_j \Delta LLT_{t-j} + \\ & \sum_{j=0}^{q_3-1} \pi_j \Delta GCF_{t-j} + \sum_{j=0}^{q_4-1} \varphi_j \Delta TOP_{t-j} + \epsilon_t \end{aligned} \quad (6)$$

### Description of Terms

*ECT* Is the error correction term, with its associated coefficient ( $\gamma_1$ ) being the adjustment parameter. It measures the speed at which the dependent variable (which in this case is real GDP per capita) adjusts from its short-run fluctuations to its long-run equilibrium value. The convergence criteria hold that the adjustment parameter is negative, less than 1 in absolute value, and statistically significant at any of the conventional levels. *LRPCI* is the natural log of real GDP per capita (a proxy for inclusive growth), *LLOAN* is commercial banks' loan to sectors (a proxy for entrepreneurial financing), *LLT* is liquid liabilities, % of GDP (a proxy for financial depth), *GCF* is gross capital formation (a proxy for domestic investment), *TOP* is trade openness (%),  $\Delta$  is the first difference operator,  $\delta_i$ ,  $\theta_j$ ,  $\mu_j$ ,  $\pi_j$ ,  $\varphi_j$  are short-run

parameters while  $\rho_1, \rho_2, \rho_3, \rho_4$  are long-run parameters,  $p - 1$  is the maximum lag length for the dependent variable whereas  $q_j - 1$  for  $j = 1, 2, 3, 4$  are the maximum lag lengths for the explanatory variables, and  $\epsilon_t$  is the error term, with “ $t$ ” signifying the time dimension.

### **A priori Expectations**

With respect to eq. (6), the restrictions on the short-run and long-run coefficients are as follows:

$$\delta_i > \text{or} < 0; \theta_j > 0 \text{ and } \rho_1 > 0; \mu_j > 0 \text{ and } \rho_2 > 0; \pi_j > 0 \text{ and } \rho_3 > 0; \varphi_j < 0 \text{ and } \rho_4 < 0$$

### **Data and Empirical Analysis**

#### *1.1 Data Description and Sources*

This study is focused on the Nigerian economy with data scope ranging from 1981 to 2016. The data on variables including real GDP per capita, trade openness, and gross capital formation were obtained from World Bank’s World Development Indicators (WDI, 2017). The data commercial banks’ loan to sectors were sourced from the Central Bank of Nigeria’s Statistical Bulletin (CBN, 2016), while the data on liquid liabilities were collected from the financial structure dataset as updated by Beck et al. in September, 2015. A five-year moving average is taken to obtain the value of liquid liabilities for 2016.

#### *1.2 Descriptive Statistics*

Table 1 below describes the statistical features inherent in the variables used in this study. The average values of the natural log of real GDP per capita, the natural log of commercial banks’ loan to sectors, liquid liabilities, % of GDP, and gross capital formation, % of GDP are, approximately 10.01%, 26.58%, 23.33%, 12.67%, and 50.69%, respectively. In terms of standard deviation and coefficient of variation, the most volatile series is gross capital formation, while the least volatile series is the natural log of commercial banks’ loan to sectors. With respect to Jarque-Bera statistic, all variables except gross capital formation are normally distributed since the associated probabilities are greater than 0.1. These incoherent statistical features across the variables necessitate further investigation of time-series properties in the data including unit root and cointegration tests, which are addressed by subsequent sections.

**Table 1:** Summary Statistics

Variable	Obs.	Mean	Standard deviation	Coefficient of variation (%)	Jarque-Bera stat
<i>LRPCI</i>	36	10.009	2.300	22.979	2.773[0.249]
<i>LLOAN</i>	36	26.581	2.607	9.808	3.312[0.191]
<i>LLT</i>	36	23.327	6.699	28.718	4.397[0.111]
<i>GCF</i>	36	12.668	6.053	47.782	41.526[0.000]
<i>TOP</i>	36	50.698	16.556	32.656	1.561[0.458]

**Note:** The values in block bracket [ ] are probabilities.

**Source:** Author's computation.

### 1.3 The Unit Root Test Results

The results of unit root tests are shown in Table 2. For robustness sake, two test approaches including the augmented Dickey-Fuller (ADF) test and Phillip-Perron (PP) test are employed. Also, three test regressions comprising models with intercept and trend, with intercept, and with none are explored, but only test regressions that have test statistics close to rejecting the null hypothesis of non-stationarity are presented. Results indicate that that only gross fixed capital formation is stationary at levels and it is said to be integrated of order zero, while the remaining four variables become stationary after first differencing; hence, the latter are said to be integrated of order one.

**Table 2:** Results of Unit root Tests

Variable	ADF test		Phillips-Perron test		I(d)
	Level	1 <sup>st</sup> Difference	Level	1 <sup>st</sup> Difference	
<i>LRPCI</i>	-1.624 <sup>a</sup>	-5.450 <sup>a***</sup>	-1.863 <sup>a</sup>	-5.442 <sup>a***</sup>	I(1)
<i>LLOAN</i>	-1.949 <sup>a</sup>	-5.203 <sup>a***</sup>	-1.949 <sup>a</sup>	-5.207 <sup>a***</sup>	I(1)
<i>LLT</i>	-2.735 <sup>a</sup>	-6.049 <sup>a***</sup>	-2.623 <sup>a</sup>	-8.976 <sup>a***</sup>	I(1)
<i>GCF</i>	-4.460 <sup>b***</sup>	----- †	-4.269 <sup>b***</sup>	-----	I(0)
<i>TOP</i>	-2.245 <sup>b</sup>	-8.192 <sup>b***</sup>	-2.187 <sup>b</sup>	-8.269 <sup>b***</sup>	I(1)

**Note:** \*\*\*, \*\*, \* indicate the rejection of the null hypothesis of a unit root at 1%, 5% and 10%, respectively; I(d) is the order of integration, where 'd' refers to the number of differencing required for a series to become stationary; † implies that a series that is stationary at levels does not require its first difference being reported; a and b denote model with intercept and trend and model with intercept only, respectively.

**Source:** Author's computation.

#### 1.4 The ARDL Bounds cointegration Test

Table 3 shows the result of ARDL Bounds cointegration test, which becomes appropriate since this study employs a combination of stationary and non-stationary variables. Since the F-statistic is less than the lower critical (I0) bound, it can be concluded that exists no long-run equilibrium relationship between output growth and its possible determinants (namely commercial banks' loan to sectors, liquid liabilities, gross capital formation and trade openness) in Nigeria. By implication, only a short-run or an ARDL model of growth is estimated in the next section.

**Table 3:** Result of Bounds Cointegration Test

Growth model: $LRPCI = f(LLOAN, LLT, GCF, TOP)$		
F-statistic	1.019	
Critical values		
Significance	I0 Bound	I1 Bound
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

**Source:** Author's computation.

#### 1.5 The Regression Results

Table 4 presents the results of the autoregressive distributed lag (ARDL) estimates of growth determinants. It can be observed that the coefficient of autocorrelation between the current value of output growth and its previous values is positive overall and also statistically significant at 1% level of significance. Similarly, as a way to encourage entrepreneurship across sectors, commercial banks' loan to sectors has a positive impact on output growth, and the impact coefficient (0.165) implies that for every 1% increase in the loan, real GDP per capita increases on average by 0.165%. This implies the employment elasticity of sectors could be enhanced if the much needed funds are made available. This result parallels the findings of Farabiyyi (2016).

On the whole, financial depth as measured by liquid liabilities has a negative impact on output growth. Results also show that liquid liabilities have instantaneous and lag effects on output

growth as the associated impact coefficients are individually significant at 1% level of significance. As expected, gross capital formation has an overall positive impact on output growth, and the associated instantaneous and lag impact coefficients are statistically significant at 10% and 5%, respectively. Contrarily, trade openness has a positive and insignificant effect on output growth in Nigeria. In addition, the adjusted  $R^2$  and F-statistic indicates that high explanatory power and overall significance of the short-run growth model attributed to variables including commercial banks' loan to sectors, liquid liabilities, gross capital formation, and trade openness. Similarly, the result of post-estimation tests indicate that the estimated short-run growth model is free of violations such as wrong functional form, non-normality in the residuals, serial correlation in the residuals, and non-constant residual variance.

**Table 4:** ARDL Estimates of Growth Determinants

Dependent variable	$LRPCI_t$
$LRPCI_{t-1}$	1.416****( 0.130)
$LRPCI_{t-2}$	-0.619*** ( 0.126)
$LLOAN_t$	0.165** ( 0.076)
$LLT_t$	-0.035*** ( 0.004)
$LLT_{t-1}$	0.047*** (0.006)
$LLT_{t-2}$	-0.024*** ( 0.005)
$GCF_t$	-0.013* ( 0.007)
$GCF_{t-1}$	0.015** ( 0.006)
$TOP_t$	0.001(0.001)
$C$	-2.120** ( 0.971)
Adjusted $R^2$	0.998
F-stat	2273.437[0.000]
Ramsey RESET linearity test	0.409[0.686]
Jarque-Bera normality test	1.849[0.397]
Breusch-Godfrey serial correlation LM test	1.603[0.224]
Breusch-Pagan-Godfrey heteroscedasticity test	1.074[0.416]

**Note:** \*\*\*, \*\*, \* indicate the statistical significance of coefficients at 1%, 5% and 10% respectively; the values in parentheses and block brackets are, respectively, the standard errors and the probabilities; RESET implies Regression Error Specification Test.

**Source:** Author's Computation



## Conclusion

This study investigated the role in entrepreneurship in inclusive growth in Nigeria between 1981 and 2016. Data were collected from secondary sources namely Central Bank of Nigeria's Statistical Bulletin (CBN, 2016) and World Bank's World Development Indicators (WDI, 2017). The study differs from previous studies as it employed the autoregressive distributed lag (ARDL) modeling framework. Owing to the absence of a long-run relationship between output growth and its possible determinants in Nigeria, only the short-run estimates were reported. Results showed that entrepreneurial financing in terms of commercial banks' loan to sectors has increasing employment elasticity; hence entrepreneurship is found to be a major positive driver of inclusive growth in Nigeria if well financed. Similarly, over the short term, financial depth (measured by liquid liabilities) contributed significantly in dampening inclusive growth, while gross capital formation had an overall positive and significant on inclusive growth. Trade openness appeared as the only insignificant determinant of inclusive growth in Nigeria. Based on these findings, it is suggested that the Nigerian government and policy makers re-strategize efforts in tapping the employment potential of entrepreneurship by making funds available at the lowest possible cost to genuine business owners across the various sectors of the economy; this would in turn lead to a kick-off of increased investment activities with the attendant positive growth effect. Also, the nation's financial sector should be strengthened in order to make it impact positively on growth.

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## DOES TRADE LIBERALIZATION RESULT TO INCREASED OUTPUT IN NIGERIA'S AGRICULTURAL SECTOR?

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### Abstract

This study is an inquiry into whether or not trade liberalization has increased agricultural output in Nigeria. The study used multiple regression analysis under the frame work of the Ordinary Least Square (OLS) estimation technique to analyse the data which were obtained from the Central Bank of Nigeria Statistical Bulletin various issues and National Bureau of Statistics 2017 publication for the period 1970 - 2017. It is found that trade liberalization has a significant impact on agricultural output in Nigeria. Liberalization increased the demand for agricultural products, thus, encouraged agricultural production. Conclusion reached is that trade liberalization promotes agricultural output in Nigeria. Thus, it is recommended for the managers of the economy to direct policies towards promoting external trade. But this should be done with caution with a view to protecting the local industries that use agricultural outputs as raw materials.

**Key words:** Nigeria, Trade liberalization, Agricultural output

### Introduction

The economic benefits of the agricultural sector to any economy, especially to the Nigerian economy can never be over emphasized. The agricultural sector is seen as the major supplier of food and the needed raw inputs for smooth operation of both the industrial and manufacturing sectors, which are key to the development of any economy. Thus, growth in agricultural output creates higher average incomes and therefore enables consumers to enjoy more goods and services and better standards of living Tejvan (2015).

According to *Szirmai* (2015), an Increase in agricultural output leads to an agricultural surplus and enables lower food prices, which determines wage costs and global competitiveness. Agricultural output growth has strong growth linkages to other sectors of

the economy. When income from growing agricultural output is spent on domestically produced tradable goods and services, it stimulates demand for domestic industry and services which contributes to the aggregate output growth Tejvan (2015). It is a common fact that the poorest countries are invariably the least in agricultural output growth and the developed economies are at the upper end of the scale.

However, significant growth in agricultural output is often associated with countries embracing globalization and increasing openness to the international exchange of goods and services as well as ideas and technologies. In Nigeria, Trade was liberalized in the last quarter of 1986 (Karimo, 2014). With the liberalization of trade and the continuous policies of government to further opening trade to the rest of the world, one expects that competition will increase and domestic production will be enhanced with expanded production possibility frontiers leading to steady output growth in line with predictions of conventional trade theories such as the Classical Ricardian theory and the Heckscher-Ohlin theory. Again, an enlarged market for domestic agricultural and industrial outputs was expected to have been made possible through trade liberalization which could lead to an increased investment and aggregate output and income. The country is still in the class of developing nations with low output growth compared to developed economies and even other African nations such as South Africa. Both industrial and agricultural output are still very low and they contribute insignificantly to GDP. Also, Andersen and Babula (2008), opined that the expected positive relationship between liberalization and output growth may not be applicable to every nation. Therefore, policy makers should not open up to world trade in a hurry. This necessitates the investigation of empirical relationship between trade liberalization and growth in agricultural output in Nigeria.

The paper is targeted to achieving the following objective;

- a. Examine the impact of trade liberalization on growth in agricultural output in Nigeria

The hypothesis to be tested is;

- a.  $H_0$  : Trade liberalization has no significant impact on agricultural output in Nigeria

### **Theoretical Underpin**

### **Heckscher-Ohlin Theory**

The study uses the Heckscher-Ohlin trade theory as its framework. The Heckscher-Ohlin trade theory seeks to explain the pattern of international trade as determined by the relative factors of production existing in countries. This theory postulates that, trade arises from differences in comparative costs which in turn arise from inter-country differences in relative factor endowments. This means that countries should make use of locally abundant factors to produce export goods and import goods that are locally scarce. By implication the emphasis of this theory is that countries should rely on factor endowment. This links international trade to the international movement of labour and capital. The theory is based on the following assumptions; (1) there are no transport costs and impediments to trade, (2) there is also perfect competition in commodity and factor markets, (3) all production functions are homogeneous of the first degree, (4) the production functions are such that the two commodities show different factor intensities, (5) the production functions differ between commodities, but are the same in both countries Egai (2004).

It is the belief of many economists that the Heckscher-Ohlin model is an improvement on the Ricardian theory of comparative advantage. Comparative advantage theory is absorbed in the Heckscher-Ohlin model in that it began with the comparative advantage and goes beyond it to link the pattern of international trade to the economic structure of trading nations.

Heckscher-Ohlin model was tested by Leontief through a study on the United States. His view was that a country that is rich in capital will export capital intensive goods and import labour intensive goods. He tested his hypothesis using an input-output table for the US in 1947 and concluded that export industries use relatively more labour than import industries. By his result the US tends to export more labour intensive goods than capital intensive goods. Several authors reacted to his conclusion. They argued that the test was done when US trade policy was highly protected and considered it as quirk in nature. He was also criticized on the accuracy of his data Egai (2004).

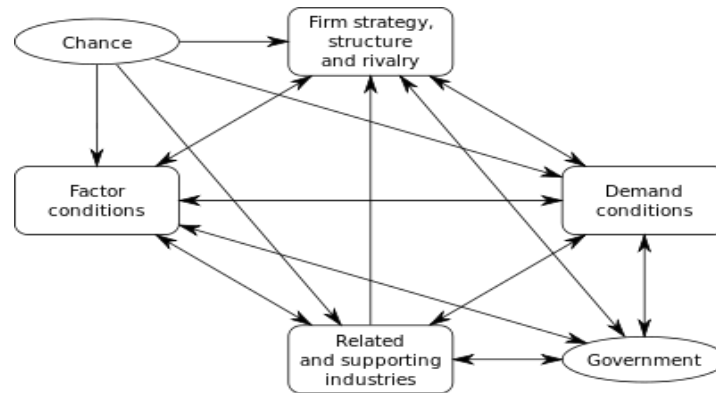
### **Porter's Theory**

Whereas the traditional trade theories define factor conditions as land, labour and capital (including human capital), Porter (1990a) distinguishes between the following



categories: human resources, physical resources, knowledge resources, capital resources and infrastructure.

Porter's theory of competitive advantage suggests that the pattern of trade is influenced by four attributes, which is also referred to as Porter's diamond model.



Source: adopted from Egai (2004)

Figure 2.1: The Porter's Diamond

- Factor conditions are human resources, physical resources, knowledge resources, capital resources and infrastructure. Specialized resources are often specific for an industry and important for its competitiveness. Specific resources can be created to compensate for factor disadvantages.
- Demand conditions in the home market can help companies create a competitive advantage, when sophisticated home market buyers pressure firms to innovate faster and to create more advanced products than those of competitors.
- Related and supporting industries can produce inputs that are important for innovation and internationalization. These industries provide cost-effective inputs, but they also participate in the upgrading process, thus stimulating other companies in the chain to innovate.
- Firm strategy, structure and rivalry constitute the fourth determinant of competitiveness. The way in which companies are created, set goals and are managed is important for success. But the presence of intense rivalry in the home base is also important; it creates pressure to innovate in order to upgrade competitiveness.

- The government can influence each of the above four determinants of competitiveness. Clearly stated, the government can influence the supply conditions of key production factors, demand conditions in the home market, and competition between firms. Government interventions can occur at local, regional, national or supranational level.
- Chance events are occurrences that are outside of control of a firm. They are important because they create discontinuities in which some gain competitive positions and some lose.

The Porter (1990) thesis is that these factors interact with each other to create conditions where innovation and improved competitiveness occurs. The four attributes are called Porter's diamond. He called them the attributes of a nation that constitute the diamond of national advantage. There are two types of competitive advantages for firms:

1. Efficiency: this relates to relative cost of production.
2. Differentiation: this relates to the uniqueness of the product.

The sources of competitive advantage include the following:

(a) production, (b) purchasing, (c) financing (d) distribution, (e) advertising and sale.

Porter argued that a nation which invests in advanced factors (sophisticated labour and technology) has domestic customers who are sophisticated and demanding, has suppliers or related industries that are internationally competitive and appropriate firm strategy and a vigorously domestic rivalry (a competitive market structure) will enhance a nation's competitive advantage.

### **Empirical Literature**

Many studies provide evidence that liberalization has a positive effect on gross domestic product (GDP) growth. On the other hand, some studies report negative relationship between liberalization and growth. These studies include the study by Rodriguez (2006), which critically argue that trade is mostly uncorrelated with growth, while the trade shares can correlate with income levels and growth rates. But the complexity of links of causality

and endogeneity among trade shares, growth and other sources of growth makes it difficult to define a strong effect of openness on economic growth.

Jean-Christophe Bureau, Hussain and Sebastein (2017), using a decomposition of the changes in various types of tariffs to take stock of developments regarding import protection in the agricultural sector found that the multilateral system has played a limited role in trade liberalization.

Similarly, Anowor et al (2013) studied the impact of trade liberalization on the Nigerian agricultural performance. They employed the Error Correction Model and found that agricultural capital formation, real exchange rate and foreign direct investment on agriculture in Nigeria are key in enhancing increased output and exportation of agricultural products.

Also, Usman et al (2010) in their study on agricultural trade liberalization and food security in Nigeria for the period 1981 to 2003 observed that despite the several policy measure measures to enhance food production, the demand for food has consistently outplayed supplied with increasing number of people becoming more vulnerable. Thus, recommended for measures to mitigate the adverse effects of trade liberalization on domestic food security. SCBD (2005) in their study on the impact of trade liberalization on agricultural biological diversity disclosed that reducing trade-distorting domestic support is a vital element in liberating agricultural trade.

Ekpo and Egwaikhide (1994) also examined the relationship between trade openness and economic growth in Nigeria from 1970-1996. They found a negative relationship between trade openness and economic growth. Olomola (1998) used the endogenous growth model to explore the long-run relationship between openness and economic growth. He adopted Dickey-Fuller and Augmented Dickey-Fuller test to examine the stationarity of the variables. Openness was proxied by export/GPD and total trade/GDP for sample period of 1960 to 1998, he found that total trade/GDP, has no significant relationship with long run growth in Nigeria.

Likewise, Ogujiuba, Oji and Adenuga (2004) tested the validity of trade openness for Nigeria's long-run growth using a co-integration approach. They preferred the VAR approach for some reasons and their econometric results show that there is no significant

relationship between openness and output growth, and that unbridled openness could have deleterious implications for growth of local industries, the real sector and government revenue.

On studies that relate to Africa and Nigeria in specific, Sarkar (2007) examines the relationship between openness (trade-GDP ratio) and growth. The cross-country panel data analysis of a sample of 51 countries of the South during 1981-2002 shows that for only 11 rich and highly trade-dependent countries a higher real growth is associated with a higher trade share. Time series study of individual country experiences shows that the majority of the countries covered in the sample including the East Asian countries experienced no positive long-term relationship between openness and growth during 1961-2002. He finds that the experience of various regions and groups shows that only the middle income group exhibited a positive long-term relationship.

### **Methodology and Data**

Multiple regression analysis under the frame work of the Ordinary Least Square (OLS) estimation technique was used to analyze the data which were obtained from the Central Bank of Nigeria Statistical Bulletin various issues and National Bureau of Statistics 2017 publication. The annual time series data covered the period 1970-2017. Estimation began with analyses of the data. This is followed by test for unit root, adopting the Augmented Dickey Fuller (ADF) unit root test procedure to avoid misleading result. Co-integration test was also conducted to check the existence of a long-run equilibrating relationship among the variables in our model in section 3.2. Finally, the Durbin-Watson test shall be used to examine the models for autocorrelation.

### **Model Specification**

The functional form of the model specified to capture the objective of the paper is as follows:

$$AOG = f(TL, GCF, FDI, ER) \quad . \quad . \quad . \quad (3.1)$$

Where:

AOG = Index of Agricultural output as a proxy for the performance of the agricultural sector

TL = Degree of trade liberalization measured by the ratio of total trade to GDP

GCF = gross capital formation in the agricultural sector

FDI = foreign direct investment into the agricultural sector and

ER = real exchange rate

Mathematically, the above functional relationship expressed in equation 3.1 can be expressed as;

$$AOG_t = \varphi_0 + \varphi_1 TL_t + \varphi_2 GCF_t + \varphi_3 FDI_t + \varphi_4 ER_t \dots (3.2)$$

The econometric model for estimating equation 3.2 is:

$$AOG_t = \varphi_0 + \varphi_1 TL_t + \varphi_2 GCF_t + \varphi_3 FDI_t + \varphi_4 ER_t + u_{1t} . \quad . \quad . \quad (3.3)$$

Where  $u_{It}$  is the error term,  $\varphi_1$ ,  $\varphi_2$ ,  $\varphi_3$  and  $\varphi_4$  are parameters to be estimated.

## Unit Root Test

The ADF unit root test equation for equation 3.1 is presented below;

$$\begin{aligned} \Delta AOG_t = & \beta + \delta t + \theta AOG_{t-1} + \sum_{i=1}^m \pi_i \Delta TL_{t-i} \\ & + \sum_{i=1}^q \gamma_i \Delta GCF_{t-i} + \sum_{i=1}^q \sigma_i \Delta FDI_{t-i} + \sum_{i=1}^q \Phi_i \Delta ER_{t-i} \\ & + \varepsilon_{2t} \dots\dots\dots \end{aligned} \quad (3.4)$$

$$\begin{aligned} \Delta\Delta AOG_t = & \beta + \delta t + \theta AOG_{t-1} + \sum_{i=1}^m \pi_i \Delta\Delta TL_{t-i} \\ & + \sum_{i=1}^q \gamma_i \Delta\Delta GCF_{t-i} + \sum_{i=1}^q \sigma_i \Delta\Delta FDI_{t-i} + \sum_{i=1}^q \Phi_i \Delta\Delta ER_{t-i} \\ & + \varepsilon_{3t} \dots\dots\dots (3.5) \end{aligned}$$

*Equation 3.5 is necessary if the variables are non-stationary at level form.*



*Note AOG, TL, GCF, FDI and ER are as defined above. Also,  $q$  is the maximum lag length and it is determined empirically by the lag order selection criteria such as the Swartz Bayesian information criterion (SBIC), the Akaike information criterion (AIC) and the Hannan Quinn information criterion (HQIC).*

### Estimation Output and Analysis

The mean AOG over the period of the study is 124.0943, while TL, GCF, FDI and ER are 526.6148, 574985.2, 851892.5 and 73.8925 respectively. The standard deviation of ER reveals that its value in the data set is close to the mean. While the standard deviation values of AOG, TL, GCF, and FDI shows that the values in the data set are farther away from the mean. All the variables are positively skewed as indicated by the positive skewness coefficients. Also, at the 5 percent level, all the variables are significant. Thus we reject the hypothesis of normality for all the variables. Thus, we conclude that the variables are not normally distributed.

**Table 4.1:** Mean, Standard Deviation Maximum Values and Minimum Values of the Variable

Variables	Mean	Standard Deviation	Minimum value	Maximum value
AOG	124.0943	70.19795	55.16	302.11
TL	526.6148	728.8293	7.24	2455.66
GCF	574985.2	1240074	130.7	5991400
FDI	851892.5	2411317	-404.1	1.10e+07
ER	73.8925	40.1491	0.74	113.2

Source: Author's Computation

**Table 4.1b:** Skewness and Kurtosis

Variables	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	p-value
AOG	0.0094	0.6452	6.40	0.0408
TL	0.0009	0.3309	9.96	0.0069
GCF	0.0000	0.0000	35.16	0.0000
FDI	0.0000	0.0000	37.54	0.0000
ER	0.0171	0.0451	8.36	0.0153

Source: Author's Computation

#### 4.1 Tests for Stationary

The results regarding the stationarity properties of the data and the order of integration of the series have been determined by Augmented Dickey Fuller (ADF) test which is presented below.

Table 4.2: Augmented Dickey – Fuller Unit Root Test Results

Variable	ADF – Statistic		Model	Lag order at level	Lag order at 1 <sup>st</sup> diff.	~I(d)
	Level	1 <sup>st</sup> Difference				
AOG	-0.217	-4.153*	Drift	3	3	I(1)
TL	-0.976	-2.976*	No constant	3	3	I(1)
GCF	-1.190	-2.167*	Drift	3	3	I(1)
FDI	-0.296	-4.490*	Drift	3	3	I(1)
ER	-1.962	-4.585*	Drift	3	3	I(1)

Where \* denotes significance at 5% and the rejection of the null hypothesis of presence of unit root. The optimal lag lengths were chosen according to Akaike's final Prediction Error (FPE) criterion (presented in Appendix B1). The critical value at level is -1.679 while the critical value at 1<sup>st</sup> difference is -1.674

Source: Author's Computation.

Since all the variables are integrated of the same order, there is a possibility of long run relationship among the variables. However, we can only be sure if empirically confirmed. For this reason, the variables are further subjected to cointegration test and the results are presented in the next Section.

#### 4.2 Cointegration Test

A test for cointegration is conducted to confirm whether or not long run relationship exists between the explanatory variables and the dependent variable in equations (3.3). The result of the test is presented in Tables 4.2 below. The results revealed three cointegrating equations between Agricultural Output Growth (AOG), Trade Liberalization (TL), Gross Capital Formation (GCF), Foreign Direct Investment (FDI) and Exchange Rate (ER). This is an indication of the presence of a long-run relationship between the explanatory variable and the dependent variable in equation (3.3)

**Table 4.3:** Results of Johansen test for cointegration between AOG, TL, GCF, FDI, and ER

Maximum Rank	Eigenvalue	Trace Statistics	5% critical value
0	.	130.0600	59.46
1	0.84290	52.3233	39.89
2	0.43858	28.0770	24.31
3	0.33277	11.0833*	12.53
4	0.18996	2.2348	3.84
5	0.05182	-	-

Source: author's computation

The result in table 4.3 above means that the error and short run disturbances that cause the variables to deviate from long-run equilibrium paths could be corrected and, there is the tendency that they will converge and adjust back to the long-run equilibrium but the speeds at which this adjustment take place can only be determined by the coefficient of adjustment in the error correction model. This therefore, necessitates estimating an error correction model.

## Discussion of Results

The error correction model was estimated and the results are shown in Appendix, Table A. The coefficient of adjustment (ECM) for the model was found to be negative as expected. The results revealed that with short-run fluctuations, AOG, TL, GCF, FDI and ER converge to its long run equilibrium path at the speed of 26.1 percent per annum.

Equation (3.3) specified in line with the objective of this study was estimated using the Ordinary Least Square procedure. The results are presented in Table 4.3. All the coefficients are positive except exchange rate. The results revealed that trade liberalization has positive impact on agricultural output growth in Nigeria. Increase in agricultural output resulting from trade liberalization is significant at 5 percent, as shown by the high t-statistics (3.75) and low probability value (0.000). This result points to the clear rejection of the hypothesis that trade liberalization has no significant impact on agricultural output in Nigeria. Thus, trade liberalization has a significant impact on agricultural output in Nigeria. It determines significantly the agricultural output of Nigeria. Trade liberalization facilitates increased demand for agricultural products, thus rising agricultural production and output.

**Table 4.4:** Estimation results for Agricultural Output; Dependent Variable AOG

AOG	coefficients	Standard Errors	t-Statistic	P-value
TL	0.0055	0.0014666	3.75	0.000
GCF	4.22	1.43537	2.94	0.007
FDI	1.11	0.41729	2.66	0.009
ER	-0.099	0.03498	-2.83	0.006
Constant	5.150	1.69967	3.03	0.004
R-Squared		0.7469		
Adj. R-Squared		0.6534		
F(4, 38)		55.647 (0.000)		
Durbin-Watson d-statistic (5, 43)		1.520581		
Breusch-Godfrey LM chi2		1.281 (0.1122)		
Ramsey RESET F (3, 35)		2.27 (0.0980)		
Breusch-Pagan / Cook-Weisberg chi2(1)		0.02 (0.8770)		

Source: Authors' computation

Similarly, gross capital formation and foreign direct investment in the agricultural sector increase agricultural output. An increase in gross capital formation and foreign direct investment increase agricultural output by 4.22 and 1.11 units, respectively. They also significantly determine Nigeria's agricultural output. This is revealed by the respective low probability values and high t-statistics. On the other hand, exchange rate reduces agricultural output. If rate of exchange increases by ₦1, agricultural output reduces by about 0.1. This result is similar to the findings of Seetanah, Matadeen, and Matadeen (2012) who examined the relationship between trade openness and economic performance in selected African countries that the relationship between trade openness and economic growth is positive and statistical significant for developing countries.

The coefficient of determination is 0.7469, indicating that the variables in the model explained about 74.69 percent change in agricultural output. In other words, 74.69 percent change in the growth rate of agricultural output in Nigeria is determined by trade liberalization, gross fixed capital formation, foreign direct investment and exchange rate. The significant F-statistics means that the explanatory variables jointly and significantly determine agricultural output. The Durbin-Watson d-statistic points to no autocorrelation. This is further confirmed by the insignificant Breusch-Godfrey LM  $\chi^2$  value of 1.281 (0.1122), indicating no serial correlation. In addition, the test for omitted variables indicates that there are no omitted variables in our model. This is evidenced by the Ramsey RESET F (3, 35) value of 2.27 (0.0980). Therefore, the model is properly specified with the right set of variables included; and the Breusch-Pagan and Cook-Weisberg test for heteroskedasticity revealed constant variance as shown in Table 4.4. Thus the use of OLS technique is appropriate.

### **Summary, Conclusion and Recommendations**

Summarily, this study found that trade liberalization has a significant impact on agricultural output in Nigeria. It increased the demand for agricultural products, therefore encouraged agricultural production. This corroborates the findings of Anowor et al (2013). Also, it was discovered that an increase in the rate of exchange discouraged import generally, and consumers shifted to demand for local goods. The increased demand for made in Nigeria products actually leads to increase in output. This as refutes Anowor et al (2013), discovery

as their shows a positive relationship between real exchange rate and trade liberalization. Similarly, foreign direct investment increased output generally.

From the findings in this study, we conclude that trade liberalization promotes agricultural output in Nigeria. Trade with other countries had increased demand for Nigerian agricultural products and had improved agricultural output. In general, trade liberalization has significant positive impact on Nigeria's agricultural output. It is thus, recommended for the mmanagers of the economy to direct policies towards promoting external trade to further boost agricultural output in Nigeria. But this should be done with caution with a view to protecting the local industries that use agricultural outputs as raw materials.

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THE INTERNATIONAL CENTER  
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19 – 20 Nov 2018; SUBR Louisiana, USA.

### Genetic Control Of Water Hyacinth In Lake Geriyo For Sustainable Development In Adamawa State, Nigeria

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#### Abstract

Water hyacinth, *Eichhornia crassipes* (Mart.) is the world's most noxious aquatic weed which has attracted worldwide attention due to its fast spread and congested growth. Infestation of Water hyacinth a growing problem in Lake Geriyo Adamawa State Nigeria, causes environmental, economic and social problems with accumulated damages that can easily be valued in the order of millions of naira. It has spread and established throughout Lake Geriyo, a lake that serves as one of the major areas of activities for the Upper Benue River Basin Development Authority, a parastatal under the Federal Ministry of Agriculture and Water Resources causing serious socio-economic and environmental problems for millions of people in this community resulting in a constraint on sustainable development with enormous economic losses and environmental degradation in Adamawa state. Many resident and migrant fishermen derive their means of livelihood from catches within the lake. This may cause hindrance to sustainable development as the erratic supply of pipe borne water in Yola, as in most places in Nigeria, the lake serves as a direct source of usable water for the surrounding communities. The attendant problems that come with water hyacinth infestations cause the dwellers of Lake Geriyo communities to suffer many social, health, and economic problems. Concerted efforts must be made to safeguard Geriyo Lake from being taken over by water hyacinth. All efforts to control its growth and spread, including physical, chemical and biological methods have failed miserably or are too expensive to carry out on a regular basis water-hyacinth infestation keeps getting worse despite the three types of concerted control efforts. Hence the concept of eradication through possible genetic means became imperative. The present investigation desires to dig deeper into the possible reasons for the weed's rapid proliferation in the aquatic environment. Flower buds were; collected, anthers dissected, fixed in Carnoy's fluid, preserved in 70% alcohol, stored in a refrigerator. For chromosome analysis, anthers were stained and squashed directly in 1% acetic Orcein. Photomicrographs of good meiotic stages taken using digital camera. Chromosomal studies were carried out on *Eichhornia crassipes* and the taxon was found to have 32 individual chromosomes with a haploid chromosome number of 16 ( $n=16$ ), indicating a clear tetraploid genome of  $2n=4x=32$ . At diplotene and diakinesis, chiasma frequencies per nucleus/bivalent were analyzed revealing a marked reduction of chiasmata at diakinesis as compared to diplotene. The very low terminalization value of 0.43 showed that most of the chiasmata were

terminalized at diakinesis and metaphase I. Multivalent associations were frequent suggesting the presence of a translocation heterozygote. The Average chiasmata frequencies per bivalent at diplotene and diakinesis varied between 1.85 and 1.42 respectively. Analysis showed that the longer chromosomes at diplotene stage formed more chiasmata (1.85 average) at least two chiasmata per bivalent than at diakinesis with 1.42 average. The high terminalization value of 0.43 suggested that at diakinesis and metaphase I almost all the chiasmata were terminalized. This phenomenon, along with other Meiotic aberrations affects the pollen fertility of the taxon considerably. If the present generation is to hold the environment in trust for succeeding ones, then every effort should be made to tackle the problem of water hyacinth and its attendant consequences on socio-economic development of the state which in turn affects sustainable development in Adamawa state, Nigeria.

**Key words:** chiasma frequency, terminalization value, Prolific Reproduction, *Eichhornia crassipes*.

## INTRODUCTION

The sites of genetic exchange are cytologically visible as crosses between the arms of chromosome pairs during late prophase I. These crosses were originally described by Janssens (1909) and termed as “chiasmata”. The chiasma type theory, i.e., Janssens’s idea that chiasmata are formed at the sites of genetic exchange, sparked a debate that continued for over half a century. The most convincing evidence supporting the chiasma type theory was provided by Tease and Jones (1978) using techniques for differential sister chromatid labeling.

Fresh water is a precious resource and its management is of particular importance, so control of excessive growths of *Eichhornia crassipes* (Mart.) Solms (water hyacinth) has been of wide spread interest for decades (Kateregga and Sterner, 2007). The cost of water hyacinth to communities far outweighs the benefits that might occur through its utilization (Julien *et al.*, 1996; Kliber and Eckert, 2005). All efforts to control its growth and spread, including physical, chemical and biological methods have failed miserably or are too expensive to carry out on a regular basis (Nagendra, 2001; Calvert, 2002). In Lake Geriyo, however, water-hyacinth infestation keeps getting worse despite three types of concerted control efforts made by the Upper Benue Authority.

Thus, the propensity to spread fast within a short time and the attendant socio-economic problems of this plant constitutes a great challenge to the scientific world. Understanding the invader species pathways of introduction and true means of reproduction and proliferation will enable development of technologies to combat the menace. It is also hoped that the present findings based on the foregoing objectives would form an additional knowledge to a more specifically oriented studies within a consequent of cytogenetics.

In view of the paucity of information on the cytological status and chromosome behavior and its effects on the prolific reproduction of the plant under investigation to consider alternative control methods through genetic means becomes imperative. The objective of this research therefore was to characterize water hyacinth chromosome behaviour during meiosis.

Meiosis generally involves the formation of chiasmata (chiasmata meiosis). Generally every bivalent seems to form at least one chiasmata, in fact Roberts (1976) observed as many as eight chiasmata per bivalent, and these can be formed between any two of the four chromatids. Thus the degree of homology between two or more associating chromosomes is measured by the degree of pairing followed by crossing over and free gene exchange present at diplotene stage of meiosis. The exact mechanism of crossing over depends on the manner in which chiasmata are formed and their frequency.

The points of chiasmata therefore have two main functions. One is mechanical and the other genetical. Mechanical- to hold the homologous chromosomes together as they maneuver themselves onto the spindle equator and genetical- to enable exchange of genes occur between homologous chromosomes, a process known as “crossing over.” This in turn ensures new combinations of genes in the gametes. It therefore follows that the greater the number of chiasmata the greater will be the exchange recombination in the offspring.

Chiasma frequency is usually considered a good estimate of the level of genetic recombination in a population, especially in organisms in which genetic analysis is difficult or impossible to perform (Colombo, 1992). In the last century, mean chiasma values have been determined for many species with cytologically well-defined meiotic chromosomes (Nilsson et al., 1993). Darlington (1929) proposed an index to estimate genetic recombination in a population by chiasma counting. The recombination index consisted of the sum of the haploid number ( $n$ ) and the average chiasma number per nucleus ( $x$ ). The index ( $n + x$ ) represents the average number of elements that segregate independently, so that the number of possible gametes is equal to  $2(n + x)$ . However, in recent years, cytogeneticists have proposed a more accurate approach to estimate the recombination index taking into consideration the chromosome length and the exact position of chiasmata (Colombo, 1992).

Chromosomal studies carried out on *Eichhornia crassipes* revealed that the taxon have 32 individual chromosomes with a haploid chromosome number of 16 ( $n=16$ ), indicating a clear tetraploid genome of  $2n=4x=32$  (Darlington, 1965).

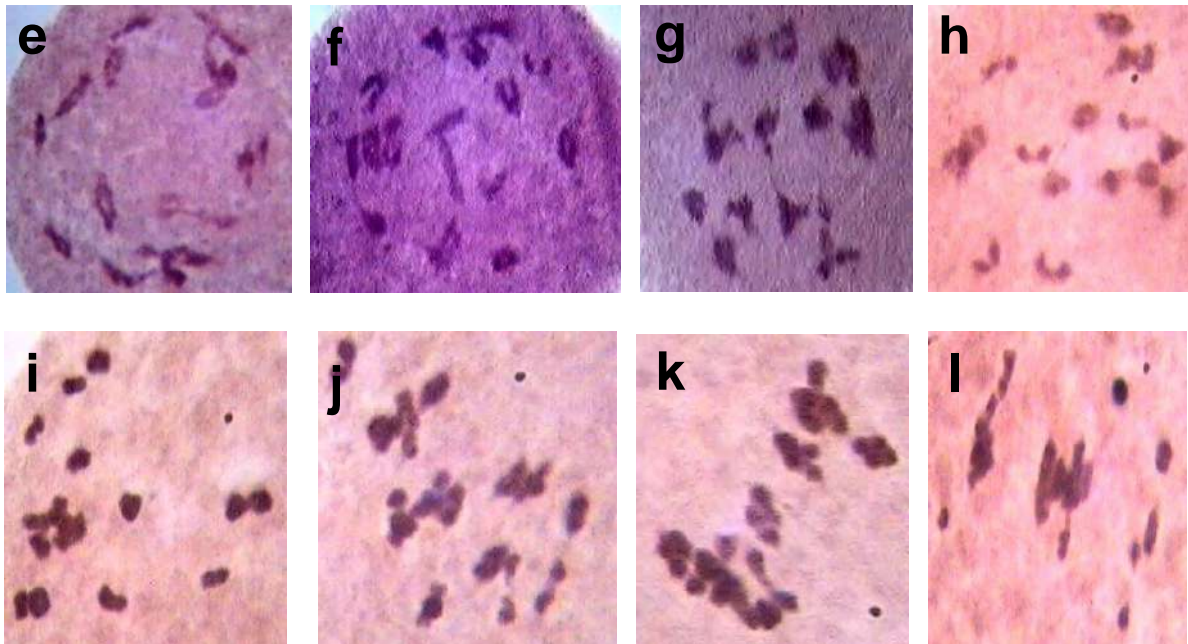
The wild growing tetraploid *Eichhornia crassipes* presents cytologically 32 individual well-defined chromosomes with a haploid chromosome number of 16 ( $n=16$ ) that facilitate chiasma counting (Malgwi *et al.*, 2008). In the present study we evaluated the chiasma frequency and terminalization value of this taxon.

## MATERIALS AND METHODS

For meiotic analysis pollen mother cells (PMC) were analyzed. 10 small unopened flower buds were collected from Lake Geriyo between 8:00 and 10:00 A.M., anthers were dissected and fixed directly in Carnoy's fluid (6:3:1) for 24 hours after which they were transferred to 70% alcohol and stored at 4°C. Pollen mother cells (PMCs) were prepared by the squash technique and stained with 1% propionic carmine. Chiasma counts were performed at diakinesis in 20 microsporocytes per plant.

## RESULTS

The cytological analysis of microsporocytes of *Eichhornia crassipes* revealed the results presented below:



**PLATE I: Different stages of meiosis in *Eichhornia crassipes* (Mart.) Solms**

- e. Diplotene - Showing attachment of bivalents to the nuclear wall
- f. Showing late diplotene nucleus
- g. Diakinesis – Prometaphase
- h. Late Diakinesis
- i. Prometaphase showing 16 clear bivalents 8 of which are ring bivalents
- j. Late Diakinesis – with 16 bivalents
- k. MI – Showing a disturbed spindle indicating 2 large groups of associating bivalents
- l. MI – Showing orientation of bivalents indicating two linear associating quadrivalents



# I: MI-Showing orientation of bivalents indicating two linear associating quadrivalents

At diplotene, the longitudinal duality of each chromosome becomes clearly evident and as the pairing relationships of pachynema lapses at this stage, the homologous segments were observed to move apart from each other. Chromosome mates which began to show repulsion and attraction at this stage were observed to be between chromatids and not chromosomes as such. The opening out of early diplotene is usually described as a decrease in attraction amongst homologous chromosomes or bivalents or as a result of centric repulsion. Paired chromosomes at diplotene were completely separated except at their points of chiasmata. The frequency of chiasmata per bivalent at diplotene has been analyzed and the result of analysis presented in Table 1. The frequency of chiasmata varied between 1.38 and 2.31 per bivalent. However, the total number of chiasmata per individual nucleus varied considerably.

In most meiocytes, distinctions between diplotene and diakinesis were not always easy. However, at diplotene, the chromosomes are in a less highly contracted state (Plates Ie and If) than at diakinesis (Plates Ig and Ih). At diakinesis, the compact bivalents were well spaced out in the nucleus and members of these pairs no longer attract but repel one another. As at diplotene 16 bivalents were usually seen (Plates Ii and Ij). There is an even distribution of the bivalents in most PMCs at diakinesis. The bivalents at this stage consequently assumed a more rounded shape (Plates Ik and Il) with the homologues joined to each other largely at their terminal ends. However, multivalent associations were not infrequent. The frequency of multivalents observed at diakinesis is presented in Table 2.

At the diakinesis stage, chromosomes of bivalents were held by one or two chiasmata. The frequency of chiasmata at this stage was found to have reduced, probably due to the now highly contracted nature of the chromosome segments. It was observed to vary from 1.00 to 1.88 per bivalent. The result of analysis is presented in Table 3.

**Table 1: Frequency of chiasmata at diplotene in 120 PMCs**

Average no. of chiasmata per nucleus	No. of PMCs analyzed	Average frequency of chiasmata per bivalent
37	19	2.31
36	17	2.25
34	16	2.13
31	16	1.94
28	15	1.75
25	13	1.56
23	13	1.44
22	11	1.38
Total		14.76
Average frequency per bivalent		1.85



**Table 2: Frequencies of multivalents observed at diakinesis in 328 PMCs**

No. of PMCs analyzed	Chromosome compliments	Percentage (%)
253	16 bivalents	77.13
35	15 bivalents, 2 univalents	10.67
10	14 bivalents, 1 trivalent, 1 univalent	3.05
7	14 bivalents, 1 quadrivalent	2.13
15	14 bivalents, 4 univalents	4.57
5	13 bivalents, 1 quadri, 2 univalents	1.52
3	13 bivalents, 1 trivalent, 3 univalents	0.92
328	Total	100

**Table 3: Frequencies of chiasmata observed at diakinesis in 80 PMCs**

Total No. of chiasmata per nucleus	No. of pmcs analyzed	Average frequency of chiasmata per bivalent
30	20	1.88
28	15	1.75
28	12	1.50
26	10	1.44
22	8	1.25
18	6	1.13
28	9	1.00
Total		9.95
Average frequency per bivalent		1.42

The tetraploid *Eichhornia* species analyzed in this investigation have small chromosomes which are a characteristic of this genus and this agrees with Krishnappa (1971). Going by the assumption that the shorter the chromosome length the fewer the frequency of chiasmata, it is therefore not surprising that the diplotene stages of the present taxon showed a moderate frequency of

chiasmata per bivalent at diplotene and diakinesis. Analysis showed that the longer chromosomes at diplotene stage formed more chiasmata (1.85 average) at least two chiasmata per bivalent than at diakinesis with 1.42 average.

The terminalization value for the tetraploid species investigated is less than 1.00 (0.43). This high terminalization value of 0.43 suggested that at diakinesis and metaphase I almost all the chiasmata were terminalized. Higher terminalization value of less than 1.00 may in some cases as opined by Malgwi *et al.* (2008) may be due to slow rate of development in the cells ensuring that the chiasmata have more time to become terminalized. Darlington (1965) however, regarded such differences in terminalization values in plant species as due to different degrees of centromere repulsion in relation to the length of the chromosomes. The shortness of the chromosomes complements characteristic of the present taxon is consequential to the high terminalization value observed in the tetraploid species investigated. Malgwi *et al.* (1997) also recorded an average chiasmata frequency of 1.09 chiasmata per bivalent at diakinesis in tetraploid *Cleome polyanthera* with a terminalization value of 0.41. Malgwi *et al.* (2008) recorded the chiasmata frequency in *Gynandropsis gynandra* as 1.66 chiasmata per bivalent, at diplotene with a terminalization value of 0.39.

In the present investigation, chiasmata frequency and terminalization value in the tetraploid species investigated showed little variation from the findings of Malgwi *et al.* (1997) and Malgwi *et al.* (2008). It is however impossible to say to what degree or extent this is dependent on genic or environmental conditions. Both Malgwi *et al.* (1997) and Malgwi *et al.* (2008) worked on tetraploids involving species with short chromosomes (Darlington, 1965) as the species investigated. It is therefore possible that the terminalization value of 0.43 in this investigation is actually dependent on chromosome lengths of the species and not on the level of species ploidy as suggested by Sangowawa (1985).

Water hyacinth based on the present findings reproduces vegetatively by means of stolons (offsets) which, together with solitary plants or drifting mats, are rapidly distributed by water currents, wind, boats and rafts. And as Dyer (1976) opined, as a general rule doubling the complements of a fertile diploid with regular bivalent formation produces sterile tetraploid, while doubling a sterile diploid hybrid with limited pairing produces a fertile vigorous tetraploid. As Darlington (1965) opined, most of the factors responsible for sexual sterility in plants are linked up with natural hybridization and polyploidy, both of which are known to play important roles in the evolution of plant species.

Since *Eichhornia crassipes* as evidenced by the present investigation produces regular bivalents and multivalent disjunctions, attributed here also to its small chromosomes complements and therefore low chiasmata frequency, thus low variability and/or genome differentiation since its origin a long time ago, it is very clear here to assume that *Eichhornia crassipes* is an autopolyploid rather than its earlier assumed segmental allopolyploidy. The pattern of inheritance in water hyacinth therefore is here assumed to have been concerned with the transmission of subsequent generations of mutant alleles, determining the extent to which its alternative alleles of the same gene and alleles of different genes recombined within a group of inter fertile individuals presenting to the selective forces of nature, each mutant phenotype in some varieties of genetic backgrounds. As Lewis (1966) opined, when a new biotype occurs, it is faced with two inevitable situations: i) that of establishing vegetatively and ii) that of stabilizing its genetic system in order to reproduce sexually. Both may be taken on concurrently but often times, they are taken one after the other, establishing vegetatively first before stabilizing the genetic system. The water hyacinth under investigation may have done both, successfully establishing itself vegetatively and stabilizing its genetic system to reproduce asexually. Thus, adapting favorably to its chosen environment, they achieve the species desired level of recombination. These characteristics

seemed to enable the water hyacinth to rapidly replicate new and successful genotypes capable of exploiting the habitat they now have colonized, proliferating in mass through perpetuating their genotype through asexual reproduction.

Chiasma frequency was analyzed at diplotene and diakinesis. The Average chiasmata frequencies per bivalent at diplotene and diakinesis varied between 1.85 and 1.42 respectively. One of these conclusions is that the chiasmata frequency in most plant species has probably been underestimated by previous workers. Muntzing (1933a), in his investigation in diploid *Solanum* species, did not observe more than one chiasmata per bivalent at diplotene. He concluded that the frequency of chiasmata in any case was very low.

## CONCLUSION

Terminalization value for the *Eichhornia* species investigated has been found to be high (0.43) which suggested that at diakinesis and metaphase I most of the chiasmata were terminalized. The plant has adapted favorably to Lake Geriyo environments by successfully establishing itself vegetatively and stabilizing its genetic system enabling the water hyacinth to rapidly replicate new and successful genotypes capable of exploiting to the maximum the lake habitat they have colonized, proliferating in mass perpetuating their genotype through asexual reproduction. Water is an important resource and its infestation with aquatic weed is a major global problem. Since intensive efforts involving huge expenditure and different control measures including cytological investigations brought no success in abating the menace of water hyacinth, attention needs to be focused on ways and means of utilizing the plant. From the present findings it may seem near impossible to recommend a specific control measure for a taxon that has proved to be vegetatively stable and has eliminated completely sexual reproduction. However, it is the opinion of this author that biological control could be effective in trying to genetically engineer a biological agent specifically for the plant. This may include genetically engineering beetles that will feed voraciously only on this plant. Anything that hinders its vegetative proliferation will bring about its control; therefore emphasis on the chemical method of control might be a remedy. However, the use of chemicals may kill other plants and animals in the lake thereby affecting the ecosystem. The only alternative may be eradication through utilization of the weed by training men and women living around Lake Geriyo communities by equipping them with necessary skills and knowledge needed to produce; biogas and briquettes which can be used as fuel for cooking thereby save families from buying firewood, compost and slurry which can be used for vegetable production as substitute for fertilizer, craft work such as; picnic baskets, shading mats, hand fans, flower baskets and hats. Control of the weed through utilization will contribute towards safeguarding Lake Geriyo from being taken over by water hyacinth and save the environment from global warming. Inhabitants of Lake Geriyo community will be empowered as money will be generated from fish and rice selling as normal fishing and irrigation activities will resume following serious reduction of the biomass of water hyacinth on the lake. Money used in clearing the weed on the lake using the manual control method will be saved by farmers owning irrigation plots of rice and vegetables on the lake and more money will be generated from selling such products. Products of handcrafts such as baskets, fans, hats and shading mats will be produced from the plant providing an important source of income for dwellers of Lake Geriyo communities. Controlling the menace of water hyacinth by utilization of the weed into useful products will contribute in saving the lake from infestation of the plant reducing problems associated with its menace ranging from environment, transport, navigation, public health and agriculture. As more people become aware of the economic benefits of water hyacinth, government need not worry about the huge sum of money involved in its removal. If the lake becomes free from all these problems, the communities, its environs and the Upper Benue River Basin Development

Authority will derive maximum benefit from it thereby, resulting in sustainable development in the country Nigeria at large.

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19 – 20 Nov 2018; SUBR Louisiana, USA.

## **IMPACT OF ENTREPRENEURSHIP EDUCATION ON EMPLOYMENT OPPORTUNITIES IN NIGERIA ECONOMY**

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### **Abstract**

The study investigated the impact of entrepreneurship education on employment opportunities in Nigeria economy. The main objective of this study is to investigate how entrepreneurial training through entrepreneurship education help to provide employment opportunities to young graduates in order to reduce the menace of unemployment that cripples the prospect of Nigeria economy. Data for the study were collected through secondary source using descriptive statistic to analysis the data and regression statistical model was also used to test hypotheses. Findings revealed that the prevailing unemployment rate has significantly affected the nation GDP negatively. It was also asserted that an increase in employment will lead to an increase in GDP of every Nations. It was recommended that government should review entrepreneurship education curriculum to meet global competitive economic challenge.

**Key Word:** entrepreneurship Education, Employment, Unemployment, GDP.

### **Introduction**

Education plays a very predominance role in improving national development. This is because it promotes the economic prospects of the people; empowers and equips individuals in the society to participate in entrepreneurial activities through entrepreneurship education in order to imbibe the spirit of self-reliance for youth development. It promotes economic development and provides the basis for economic transformation and emancipation for citizenry. The efficacy of entrepreneurship education becomes the major issue in the world today to fight the present global economic crises and also it is a measure used to overcome the menace of economic recession that place Nigeria economy in doldrums and voodoo. (Aluwong,2010). Entrepreneurship education deals with the acquisition of skills and knowledge, creation of ideas and management abilities necessary for job creation. Because of the major role of entrepreneurship in combating unemployment problem in most countries in the world particularly in Nigeria, Federal Ministry of Education has to make entrepreneurship as a compulsory course to offer at both University .Polytechnic and College of Education so that students can imbibe the spirit of knowledge and skills of entrepreneurship for self-reliance. Quality entrepreneurship education could be used as a tool for fighting the war against poverty and unemployment in Nigeria. According to Agi and Yellowe (2013) Entrepreneurship education play a superior role in promoting human capital



development, transfer of appropriate skills, knowledge and attitude in order to promote economic growth, industrialization and a high way to global knowledge economy in order to re- base Gross Domestic Product of every Nation. He also opines that the motive of wealth creation poverty eradication and value re-orientation can be achieved through an efficient education system which impacts the relevant skills, knowledge, capacities, attitudes and values.

According to the World Bank (1999), education is very essential to the construction of knowledge economy and society in all nations. It is through education that knowledge and skills are transferred to individuals, and their competencies and abilities developed. Thus, youth entrepreneurship education has been given prominence all over the world. Through entrepreneurship education, youth are provided with knowledge, skills and innovation so as to encourage them to develop entrepreneurial acumen in a variety of settings. Developing entrepreneurial skills and initiative becomes a major concern of tertiary institution in order to facilitate employability of graduates so as to become a job creator or giver instead of job seeker. However, a look at the policy document reveals that the issue of self-employment or self-reliance at the end of higher education was not given adequate attention (Aladekomo, 2008). Equally, it was quite evident from the policy that Nigerian educational system was hitherto designed to produce a pool of graduates who depend on the government for employment instead of self-employment. This is in contrast to a system that could equip beneficiaries with entrepreneurial skills, make them self-reliant, self-confident and employers of labour. Emphasis was also in preparing undergraduates for leadership styles, managerial thinking and decision making procedures suitable for larger organizations. It was, therefore, not surprising that the methodologies for identifying opportunities and the spanning of entrepreneurial talent were hitherto ignored (Visser, 1997). This paper is designed to examine the efficacy of entrepreneurship education as it gives room for self-reliance, self-confident for young graduates to train to be self-employed.

### **Statement of Problem**

Entrepreneurship education and employment opportunities play pivotal roles in uplifting the growth and development of Nigeria economy. Unemployment underpins the prospects of economic growth of any nation via Nigeria and inability of government to formulate a formidable policy that would strive and reposition entrepreneurship education in most tertiary institution in Nigeria create danger to economic growth and development. Finally, unpleasant level of corruption, maladministration and fraudulent attitude of Nigeria undermine the prospects of economic growth and development of Nigeria. Most of the impediments aforementioned above affect the GDP of every nation. Previous literature on this similar study do not emphasizes much on how entrepreneurship will help to solve unemployment problem in Nigeria do to some contradictory recommendations given that did not help the government to solve the problem but the present research is out to see that through entrepreneurship education students would acquire a lot of entrepreneurial skills and knowledge that would change their mind set on not to depend on paid- employment instead of self- employment..

### **Objectives of the Study**

- (1) To examine the impact of entrepreneurship education on employment opportunities in Nigeria economy.

- (2) To examine the effects of entrepreneurship education and employment opportunities on Gross Domestic Product (GDP) in Nigeria economy.
- (3) To determine how entrepreneurship education helps to improve standard of living of Nigerian through provision of employment opportunities.

### **Hypotheses**

Ho There is no relationship between entrepreneurship education and employment opportunities in Nigeria.

Ho Entrepreneurship education does not have impact on employment opportunities and the growth of Gross Domestic Product (GDP) of Nigeria economy.

Ho Entrepreneurship education does not improve standard of living of Nigerian through employment opportunities.

### **Conceptual Issues**

Entrepreneurship Education means many things to many people. Nwabuama (2004) opines that entrepreneurship education is the process of identify the general traits of entrepreneurs and how potential entrepreneurs can be trained to use their managerial skills needed for effective performance of persons and for continuous survival of an organization after the acquisition of occupational skills. Olawolu and Kaegon (2012) suggested that entrepreneurship education prepares youths to be become entrepreneurs or entrepreneurial thinkers by exposing them in real life learning experiences where they will be required to think, take risks, manage circumstances and incidentally learn from the outcome in order to become an originally. Ememe (2010) sees that entrepreneurship education enables youths to seek for success and emancipation in ventures through substantial effort. According to Ebele (2008), entrepreneurship education is the teaching of knowledge and a skill acquisition that enables the students to plan, start and run their own business in order to make profits. Swarland (2008), entrepreneurship education is out to stimulate creativity in students, enables them to identify opportunities for innovation and motivate them to transform the ideas into practical and targeted activities whether in a social, cultural or economic context. Amusan (2004) posits that entrepreneurship education will provide opportunities for students to access their attitude, aptitude and skills relating to those necessary for developing and running business. Entrepreneurship education entails teaching students on how they would become businessmen, the essential skills required to build viable enterprises, equipping the trainees with skills needed for taking responsibility and developing initiatives of prospective trainees (Ezeani, 2012). According to Abefe (2012), Entrepreneurship education involve a dynamic process of creating wealth through the process of creating something new and in the process assumes both attendant risks and rewards. Izedonmi (2006) states categorically that it is a process of preparing trainees for self-employment.

Okereke and Okorofofor (2011) assert that entrepreneurship education has been acknowledged world wide as a potent and viable tool for self-empowerment, job and wealth creation. To Atakpa (2011) Entrepreneurship education equips an individual or group of individuals to create mindset to undertake the risk of venturing into something new through the application of knowledge and skills acquired from the school. Also to Fashua (2006) entrepreneurship education provides willingness and ability to individuals or group of individuals to seek investment opportunities to establish and run enterprises in order to make profits. .Entrepreneurship education is embedded a

philosophy of self-reliance through promoting new cultural, productive environment and sets of attitudes towards attainment of future challenges (Ogundele, Akingbade and Akinlabi, 2012).

### **The Purpose of Entrepreneurship Education**

According to Paul (2005) and Nwalado (2012) examine the main purposes of Entrepreneurship education as follows:

- a. To provide creative and innovative training to the young graduates so as to enable them identify great business opportunities.
- b. To make young graduates to be self-reliant people in their own right.
- c. To foster economic growth and development of Nigeria.
- d. To improve the standard of living of young graduates
- e. To stem the high rate of poverty and insecurity.
- f. To provide employment opportunities for its citizenry.

### **Empirical of Study**

According to Adebayo and Ogunrinola (2006), The impediments that surrounding job opportunities today can be traced to that of challenges of globalization and economic liberation that most nation in the world are facing presently which underpins the prospects of employment creation in many developing nations. Englama (2001) opined that the employment provisions offered by an economy determine the performance of any economic policy of every nation because the macroeconomic policy of every nation is to achieve full employment for economic sustainability. According to him, a successfully gainfully employed labour force in the economy of any nation contributed to the growth of a country GDP and national output which is an indicator of economic development. The income derived as remuneration to labour complemented by social programmes on food, shelter, health and education enhances the standard of living of workers. He therefore concluded that the higher the employment opportunities generated by the economy, the better the economy performance. The prelude of this assertion can be traced to economic policy of this present administration led by Muhammed Buhari in Nigeria through social investment programme of N- Power that provides a medium employment opportunities for timing youth as one of his strategic policy to cushion the effect of economic doldrums and voodoo that places Nigeria economic in chaos between 2016 and 2017.

Fofana (2001) suggested that the high rate of labour force growth and low and dwindling rate of formal sector job growth in developing nations exhibit some peculiar features. Firstly, the informal sector absorbed most of the unemployed people with pay of low wage jobs while still hoping to pick up formal sector job when available. Second, the unemployed in the labour market in poor nations do not enjoy any form of unemployment insurance or any social benefit from the government. Third, the rate of unemployment rates is very low due to high rate of disguised employment and underemployment in the informal sector in some country in the world that places emphasis on the practices of entrepreneurship programme. Fourth, self-employment, part-time employment and unpaid employment in family enterprises have a disproportionate share in total employment.

Jhingan (2003) discussed in the Keynesian theory of employment that the general level of employment in an economy depends on aggregate demand and aggregate supply functions. Unemployment is thus caused by deficiency of effective demand. Full employment will only be restored through an increase in aggregate demand and not through the classical prescription of falling money wages. Keynes recommended fiscal policy measures should put in place to reduce government deficit budgeting spent on public works. This has the potentials of increasing aggregate demand and hence removing the incidence of involuntary unemployment.

According to Swane and Vistrand (2006) measured employment using total employment and employment-to-population ratio (which measures the extent to which the population is engaged in productive labour market activity) and is defined as the proportion of a country's working-age population that are employed. They found a significant and positive relationship between Gross Domestic Product (GDP) and employment. This finding supports the strand of theory that the positive relationship between GDP and employment is normal and that the jobless growth development is just a temporary deviation because employment will soon pick up. In their work in developing countries, Stiglitz and Weis (1981) observed that the renewed interest in small and medium scale industries in developing countries stems largely from the widespread concern over employment and economic growth. Practically, all reports on the subjects in recent years appeal to the great labour intensity of small and medium firms and on this account, to the importance of channeling a great share of investment towards them.

According to Ndebbio (1987), Industrialization of a nation economy helps to provide employment opportunities in most country in the world through promotion of SMEs. He posits that it is the need for government to formulate policy that would help to provide employment generation and economic growth through promoting SMEs in Nigeria in order to absorb the rapid growing labour force. Okoro (1996), in his contribution, recognized the efficacy of self-employment through SMEs having recognized that there is wide-spread of unemployment involving all labour categories. Ashwe (1997) posits that SMEs perform very crucial roles in depressed economies by providing employment to a large percentage of the work force. Damachi (2001) Okwara (2002) opined that considering Nigeria vast population of 120 million people. It is imperative and clear that only an SME set-up could be meaningful to the Nigeria economy. This is because only SME programme can offer a responsible level of employment and skill to such a huge population. Levitsky (2004) asserted that SMEs helps to provide employment opportunities by using more labour in relation to capital invested. This is specifically important in developing countries where labour is surplus and capital relatively scarce.

## **Methodology**

The study surveyed the impact of entrepreneurship education on employment opportunities in Nigeria economy. Secondary source of data was used to elicit information on total employment in industries and business in Nigeria from 1999 – 2005 from National Bureau of Statistic Quick (QNEGS) 2006 Abuja, and Statistical Analysis of Nigeria Gross Domestic Product (GDP) from 1999- 2005. A regression statistical model was also used to test hypotheses so as to show a relationship between the two variables that is predicator (constant) employment and dependent variable which is Gross Domestic Product as indicated in the model summary.

# **Presentation and Analysis of Data**

**Table 3: Total Employment in Industries and Business 1999-2005 (000)**

Sectors	1999	2000	2001	2002	2003	2004	2005	1999-2005
Agriculture	76.5	79.9	80.7	81.3	88.4	109.5	123.8	640.1
Manufacturing and processing	1916.8	1835.1	1905.1	1849.2	1944.0	1987.5	1912.9	13350.6
Building and construction	290.6	307.9	476.5	409.9	398.8	431.7	459.0	2774.4
Hotels rest and tourism	537.1	509.7	572.0	556.2	544.3	538.2	520.6	3778.0
Transport	154.7	158.2	179.2	192.9	203.3	189.1	241.4	1318.7
Communications	17.4	28.3	193.7	198.9	315.0	325.0	467.3	1545.7
Education services	8.2	8.9	12.4	18.4	20.4	21.9	25.8	116.0
Mining and quarrying	56.1	18.7	18.7	19.9	31.9	33.7	35.9	215.1
Utilities	14.9	14.5	14.6	14.8	15.2	15.4	14.9	104.3
Banking	28.3	17.1	24.3	24.9	24.5	25.3	29.9	174.2
Distributive trade	146.6	145.5	162.5	177.1	183.5	190.9	196.5	1202.7
Private prof. services	7.0	8.4	7.6	7.8	8.8	9.6	10.2	59.5
Real estate and biz services	75.0	77.8	85.6	93.0	94.2	94.0	103.3	622.9
Health	305.9	301.6	318.4	346.1	347.3	355.7	330.0	2305.0
Finance	24.1	28.2	28.2	28.7	25.4	26.8	52.4	213.8
Total	3659.2	3539.9	4079.4	4019.2	4245.0	4354.6	4523.8	28421.0

Source: National Bureau of Statistic Quick (QNEGS) 2006, Abuja

## **Statistical Analysis of the Nigeria Gross Domestic Product (GDP) from 1999-2005**

Year	Value
1999	3,211,150,000.000.00
2000	4,676,394,201,100.00
2001	5,339,063,000.000.00
2002	7,128,203,099,900.00
2003	8,742,646,645,900.00
2004	11,673,602,238,931,000.00
2005	14,735,323,931,000.00

Source: <http://www.factfish.com/statistic> – country/Nigeria/gross domestic product, as cited by onuoha, 2015.

### Descriptive Statistics

	Mean	Std. Deviation	N
GROSSDOMESTICPRODUCT	4.5300E6	2.81493E6	7
EMPLOYMENT	4060.1571	358.07589	7

### Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.207 <sup>a</sup>	.043	-.149	3.01698E6

a. Predictors: (Constant), EMPLOYMENT

### ANOVA<sup>b</sup>

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	2.032E12	1	2.032E12	.223	.006 <sup>a</sup>
	Residual	4.551E13	5	9.102E12		
	Total	4.754E13	6			

a. Predictors: (Constant), EMPLOYMENT

b. Dependent Variable: GROSS DOMESTIC PRODUCT

### Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.113E7	1.401E7		.794	.004
	EMPLOYMENT	-1625.224	3439.710	-.207	-.472	.003

a. Dependent Variable: GROSSDOMESTICPRODUCT

### Discussion of Results

The tables above show the regression result of the relationship between Gross Domestic Product (GDP) and Employment in Nigeria for the period of seven years (Between 1999 to 2005). The results show that the descriptive statistics of the two variables have the standard deviation of 2.9149 and 358.07589 as well as the means of 4.5300 and 4060.15 of the two variables. This implies that the determinants of GDP is highly dependent on employment generation, therefore the prevailing unemployment rate has significantly affected the nations GDP negatively.



The model summary shows also that a strong relationship between the dependent variable GDP and independent variable Employment as indicated by a weak R of 0.207 as a result of low employment opportunities in Nigeria as well as weak GDP. Similarly, the R which is the measure of the strength of association or variance in the dependent variable that can be explained by the dependent variable also revealed a statistically significant relationship of 0.04. This implies that a 1 increase in employment will lead to 20 increases in GDP. In addition, ANOVA table show the level of p- value or significant is low at 0.006 which is lower than 0.05. Therefore, the null hypothesis that there is no significant relationship between employment generations is GDP is rejected. The test of significance of the regression of the two variables shows that the coefficient has a correlation of - 1625.224. Finally, the p – value of sig. of 0.03 is below the p –value of 0.05, Hence the null hypothesis is rejected.

### **Conclusion**

Entrepreneurship education and employment opportunities play essential roles in the provision of employment generation to a teeming population in most country in the world today via Nigeria. The growth of Gross Domestic Product (GDP) can only be re-based in Nigeria Government would give special attention to entrepreneurship programme because it helps to create employment opportunities for people, improve standard of living and encourage mobilization and utilization of indigenous technology for sustainable growth and development of nation economy. The impediments that surrounding job opportunities today can be traced to that of challenges of globalization and economic liberation that most nation in the world are facing presently which underpins the prospects of employment creation in many developing nations.

### **Recommendation**

Based on the above, the following recommendations are made;

- i. Federal Ministry of Education of Nigeria should collaborate with National University Commission {NUC} and National Board of Technical Education {NBTE} to review the entrepreneurship development curriculum to meet global challenges in the world.
- ii. Most business tycoons in the sector economy should be involved in entrepreneurship education by providing training to both secondary, university and polytechnics graduates to set up business through soft loan from the company.
- iii. Government should be able to make entrepreneurship training compulsory in National Youth Service Corps {NYSC} Scheme inform of weekly community development {CDS} to enable them acquire skills and knowledge that will help graduates to set up a business on their own through provision of soft loan by government.

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## PERSONNEL SATISFACTION AND INSTITUTIONAL PERFORMANCE: A PERSPECTIVE OF ACADEMIC STAFF IN STATE OWNED TERTIARY INSTITUTIONS FOR SUSTAINABLE DEVELOPMENT IN SOKOTO STATE. NIGERIA

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### Abstract

The objective of the study is to find out the relationship between personnel satisfaction and institutional performance in state owned tertiary institutions in Sokoto State Nigeria. There are six(6) state owned tertiary institutions in Sokoto State, which include; Sokoto State University, Umar Ali Shinkafi Polytechnic, Shehu Shagari College of Education, College of Nursing and Midwifery, Collage of Legal and Islamic Studies and Abdulrahman College of Health Technology, Gwadabawa. The total population of academic staff in all the institutions are; one thousand four hundred and eight (1408) staff. Stratified random sampling was used to select a sample size of seven hundred and three (703) academic staff. Structured questionnaire and interview schedule was used as the techniques of data collection. Correlation analysis (canonical correlation) was used as the method of data analysis. The variable of the study are “personnel satisfaction” and “institutional performance”. Personnel satisfaction was measured by  $y_1$  = productivity,  $y_2$  = Absenteeism  $y_3$  = Retension, while institutional performance was measure by  $x_1$  = Institutional capacity,  $x_2$  = Educational efficiency,  $x_3$  = Quality management. It was found out that there is a significant relationship between productivity and institutional capacity, while there also exist a negative relationship between retention level and quality management. It was recommended that, management of state owned tertiary institutions in Sokoto State should as a matter of urgency restructure their leadership style (quality management) so as to checkmate brain drain (retention level) in their respective institutions for sustainable development in the tertiary institutions in Sokoto State and Nigeria as a whole.

**Keywords:** Personnel Satisfaction, Institutional Performance, Academic Staff and State Owned Tertiary Institution.

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## Introduction

Personnel satisfaction is essential to the success of any organization. A high rate of personnel contentment or discontentment is directly related to individual performance (Castillo, 2006; Karir and Kipkebut, 2016; Singh, 2015; Aljasmi, 2012; Afful Broni, 2012 and Lawler 2018). By implication, keeping personnel satisfied with their careers should be a major priority for every employer.

Academic staff are the soul of educational institution, as they contribute positively towards the attainment of goals and objectives in every educational institution in Nigeria and other parts of the world (Tella, Ayeni and Popppla, 2007; Ologunde, Asadu and Elumilade, 2017). They are important to the society because they produce better and quality labour that occupies every sector of the economy.

However, many factors are responsible for low inputs of academic staff to the development of tertiary institutions in Nigeria. The reason are not farfetched from; non motivation of academic staff on the part of the government and authorities of the tertiary institutions. Bad working environment, teaching and instructional materials are said to be inadequate, low salary, inadequate research grant, problems of staff accommodation (Ghenghina, Vaduva and Postole, 2009; Sageer, Rafat and Agarwal, 2012). Ologunde, Asadu and Elumilade (2017) noted that if good salary, good physical working conditions, personnel recognition for hard work and other factors are well considered; motivation will be boosted resulting in to higher performance.

Several scholars (Lahkar and Baruah, 2013; Castillo, 2006; Karir and Kipkebut, 2016; Singh, 2015; Aijasmi, 2012; Afful Broni, 2012; Tella, Ayeni and Popppla, 2007; Ologunde, Asadu and Elumilade, 2017; Ghenghina, Vaduva and Postole, 2009; Sageer, Rafat and Agarwal, 2012 and Letki, 2018) across the world have invested so much resources in trying to identify the relationship between employee satisfaction and institutional performance. Therefore a research gap has been found in that direction within Sokoto, must especially in state owned tertiary institutions. Hence, it has become imperative for the researcher to conduct such researches so as to bridge that existing research gap. Identifying the relationship between personnel satisfaction and institutional performance among state owned tertiary institutions in Sokoto, is the major objective of the research paper.

## **Literature Review**

### **Personnel Satisfaction**

Personnel Satisfaction have been studied at various institutions and at various levels, categories and places, hence (Castillo, 2006) studied institutional performance and satisfaction with democracy in a comparative analysis in Spain, while (Karir and Kipkebut, 2016) were able to study the effect of reward management on employee commitment in the University of Nturu in Kenya. (Singh, 2015) conducted an empirical study on employee motivation in India. Aljasmir (2012) studies employee works motivation in British University Dubai. Even the researches that were conducted on personnel satisfaction in the Nigerian context like: (Tella, Ayeni and Popoola, 2007) examine the work, motivation and job satisfaction on library personnel in academic research libraries in Oyo state Nigeria. Likewise (Ologunde, Asadu and Eumilade, 2017) studies labour turnover among University lecturer in Southwestern Nigeria. None of those researches were conducted within the context of any institution in Sokoto state. Furthermore, from the above evidences, it can be posits that a research gap also exists within the context of personnel satisfaction among institutions in Northern Nigeria.

### **Institutional Performance**

According to Letki (2018) for an institution to perform, the institution have to be responsive to citizens demand and expectations, it should be able to effectively design and implement policies reflecting the demand and expectations of individuals that are leaving within the context of that environment. Many reputable institutions have been researched upon and empirical evidences have been found on their performances, for instance; (Lawler, 2018) conducted a study in Santa Monica College and came out with findings that reflect the views of 367 of 2026 employees, which the response rate is 18.1%. It was vindicated that 69% were satisfied with the institution performances. In the same vain (Ologunde, Asadu and Eumilade, 2017) sampled out 442 lecturers from two federal and two state Universities in Southwestern Zone of Nigeria. Findings indicated that motivational strategies available for University Lecturers are inadequate for their continuity within the system. Karir and Kipekebut (2016) based their findings on the outcome of a significant relationship between financial rewards and effective commitment in the University Nturu in Kenya. Afful.Broni (2012) found out from a sample of 200 respondents in the University of Mines and Technology Takwa, Ghana. That low salaries and the general lack of motivation were the major factors that reduces morale for higher performance. There is the need for researches to

be conducted within the context of state owned Universities in Sokoto because of the immense research gap that existed within this context.

### **Sustainable Development**

The key principle of sustainable development underlying all others is the integration of environmental, social, and economic concerns into all aspects of decision making. All other principles in the Sustainable Development framework have integrated decision making at their core (Lawn, 2018; Brebbia, 2018). It is this deeply fixed concept of integration that distinguishes sustainability from other forms of policy. With a view to understanding sustainable development in its practical and empirical terms the researcher found out that researches like: (Lawn, 2018) captures the inter-connectivity of environmental preservation and sustainable development. (Brebbia, 2018) harnessed all the conference facilities communication between all scientists specially in the wide range of subject including: planners, environmentalist, architects, engineers, policy makers and economists, who all must work together to ensure that planning leads to sustainable development that meets present needs without compromising our future. In the same vein, Harris (2000) emphasize that sustainable development defining a new paradigm is development which meets the needs of the present without compromising the ability of the future generation to meet their own needs. All those researches developed their theoretical framework within their understanding of the theme of sustainable development. There is the need to empirically develop a framework within the research gaps identified in this area.

### **Methodology**

This is a survey research aimed at achieving the objective of identifying the relationship between personnel satisfaction and institutional performance in state owned tertiary institutions in Sokoto State Nigeria. There are six (6) state owned tertiary institutions in Sokoto State, which include;

- 1) Sokoto State University
- 2) Umar Ali Shinkafi Polytechnic
- 3) Shehu Shagari College of Education
- 4) College of Nursing and Midwifery
- 5) College of Legal and Islamic Studies
- 6) Abdulrahman College of Health Technology, Gwadabawa.



The total population of academic staff in all the institutions are; one thousand four hundred and eight (1408) staff. Stratified random sampling was used to select a sample size of seven hundred and three (703) academic staff. The table below represents this information:

**Table 3.1: Population and Sample of State owned tertiary Institutions in Sokoto as at 2018**

State owned Tertiary Institutions	Population	Sample
Sokoto State University	125	62
Umar Ali Shinkafi Polytechnic	330	165
Shehu Shagari College of Education	560	280
College of Nursing and Midwifery	192	96
College of Legal and Islamic Studies	135	67
Abdulrahman College of Health Technology, Gwadabawa	66	33
<b>Total</b>	<b>1,408</b>	<b>703</b>

Source: Field Survey, 2018

Structured questionnaire and interview schedule were used as the techniques of data collection. The questionnaire intended to find out personnel satisfaction. Hence, it was issued to the sampled staff of the state owned tertiary institutions in Sokoto state. The questionnaire was subdivided in to three (3) sections. Section one contains the question that are related to employee productivity, section two relates to questions that are made to identify the absenteeism of the staff. While the section three emphasize on the retention level of the employee. Interview schedule was also conducted on the Head of Establishment of all the sample institutions. The schedule discussed on the issues of organizational performance which are proxied by; institutional capacity, educational efficiency and quality management. Correlation analysis was used as the method of data analysis. The variable of the study are “personnel satisfaction” and “institutional performance”. Personnel satisfaction was measured by;  $y_1$  = productivity,  $y_2$  = Absenteeism  $y_3$  = Retention, while institutional performance was measure by  $x_1$  = Institutional capacity,  $x_2$  = Educational efficiency,  $x_3$  = Quality management. A model is represented below:

$$Y = \alpha + \beta X + \varepsilon$$

“Y” is the dependent variable and “X” is the vector of independent variables.

“Y”= Personnel Satisfaction and “X” = Institutional Performance

where;

$Y_1$ = Productivity

$Y_2$ = Absenteeism

$Y_3$ = Retention

“X”= Institutional Performance with:

$X_1$  =Institutional Capacity

$X_2$  = Educational Efficiency

$X_3$  = Quality Management

$\alpha$  =intercept

$\beta$ =constants to be estimated

$\varepsilon$  =Error term

From the correlation model, Canonical Correlation was used finally to facilitate the study of linear interrelationship between two sets of variables; the canonical function of the said relationship can be seen as follows:

$$y_1 + y_2 + y_3 + \dots + y_n = x_1 + x_2 + x_3 + \dots + x_m$$

Table 3.2: Relationship between Personnel Satisfaction ( $X_i$ ) and Institution Performance ( $Y_i$ )

X Vs Y	R	P-Value	Decision
Productivity Vs Institutional Capacity	0.936**	0.00	S
Absenteeism Vs Educational efficiency	0.751**	0.00	S
Retention Vs Quality Management	-0.921**	0.00	S

Sources: Field survey, 2018

## Discussions of Findings

It was found out that there is a significant relationship between productivity and institutional capacity, by 0.936, Absenteeism and Educational efficiency are having significant relationship

at 0.751, while there also exist a negative relationship between retention level and quality management at -0.921. It was recommended that, management of state owned tertiary institutions in Sokoto State should improve on the institutional capacity, so that the productivity of their staff will be sustained. Likewise educational efficiency must be restrained to optimize absenteeism. Hence it is also recommended as a matter of urgency to the management of state owned tertiary institutions in Sokoto to restructure their leadership style (quality management) so as to checkmate brain drain (retention level) in their respective institutions for sustainable development in Sokoto State and Nigeria as a whole.

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## IMPACT OF ENTREPRENEURIAL TECHNOLOGY EDUCATION ON INNOVATION FOR SUSTAINABLE DEVELOPMENT IN NIGERIA

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### Abstract

This paper examined the Impact of Entrepreneurial Technology Education on Innovation for Sustainable Development in Nigeria. Entrepreneurial Software Technology Education played a fundamental role in wealth creation, employment creation, value reorientation, improvement of the quality of life, real economic growth and development, knowledge addition and societal transformation in Nigeria with an estimated population of about 200 million. Entrepreneurial Technology Education was the primary engine of economic growth and provided the key to unlocking the country's potentials. The main objective of this study was to assess the impact of entrepreneurial technology software of Skills, Attitude and Knowledge in Nigeria with the view to determining its challenges and prospects. Data were collected through primary and secondary sources. The population of the study consisted of all registered entrepreneurs in each Geo-Political Zones which was made up of 9,762. While the sample size which was 384 was determined, using the Taro-Yamani sampling size formula. Analyses were done through the use of simple percentages and tables, while Analysis of Variance (ANOVA) and Z-test techniques were applied in testing the hypotheses. The study revealed that Entrepreneurial Technology Education has enhanced Nigerian economy, especially in the aspect of employment generation, wealth creation, value addition and opportunity creation. It also revealed that entrepreneurship development still faced series of challenges in Nigeria such as inadequate infrastructure, inadequate support from banks, inadequacy of power supply, lack of technical knowhow and a host of others. Similarly, the research findings reviewed various policies and programs such as National Economic Reconstruction Fund (NERFUND), Small-Scales Industries Credit Scheme (SSICS), National Directorate of Employment (NDE), National Economic Empowerment and Development Strategy (NEEDS), Local Economic Empowerment and Development Strategy (LEEDS), Small and Medium Enterprise Development Agency of Nigeria (SMEDAN) and many more put in place by the Federal Government, to give a promising future for entrepreneurship development in the nation. Based on these findings, the study recommended that government should make provision for adequate infrastructural facilities; adequate incentives should also be provided for banks and other financial institutions that fund small and medium scale industries. In the same vein, government should engage in enlightenment programs to educate owners and operators of small-scale industries in Nigeria.

**KEYWORDS:** Entrepreneurship, Technology, Resources, Development, Sustainability

## INTRODUCTION

Entrepreneurship has always formed the backbone of every Economy. According to Aruwa (2006:16), entrepreneurship is the willingness and ability of an individual to seek for investment opportunities to establish, and to turn an enterprise successfully. Schumpeter (1961:18), observed that the single function which constitutes entrepreneurship, is innovation (ability to think originality). However, Stevenson and Sahlman (1990:121), defined entrepreneurship as “the relentless pursuit of business opportunities without minding the resources controlled by the person pursuing the opportunity”.

According to Murray and Lan (1999:24), entrepreneurship is a process of planning, organizing, operating and assuming the risk of a business venture. Hence, entrepreneurship could also be viewed as a practice which involves generating new ideas and introducing innovations which entails commitment of resources in production of goods and services in order to meet the needs of the people for a profit purpose.

The Federal Government of Nigeria introduced the Structural Adjustment Programme (SAP) in 1985 in order to boost the entrepreneurial activities. The programme was aimed at saving the economy of Nigeria from total collapse through liberalization of the economy, which allows greater private initiatives. The programme wanted to make the private entrepreneurs to play greater role in the economy than it was. Consequently, many enterprises were opened up for private participation. It was this that made private entrepreneurs to go into various trades such as banking. Thus, there is today a high increase in the number of banks operating in various States of the Country.

Recently, the Six Geo- Political zones of the Federal Republic of Nigeria have witnessed increase in government efforts towards encouraging local entrepreneurship. These efforts came in the face of serious unemployment and some numbers of agencies and programmes were floated. Among these were the establishment of Chamber of Commerce, Industries, Mines and Agriculture (CCIMA), National Economic Empowerment and Development Strategy (NEEDS) and down to States and the Grass Root levels as Local Economic Empowerment and Development Strategy (LEEDS). National Directorate of Employment (NDE) had launched a number of programs to generate self-employment. These were: Small-Scale Industries, Agriculture, Youth Employment and Vocational Skills Development and Special Public Works. National Directorate of Employment (NDE), National Economic Reconstruction Fund (NERFUND), Industrial Development Centres (IDCs), People’s Bank, and many more (Labour, 2007). These efforts have led to the establishment of many enterprises, especially small ones all over the Country.

## Statement of the Problem

Entrepreneurial Software Technology Education plays a fundamental role in wealth creation, employment creation, value reorientation, improvement of the quality of life, real economic growth and development, knowledge addition and societal transformation in Nigeria with an estimated population of about 200 million. Entrepreneurial Technology Education is assumed to be the primary engine of economic growth and provides the key to unlocking the country’s potentials. Entrepreneurship development still faces series of challenges in Nigeria such as inadequate infrastructure, inadequate support from banks, inadequacy of power supply, lack of



technical knowhow, lack of software technology, inadequate grants from donors and government etc.

It is in the light of the above that this study attempts to assess the Impact of Entrepreneurial Technology Education on Innovation for Sustainable Development in Nigeria

### Research Questions

In view of the foregoing statement of problem, the following research questions are stated:-

1. To what extent has entrepreneurial technology education on innovation contributed to the sustainable development in Nigeria?
2. To what extent has government supported entrepreneurial technology education on innovation for sustainable development in Nigeria?
3. To what extent has Government created awareness on entrepreneurial technology software education for sustainable development in Nigeria?

### Objectives of the Study

The main objective of this paper is to understand the *Impact of Entrepreneurial Technology Education on Innovation for Sustainable Development in Nigeria*

However, some of the specific objectives are:

- i. To determine the extent to which entrepreneurial technology education on innovation has contributed to the sustainable development in Nigeria
- ii. To examine the extent by which government has supported entrepreneurial technology education on innovation for sustainable development in Nigeria
- iii. To assess the extent by which Government has created awareness on entrepreneurial software technology education for sustainable development in Nigeria

### Research Hypotheses

From the foregoing objectives of the study, the following null hypotheses are formulated for testing.

- i. That entrepreneurial technology education on innovation has not contributed to the sustainable development in Nigeria.
- ii. That government has not supported entrepreneurial technology education on innovation for sustainable development in Nigeria
- iii. That Government has not created awareness on entrepreneurial technology software education for sustainable development in Nigeria

### Literature Review

Despite the growing importance of entrepreneurship as a subject, researchers and practitioners still do not agree about what precisely entrepreneurship is. Again, despite the dramatic increase over the last 20 years in research dedicated to answering this important question. Little progress

appears to have been made towards understanding the essence of the concept. The current state of the literature is characterized by a proliferation of concepts, theories and empirical reviews as presented in this paper.

### Conceptual framework

There are still today any different views of entrepreneurship and these can differ greatly. Many researchers view entrepreneurship as a vital factor when it comes to economic growth and the development of societies. The great difference concerning the growth and development of entrepreneurship descends from the many different views of the concept. Societies where there are many entrepreneurial individuals; the growth and development will be more intense, compared to societies where there is a lack of entrepreneurial individuals. Another view of entrepreneurship is that the subject matter, entrepreneurship, is not at all active in the growth and development of a society. The progress is more likely to emerge at times where “economic conditions are more favourable” (Bjerke and Hultman, 2002), p.59). Bjerke and Hultman (2002) who has studied the subject extensively, further argued that “if the economic conditions are not favourable, entrepreneurship will not emerge and the economy of the society will stagnate” (p.59). The last view is one in which entrepreneurship is seen as an “intervening variable between prior conditions on one hand and creation of new business ventures (which is turn causes economic growth and development) on the other” (Bjerke and Hultman, 2002, p.59).

Since the advent of the study of entrepreneurship, some of the pioneers in the field put forward various definition of entrepreneurship. The definition and exact meaning have been moving targets. The concept of entrepreneurship, which became noticeable in the 1700s evolved with various meanings probably because of the way it developed. Initially, many equated it with simply starting a business or enterprise (Shane, 2000). To some others; it is starting a business with assumption of associated risks.

According to Ennew and Binks (1998:16), efforts to give meaning to entrepreneurship can be grouped into two, namely;

1. The trait approach, which seeks to identify common psychological and social personality types among entrepreneurs compared with non-entrepreneurs.
2. Behavioural perspectives, which are based on research into what entrepreneurs do, and the processes used in carrying out entrepreneurial activities and practices.

Some of the common descriptors of the trait approach in entrepreneurship include opportunistic, innovative, proactive and restless (Chell et al., 1991). However, this approach has not yet provided an entrepreneurial archetype (Stokes, 2000). There seems to be more consensus with respect to what entrepreneurs do (behavioural) than who they are (trait).

Stonner et al (1995:75), for instance, informs that entrepreneurship is the practice of taking idea and inventing organizations an enterprise for the developments of the idea. Oma-Williams (2000:21), opines that entrepreneurship is all about change in products and services provided by any organization to meet the needs opened by opportunities. He concludes that it is the exploitations of opportunities to create change while the entrepreneur or actors of the change bear full risks of their undertakings.

## Entrepreneurial Technology Education Software

According to Global Entrepreneurship Monitor 2013, Nigeria has the possibility of creating jobs for billions of her citizenry through entrepreneurship education. We are living in both opportunity and necessity driven economy where we can create and reorient value. We can still be part of the advanced Countries if we can come together as managers with the team spirit of real economic development.

The world has become a global village and the future prosperity depends on enhanced global entrepreneurial skills. This hinges on people and their technological sophistications. Towards this, some crucial entrepreneurial and technical skills are needed by us to meet the trends of global economy reality.

Based on agreement reality of knowledge acquisition, man has strived to improve his way and quality of life through technological discovery in order to add value to the larger society. The aggregate of the use and the application of his Entrepreneurial software Technology Education of **Attitude, Skills and Knowledge (ASK)** constitute what enriches entrepreneurial mind. Natural instinct therefore directs us and compels the application of Entrepreneurial software Technology Education for the well-being of man. *Entrepreneurial Software Technology Education plays a fundamental role in wealth creation, employment creation, value reorientation, improvement of the quality of life, real economic growth and development, knowledge addition and societal transformation.* Technology is, therefore, the primary engine of economic growth and provides the key to unlocking the country's potentials.

There is a need for the training and retraining of ourselves on Software Technology education to enrich our entrepreneurial capacities. This includes coaching, mentoring and tutoring in professional areas such as entrepreneurial engineering, entrepreneurial agriculture, entrepreneurial home economics, entrepreneurial technology and entrepreneurial communication etc. These skills involve practical works and applications that lead to a particular occupation. The application of Technical, human relation, conceptual, communication, team building, computer and decision making skills will make us value adders.

## Theoretical framework

The major point to note in entrepreneurship is that of components of entrepreneurship (which would assist conceptual and operational definitions of the construct) to be observed in entrant literature and sample groups and environments where entrepreneurship is practiced.

## **1. Frank Knight's Risk Bearing Theory**

Frank Knight (1885 – 1972) first introduced the dimension of risk-taking as a central characteristic of entrepreneurship. He adopts the theory of early economists such as Cantillon and J.B. Say, and adds the dimension of risk-taking and holds the main function of the entrepreneur as acting in anticipation of future events. The entrepreneur earns profit as a reward for taking such risks.

## **2. Alfred Marshall's Theory of Entrepreneurship**

Alfred Marshall in his principles of Economics (1890) held land, labour, capital and organization as the four factors of production, and considered entrepreneurship as the driving factor that brings these four factors together.

The characteristics of a successful entrepreneur include:

1. Thorough understanding of the industry
2. Good leadership skills and
3. Foresight on demand and supply changes and the willingness to act on such risky foresights.

## **3. Joseph Schumpeter's Innovation Theory**

Joseph Schumpeter's innovation theory of entrepreneurship (1949), Holds an entrepreneur as one having three major characteristics: innovation, foresight, and creativity. Entrepreneurship takes place when the entrepreneur

1. Creates a new product;
2. Introduces a new way to make a product;
3. Discovers a new market for a product;
4. Finds a new source of raw material and
5. Finds new way of making things or organization.

Schumpeter's innovation theory however ignores the entrepreneur's risk taking ability and organizational skills, and place undue importance on innovation. This theory applies to large-scale businesses, but economic conditions force small entrepreneurs to imitate rather than innovate.

## **Methodology**

The researcher used the Survey research design methods to explain the various techniques adopted and procedures followed in carrying out this research.

Data collections were done through a survey carried out on a sample of respondents taken through simple random sampling from the study population. Data were presented in tables as frequency and distribution. The analytical techniques used in the study were frequency and percentages.

The sources of data collection include primary and secondary sources. Both were the methods used for collecting data and information in the analysis of the study.

The primary source of data collection included responses from the administered questionnaire, personal interview, and observation method within different categories of entrepreneurs in the 6 Geo-Political zones while the secondary sources of data included information gathered from

textbooks, journals, seminar papers, dailies, internet, and other information related for the area of the study.

The population of this presentation consisted of all the registered entrepreneurs in 6 Geo-Political Zones. The study selected each State from each zone which entailed Bauchi, Kaduna, Oyo, Kogi, Edo and Anambra States with the total population of 1,627 each making the total Registered Entrepreneurs to be 9,762

### Sample Size

Since it was not possible to administer questionnaire to all entrepreneurs in the 6 States, there was a need to limit the number of respondents. Therefore, the researcher decided to adopt the formula by Taro Yamani in Ezirim et al (2004:114) the sample size.

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

Where n = Sample size

N = Population

e = an assumed margin of error

1 = is constant and regular

The registered entrepreneurs in the 6 States were 9,762 and assumed e= 0.05, the population (N) be determined using the above formula in solving to determine the sample size of this research.

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

$$n = \frac{9,762}{1 + 9,762 (0.05)^2}$$

$$n = \frac{9,762}{1 + 9,762 (0.0025)}$$

$$n = \frac{9,762}{1 + 24.405}$$

$$n = \frac{9,762}{25.405}$$

$$n = 384$$

Therefore,  $n = 384$

### Sampling Techniques

Sampling size of three hundred and eighty four (384) was used as copies of questionnaires distributed, but in return, three hundred and seven (307) copies were returned, out of which seven (7) copies were irrelevant, and three hundred (300) copies were later used for the study. These 384 entrepreneurs were selected from all the 6 States selected. It was also aimed at making sure that the respondents choose good representatives of the key entrepreneurs in the States.

### Method of Data Analysis

In analyzing the data, the techniques of frequency was applied as shown below,

$$\frac{F}{N} \times 100$$

$$N = 1$$

Where  $F$  = Frequency of a particular response to variable to interest

$N$  = Total response

% = Percentage

In testing the hypotheses, two testing methods were adopted. The first two hypotheses were tested through Analysis of Variance (ANOVA) while the remaining were tested via Z-test.

The analysis of variance (ANOVA) formula could be analyzed thus:

$$SSB = r \sum (\bar{x}_{ij} - \bar{x})^2$$

$$SSW = \sum \sum (x_{ij} - \bar{x})^2$$

Where  $SSB$  = Between treatment sum of square

$SSW$  = Within treatment of the square

$x_{ij}$  = Individual observation around their column mean

$ij$  = Number of column

$\bar{x}$  = Grand mean column

$df$  = Degree of freedom  $(c - 1)(n - 1)$

$C$  = Number of column

$n$  = Number

$r$  = Number of row

$\Sigma$  = Summation

$(0.05)$  = Level of Significance



The remaining two hypotheses were tested via Z-test. This entailed using relevant data to compute the value of Z as shown below.

$$Z = \frac{P - P_o}{\sqrt{\frac{P_o(1 - P_o)}{N}}}$$

Where P = Population of positive response to variable of interest.

P<sub>o</sub> = Probability of rejecting null hypothesis (0.5)

1 = is Constant

N = Total number of responses

Then, the computed Z were compared with its critical value at P and 0.5 which was 1.96.

### Discussion of Findings

In chapter one of this paper, some hypotheses were formulated by the researcher, these have to be tested to verify its viability.

#### HYPOTHESIS ONE (Table 4.2.8)

- i. Ho: That entrepreneurial technology education on innovation has not contributed to the sustainable development in Nigeria.

TABLE 4.3.1: The contribution of Entrepreneurial technology education on innovation for sustainable development in Nigeria.

EXTENT	RESPONDENTS	PERCENTAGE (%)
Greatly	200	67
Great	50	11
Little	33	17
No Idea	17	5
TOTAL	300	100

Source: Research Survey, 2018

### Testing Data

Using the information from table 4.3.1, it indicated that 67% representing 200 numbers of respondents strongly agreed that entrepreneurial technology education on innovation has contributed to sustainable development in Nigeria, 17% representing 50 numbers of the respondents agreed that entrepreneurship development has contributed greatly to the economic growth and development in Nigeria, encountered great, 11% of the representing 33 numbers of the respondents disagreed with the view that entrepreneurship development has contributed to the economic growth and development in Nigeria, while 5% representing 17 numbers of respondents

said nothing to the effect. This implied that entrepreneurial technology education on innovation has contributed to sustainable development in Nigeria.

This can be analyzed by the use of ANOVA Test;

### HYPOTHESIS ONE

TABLE	GREATLY	GREAT	LITTLE	NO IDEA
Table 4.2.8	200	50	33	17
Table 4.2.12	133	67	67	33
Table 4.2.13	183	83	27	7
X	172	67	42	19
X	75			

$$SSB = r \sum (\bar{x}_{ij} - \bar{x})^2$$

$$SSW = \sum \sum (x_{ij} - \bar{x})^2$$

$$\begin{aligned}
 SSB &= 3(172 - 75)^2 + (67 - 75)^2 + (42 - 75)^2 + (19 - 75)^2 \\
 &= 3(97)^2 + (-8)^2 + (-33)^2 + (-56)^2 \\
 &= 3(9,409 + 64 + 1,089 + 3,136) \\
 &= 3(13,698)
 \end{aligned}$$

$$SSB = 41,094$$

$$\begin{aligned}
 SSW &= (200 - 172)^2 + (133 - 172)^2 + (183 - 172)^2 \\
 &\quad (28)^2 + (-39)^2 + (11)^2 \\
 &\quad 784 + 1,521 + 121 = 2,426 \\
 &\quad (50 - 67)^2 + (67 - 67)^2 + (83 - 67)^2 \\
 &\quad (-17)^2 + (0)^2 + (16)^2 \\
 &\quad 289 + 0 + 256 = 545 \\
 &\quad (33 - 42)^2 + (67 - 42)^2 + (27 - 42)^2 \\
 &\quad (-9)^2 + (25)^2 + (-15)^2 \\
 &\quad 81 + 625 + 225 = 931 \\
 &\quad (17 - 19)^2 + (33 - 19)^2 + (7 - 19)^2 \\
 &\quad (-2)^2 + (14)^2 + (-12)^2 \\
 &\quad 4 + 196 + 144 = 344
 \end{aligned}$$

$$SSW = 2,426 + 545 + 931 + 344 = 4,246$$

### ANOVA

SOURCE	SS	DF	MS	F cal	Sig.
Between Treatment	41,094	$C - 1 = 4 - 1 = 3$	13,698	25.81	0.05
Within Treatment	4,246	$N - C = 12 - 4 = 8$	530.75		
			25.81		

$$F_{cal} = 25.81$$

$$F_{tab} = 4.07$$

### Decision Rule

Using the ANOVA test statistics table, the computed ANOVA was more than its critical value ( $25.81 > 4.07$ ), we therefore reject the Null Hypothesis ( $H_0$ ) and accept the Alternative Hypothesis ( $H_i$ ) which posited that “entrepreneurial technology education on innovation has contributed to sustainable development in Nigeria, ”

### Hypothesis Two (Table 4.2.9)

$H_0$ : That government has not supported entrepreneurial technology education on innovation for sustainable development in Nigeria

TABLE 4.3.2: Government Support for Entrepreneurship Development in Nigeria

RESPONSES	RESPONDENTS	PERCENTAGE (%)
Strongly Agreed	234	78
Agreed	39	13
Disagreed	27	9
Undecided	0	0
TOTAL	300	100

Source: Research Survey, 2018

### Test Data

Table 4.3.2 indicated that 78% representing 234 numbers of the respondents strongly agreed that government has greatly supported entrepreneurship development in Nigeria, 13%

representing 39 numbers of respondents agreed that government has given great support to entrepreneurship development in Nigeria, 9% representing 27 numbers of the respondents disagreed with the view that government has given no support to entrepreneurship development in Nigeria.

This can be analyzed by the use of Z-test formula;

$$\frac{P - P_o}{\sqrt{\frac{P_o(1 - P_o)}{N}}}$$

Where  $P = 234 = 78\% = 0.78$

$$P_o = 0.5$$

$$N = 300$$

$$Z = \frac{0.78 - 0.5}{\sqrt{\frac{0.5(1 - 0.5)}{300}}}$$

$$Z = \frac{0.28}{\sqrt{\frac{0.5(0.5)}{300}}}$$

$$Z = \frac{0.28}{\sqrt{0.25}}$$

$$Z = \frac{0.28}{\sqrt{0.000833}}$$

$$Z = \frac{0.28}{0.02887}$$

$$Z = 9.7$$

### Decision Rule

The computed Z is more than its critical value ( $9.7 > 1.96$ ) therefore, we reject the Null Hypothesis ( $H_o$ ) and accept the Alternative Hypothesis ( $H_i$ ) which stated "That government has supported entrepreneurial technology education on innovation for sustainable development in Nigeria

### Hypothesis Three (Table 4.2.10)

That Government has not created awareness on entrepreneurial technology software education for sustainable development in Nigeria

TABLE 4.3.3 Government awareness on entrepreneurial technology software education for sustainable development in Nigeria.

EXTENT	RESPONDENTS	PERCENTAGE (%)
Strongly Agreed	0	0
Agreed	36	12
Disagreed	15	5
Undecided	249	83
TOTAL	300	100

Source: Research Survey, 2018

### Test Data

Table 4.3.3 indicated that 0% representing 0 number of respondent strongly did not agree that Government did not create awareness on entrepreneurial technology education software for sustainable development. 12% representing 36 numbers of the respondents agreed that Government created the awareness. 5% representing 15 numbers of respondents disagreed with the view. This implied that Government has not created awareness on entrepreneurial technology software education for sustainable development in Nigeria

This can be analyzed by the use of Z-test formula;

$$\frac{P - P_o}{\sqrt{\frac{P_o(1 - P_o)}{N}}}$$

Where P = 249 = 83% = 0.83

$$P_o = 0 - 5$$

$$N = 300$$

$$Z = \frac{0.83 - 0.5}{\sqrt{\frac{0.5(1 - 0.5)}{300}}}$$

$$Z = \frac{0.33}{\sqrt{0.5(1 - 0.5)}}$$

$$Z = \frac{300}{\frac{0.33}{\sqrt{0.5(0.5)}}}$$

$$Z = \frac{0.33}{\sqrt{0.25}}$$

$$Z = \frac{0.33}{\sqrt{0.000833}}$$

$$Z = \frac{0.33}{0.02887}$$

$$Z = 11.4$$

### Decision Rule

The computed Z is more than its critical value ( $11.4 > 1.96$ ) therefore, we accept the Null Hypothesis (Ho) Which stated that Government has not created awareness on entrepreneurial technology software education for sustainable development in Nigeria and reject the Alternative Hypothesis (Hi).

### Discussion of Research Findings

From the results of the research conducted through the administration of questionnaire, testing of hypotheses, references made to relevant literature, the following findings were made.

It was widely accepted that there were many good reasons to promote entrepreneurship among people. In promoting entrepreneurship development in Nigeria, government should introduce some entrepreneurship programs like Nigeria Chamber of commerce, industries, mines and Agriculture (NCCIMA), State Economic Empowerment and Development Strategy (SEEDS) and down to the grass root level as Local economic Empowerment and Development Strategy (LEEDS) this in collaboration with National Directorate of Employment (NDE) had launched a number of programs to generate self-employment. These were: Small-scale Industries, Agriculture, youth employment and vocational skills development and special public works. The program operated two Credit Guarantee Schemes complemented by an entrepreneurial development program to assist the SMEs. The two credit schemes were the Graduate Job Creation Loan Scheme (GJLS) and the Mature People's Scheme (MPS).

Facilities under the two schemes were repaid over a five-year period at a concessionary interest rate with varying periods of moratorium. SME projects covered include soap making, food processing, flour milling etc.



According to the agency, prioritized skills acquisition was the fastest route to job creation, which was the greatest challenges confronting the global economy. The directorate in 2007, created more skills acquisitions centres, and built 41 of the centres up to date. Jobs were hard to come by these days and even on the global stage, unemployment continued to be a big challenge. In combating unemployment, federal government through National Directorate of Employment (NDE) established these skills acquisition centres in collaboration with the Millennium Development Goals (MDGs) office. The skills acquisition centres were fully rehabilitated and equipped and were located in some States of the federation.

## Conclusion

The following were the major findings of the study;

1. It was obvious that most entrepreneurs in studied States were engaged in small scale businesses and they were mostly involved in retail and services.
2. Entrepreneurship has done more good than harm in the 6 States and Nigeria at large. Especially in the aspects of employment, productivity and so on.
3. It also reviewed that proper training and orientations were not given to most of the entrepreneurs in the 6 States on entrepreneurial technology education software.

In conclusion, it has been reviewed that the development of entrepreneurship has some limitations and the paper was not meant just to highlight them but to come up with appropriate solution aimed at fostering the development of entrepreneurship in Nigeria.

Management control was another serious problem the entrepreneurs faced. A typical Nigerian entrepreneur did not take his day-to-day running of the business seriously instead, they indulged in other activities. Nigerian entrepreneurs were of the habit of producing sub-standard goods and this has made local consumers go for foreign goods in preference to locally manufactured goods. This was as a result of anxiousness for profit.

Finally, only a knowledgeable dynamic and purposeful manufacturer with the encouragement and assistance of the government and its employees can develop entrepreneurship in Nigeria.

## Recommendations

1. It is recommended that special centres are created and specifically entrusted with the responsibilities of assisting individuals develop the skills, knowledge and general competencies for managing entrepreneurship challenges.
2. Tax holdings should also be given to entrepreneurs as they would help them grow faster than when they are compelled to pay huge taxes on their businesses.
3. As being practice globally, SMEs and their operations should constitute themselves into industrial/commercial clusters, in order to attract not only government presence and assistance but also be able to attract external development agencies for enhancing productive and sustainable growth.

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## **TELEMEDICINE DIFFUSION IN A DEVELOPING COUNTRY: A CASE OF SENEGAL**

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### **Abstract.**

Senegal is located in West Africa where health care resources are extremely limited. Although it is improving each day, many say that an even bigger improvement is needed to decrease the high mortality rate, and ensure good health countrywide. Several factors justify the efficient application of Telemedicine in Sub-Saharan Africa (SSA) to augment the declining health care delivery system in that region of the world. In doing research, telemedicine, along with other solutions, play a huge role in ensuring this plan is effective because of its convenience and benefits. In recent years, the use of telemedicine has become increasingly popular in countries like Senegal. Telemedicine is significant because of its ability to transmit the needed information promptly. Besides, it is a means to communicate and care for patients having limited access to health care at efficient and personalized level. Over the years, the use of telemedicine has extended to several countries and the technology continues to improve each day.

Index Terms: Senegal, health care, telemedicine, Sub-Saharan Africa (SSA), research, solutions, benefits, information, and expansion.

### **Introduction**

Spanning over 192,000 square kilometers, Senegal (also known as the Republic of Senegal) has a population of 14.7 million residents. There has been a recent population growth rate of 3.13%, which is higher than the world median by 2.5 times. There are 38 births per one 1000 and six deaths per 1,000 residents. The average life expectancy in Senegal is 66 yrs. Although this is predicted for both genders, Senegalese women have a higher chance of meeting the life expectancy compared to Senegalese men. To decrease the mortality rate and increase the longevity, improvements in healthcare are a necessity.

Although this is a very populated country, every Senegalese citizen has a constitutional right to access quality healthcare (Colome, 2010). The country's overall health system is inadequate. Senegal has a high prevalence of infectious diseases such as Tuberculosis, Malaria, HIV/AIDS, and Bronchitis. Since most remote areas in Senegal have limited medical resources, most diseases are incorrectly diagnosed. The use of telemedicine in these regions provides access to medical providers who can correctly diagnose and treat these conditions.

Senegal being an underdeveloped country can benefit from remote technology that requires limited financial investment onsite. The benefits of telemedicine will include effective patient care, access to qualified medical professionals and timely transmission of medical information

and treatment recommendations. The use of telemedicine will also facilitate communication between medical specialists and local doctors who require a second opinion (Bagayoko, 2016). In the following paragraphs, a few cases displaying the application of telemedicine and how it can be used to improve the delivery of health care in Senegal shall be discussed. The application will be geared towards Senegalese with chronic conditions, pediatric and obstetric care in remote areas. The modalities and strategies of telemedicine delivery will be discussed. After a resolution is established and applied to improve the healthcare systems, it is anticipated that the people of Senegal will experience better care and a possible decrease in mortality rate.

### **Need for Telemedicine in Senegal**

Due to the rapidly growing population in various Senegalese communities, the use telemedicine is a necessary upgrade to the healthcare system. Senegal, a predominantly rural country with an urban population of 6,543,954 residents and a rural population of 8,423,492 inhabitants, will significantly benefit from a more efficient health care system (Mars, 2013).

Several reasons have accelerated the advancement of telemedicine, but Senegal is a large country with limited health care facilities hence patients in the difficult to access areas cannot reap the benefits. There are only seven hospitals and six "rural health huts" in Senegal to treat those in need of medical attention and annual checkups. There are limited infectious disease specialists for epidemics in Senegal in particular and the western part of Africa as a whole (2013). Most medical graduates leave Africa in search of better-paying jobs abroad. The mass emigration of health care providers has further contributed to the declining quality of care in a region with about 14.7 million+ people (Harvard Gazette, 2009).

In the United States, there is a doctor to patient ratio of about 1 to 400, whereas in sub-Saharan Africa, there is a ratio of 1 to 50,000. In addition to the growing shortage of medical specialists to provide quality health care, sub-Saharan Africa has a high morbidity rate and a rapidly increasing infant and maternal mortality rate. There is also a growing incidence HIV and AIDs related infections. Unfortunately, other medical conditions that can be treated and prevented such as malaria and cholera also have a high incidence (2009).

According to the International Journal for Vascular Biology and Medicine, several factors have been identified to limit the use of telemedicine in Senegal and other sub-Saharan-African countries. These factors include shortage of human resources, limited infrastructures, poverty, lack of internet connectivity, high internet connectivity costs and so on (Mars, 2012).

The limited availability of human resources explains the shortage of medical staff to assist patients and provide quality health care services. The spread of infectious disease in Senegal is very high since most of the patients are wrongly diagnosed hence the proper protocol to prevent the spread of the disease is not followed. Furthermore, there are very limited financial resources available for the connectivity of telemedicine and tele health system. If there are no funds allocated for internet connection, there cannot be a system to assist these patients. These problems can be resolved by implementing an efficient plan to address these concerns and decrease patient's travel expenses (Wooton, 2009).

### **Overview of Senegal's Telemedicine Infrastructure**

The use of Telemedicine facilitates communication between medical professionals and patients; it also facilitates the secure sharing of medical information electronically. With the use of Telemedicine technology, a medical provider can consult a specialist at a different geographical location. Medical information can also be exchanged securely between medical providers worldwide. The potential application of telemedicine is particularly significant in countries with

a shortage of medical specialists, underserved villages with limited means of transportation to a medical facility (Muller, 2016).

Compared to other African nations, Senegal has a well-organized but delayed infrastructure. (Nation's Encyclopedia, 2016). An Infrastructure refers to a simple physical structural arrangement or a facility needed for a process of a society or an enterprise. As per the definition of an infrastructure, the telecommunication industry has a deficit as portrayed by the existing shortages of power and service (2016).

Senegal's energy infrastructure generates a minuscule fraction of the services needed when compared to the amount delivered in other developing countries. These services include electricity generation and security. About 48 Sub-Saharan- African countries (having a combined population of about 800 million) generate about the same amount of power as Spain (The World Bank, 2013). Unfortunately, a majority of the already struggling companies in many countries in sub-Saharan Africa have cited the limited availability of power as an outstanding business obstacle.

While there are significant technical and regulatory barriers, such as power shortage, the development of infrastructure for telemedicine and other infrastructural necessities have to be addressed if the potential of telemedicine is to be fully realized in Senegal. Unfortunately, there is limited data on the application of telemedicine; this has been a major setback to medical providers, and policy makers (Puskin, 2009). Many developing countries, especially SADC countries, and the RSA (both have the lowest level of Telecommunication density) are plagued with a stunted economy (Alleman, 2007).

For telemedicine to improve and remain accessible, the government must contribute to its infrastructure and invest in each area. While the Senegalese government has discontinued foreign investments, this should be no hindrance to its progress. Government officials have introduced satellite-based telemedicine and eHealth programs. However, when considering the benefits of an intervention, it is important also to take the associated costs into account. In one year, the Senegalese government spent 3,266 million on telecommunication, telemedicine infrastructure and satellites to effectively transmit data to healthcare centers (2007).

The satellite-based SAHEL telemedicine solution is one that addresses two very important needs of Africans: better communications and dispersed medical care. The use of satellite communication devices can provide access to health care in remote areas. It can be used to bridge the "digital divide" and serve as a vital service to countries with many pockets of underserved areas. These areas will benefit by having quality health care services to access (Artes Apps, 2016).

This use of satellites to provide telemedicine services will narrow the gap on access to medical care irrespective of a patient's geographical location. This technology requires the satellite-based broadband which happens to be the most up to date version required to deliver several eHealth services fast, secure and more efficiently.

The SAHEL project offers an effective collaboration between technologies such as industries and operators, stakeholders such as specialists, health workers, nurses, centers of learning providing medical content for eLearning and NGOs for a local implementation with the support of regional actors (2016). The SAHEL project is about to commence an engineering-centered stage devoted to the modification of the SAHEL platform which will be more user-friendly.

Another Senegalese broadband satellite is BusinessCom. BusinessCom enables the delivery of medical services via a single or multiple clinic room access. These services delivered include Physical examinations, emergency medical services, OB/GYN services, and dental consultations.



This modality is designed to be very flexible, permanent mode of health care delivery. It can also be used in emergency medical relief situations (BusinessCom Networks, 2015).

Virtual clinics can be operated from any geographical location. They are well equipped with very efficient and up to date BusinessCom satellite connectivity services such as efficient electronic devices, secure IP, High Definition video calling and many other features. The virtual clinic powered by solar panels, generators and running water. The main model is based on the 5 kW Diesel generator, with 6 kW solar energy system (roof rack, panels, inverter, charge controller and batteries) available as an alternative.

Telecommunication kits usually include a wide variety of medical equipment. The kit also include equipment that helps real-time communication through satellite to help with the exchange of images and data from ultrasounds, ECG, derma scopes, X-ray, surgical fluoroscopes, stethoscopes and other medical devices. One of the most important features of any telemedicine patient-provider counter is privacy. The connection is encrypted with 256-bit AES cipher that ensures the most secure communication (2015).

### Specific Cases of Telemedicine Projects in Senegal

There are three main subtypes of telemedicine: 1) store-and-forward, 2.) Remote monitoring 3) Real-time interactive services. These have different each of these telemedicine subtypes play a major role in the delivery of quality health care. Telemedicine sub-types can be further divided into smaller segments that provide more specific services.

**Tele-Ophthalmology Case:** This is an essential sub-system in Senegal. Many Senegalese suffer from blindness and/or impaired vision with an undiagnosed underlying cause. The lack of ophthalmology specialists, as well as the high demographic dispersion in the area, it is important to consider telemedicine, particularly tele ophthalmology, which benefit the underserved rural parts of Senegal.

### Study Design:

Lack of resources related to telecommunications infrastructure in rural areas of Senegal is a major challenge to obtaining an optimum bandwidth and good quality medical images. The entire technical solution is illustrated in figure 1. The image is an illustration that an ICS replica server gives redundancy to the security and system of health images.

The system can pass through firewalls to arrive at any terminal that the ophthalmologist gain access the web (Benseny, 2010).

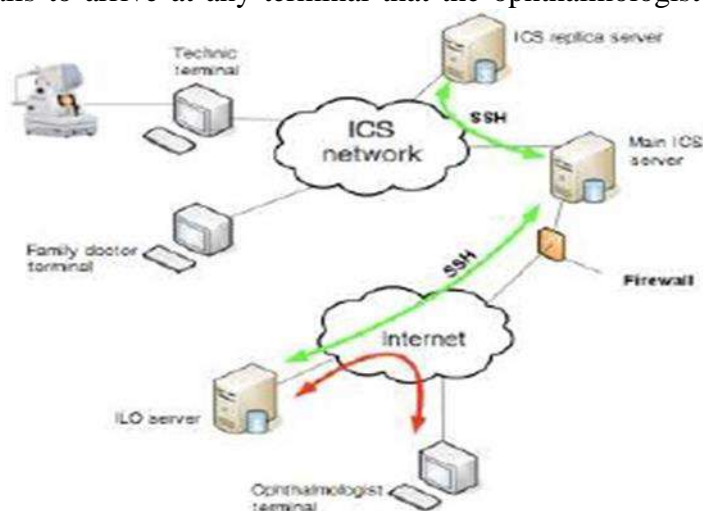


Fig. 1 Source: academia.edu, ICS Network,(2010).

The Eye-Health Project has accomplished major milestones in areas in which medical resources are limited. There is no need to regularly get an ophthalmology specialist to handle the first stage of the process of selection. Also, patients save their time and money as they do not have to visit the remote hospital every single time they need services (2010).

The Eye-Health project recruited a staff consisting of 13 General Practitioners, three nurses and an ophthalmologist. The total number of 489 patients was treated, and about 1004 eye fungus' pictures were taken. The project was considered successful, based on patient feedback. The General Practitioner and the Ophthalmologist had the same diagnoses for about 80% of the cases which were studied during the Eye-Health project. The remaining 20% of cases for which the general practitioner and the ophthalmologist had conflicting diagnoses were referred to another specialist for a second opinion. This project significantly decreased the numbers waitlisted for a specialist; it helped to build a better patient-doctor relationship, and several isolated pockets of patients were able to receive specialized care (Domingo, 2010).

**MicroG Center Case Study:** In another study in Senegal, researchers shared information on several studies conducted in developing countries. The Telemedicine Laboratory also referred to as the MicroG Center performed a number of eResearch activities which were successful. These activities were related to the development of hardware and software that have been used in eHealth projects, tele transmission to partners of live surgeries, lectures, and data collection for several studies but nationally and internationally. To promote greater collaboration (international) for aerospace-physiological studies at the MicroG Center, the Telemedicine Laboratory had on many occasions used video-conferencing technology to allow virtual participation during data collection (Russamano, 2016).

The use of Telemedicine technology has enabled researcher partners from other institutions to take part in joint studies without the need to relocate. It has allowed smooth interactions and active participation between researchers, professors, and students from different nations, with the benefits of avoiding the need to travel and thus reducing costs. Because of the shortage of internet access in remote areas, the electronic patient record software requires local database management systems to employ "store and forward" methodology for data communication (2016).

Data exchange between sites takes place depends only on internet availability, allowing greater flexibility and mobility of the specialized virtual assistance service. Data input is divided into general patient information and specialized areas, such as odontology, cardiology, pharmacy, and so on. Each specialty service is used according to the need of the receiving physician for a second opinion. All patient data is secure, and its access is protected by a user login and password.

This study was deemed successful and created a means for patients, no matter the illness, to gain access doctors and keep records confidential. It also sparked many ideas to create desktop and web applications for patients to access their medical records (2016).

**Ebola Outbreak Case:** Lastly, there was an outbreak in Senegal as per the official announcement on August 29, 2014 (Fig. 2). One of the first confirmed cases of Ebola in Senegal was a man traveling from Dakar to Guinea who came in close contact with an Ebola patient at some point during the trip (WHO, 2014).



## Ebola spreads to Senegal

1,500 people have already died in the latest epidemic



Fig. 2

Dakar, Senegal is the home to a world-class foundation called the Pasteur Institute & Laboratory. The laboratory is approved by WHO (World Health Organization) to conduct fast and reliable tests for viral hemorrhagic fevers (2014).

The WHO dispatched three senior epidemiologists (Drs. Guénaél Rodier, Florimont Tshioko, and Amada Berthe) who immediately applied their extensive expertise and medical knowledge to contain one of the largest Ebola outbreaks (2014). The worked together with the local staff and top officials from the Senegalese Ministry of Health (Dr. Alimata Jeanne Diarra-Nama, Dr. Papa Amadou Diack,) other key players in the containment of the epidemic were the MSF (Médecins Sans Frontières) and the CDC (US Centers for Disease Control and Prevention). At this point, Senegal had become well medically equipped to prevent the spread of disease especially with the rising number of cases of Ebola outbreak that lurked its borders.

Initially, the response was coordinated by government officials. A National Crisis Committee provided the “nerve center” for the emergency response (2014).

Funds required to support the eradication of the outbreak were mobilized by local organizations and international partners. These funds were put towards technical, material and telemedicine services. Funds were also set aside to provide the necessary equipment and resources needed to protect health care workers from contracting the disease.

### Discussion

Telemedicine has eased the provision of health care services to the underserved population. It has also aided in the delivery of emergency medical services in major medical outbreaks (Ebola). The re-emergence of Telemedicine is gaining attention due to the possibilities it provides. Lack of facilities is a major limitation to telemedicine is limited in Senegal. A few medical providers with more advanced medical equipment have adopted the use of Telemedicine in their practices. to provide a more efficient telemedicine system, several changes have to be made in other sectors especially in the Senegalese health care system as a whole (2009).

1. **Set Clear Objectives for the Program:** A strategic plan including a literature review and a gap analysis of telemedicine in Senegal is the starting point for improving the delivery of health care and providing better services.
2. **The Government's Support:** The financial assistance of the Senegalese government is needed to support telemedicine projects. A better telemedicine system will not only benefit people in the underserved areas of the country, but it will also enhance the country's health care system.
3. **Become User-Equipped and Adapt to the Program:** Increasing familiarity with all the different telemedicine options available and determining the best fit for individual services. Start looking for ways to improve the interface the pass on knowledge to colleagues. Many interfaces already allow introducing and spreading existing databases and the capability to integrate with other databases. Take advantage of each use and apply it in each facility.
4. **Determine Convenience via Telecommunications and Internet Connectivity.** There is very limited access to Internet services in Senegal, the high cost of providing this services discourages the extension of these resources to rural areas where the demand is less (E-OTI, 2009). Determining how telemedicine projects use the internet to schedule consultations, transfer patient data, etc. as it pertains to landlines and satellites. Understanding other telemedicine projects will provide a foundation of knowledge to commence a strategic plan to build a telemedicine system convenient to patients and doctors.
5. **Implement Ethics and Procedure:** Clinical practice standards are the core guidelines used by all telemedicine sites. SAHEL is one standard that has been used for telemedicine for creating firewalls and security. Although there is a set protocol, there are still potential security bridges.
6. **The measure of Cost Efficiency and User-Satisfaction:** The costs of providing medical services by means of telemedicine can be put in two categories: non-health care costs and direct health care costs. The direct health care costs refer to the physical health resources required to produce a specific health service. The non-health care costs refer to costs outside of the health care sector. These include Production losses, travel cost, childcare costs and leisure time costs. Once costs have been determined, and they have been deemed effective, the next step is to evaluate the user-satisfaction. It is essential that things not be only easy for doctors but also satisfying to the patients. Whoever is using it should usually be comfortable (Bergmo, 2009).

## Conclusion

Why believe that telemedicine will benefit the world? Telemedicine fills the gap made wider by the changing health care needs. It is one of the solutions to the evolving requirements of the healthcare community; facilities provide the necessary solutions and services to encourage a sustainable technological revolution in the healthcare industry (Telemed Africa, 2016). The aging population's problem facing developed nations, the shift from infectious to chronic disease and the rising health care cost are different to those of the developing nations, but both can be addressed through the use of telemedicine. In developing nations, the problems are access to quality care and more specifically access to specialist care. As a result of poverty, tax bases are low and thus governments have less to spend on healthcare and the provision of information technology, infrastructure for eHealth solutions such as telemedicine. Poverty can be linked to diseases and the burden of diseases is very great. (Mars, 2013)

Telemedicine has the ability to benefit the shortage of health professionals in Africa and improve the quality of life of many people (2013). International services have inclined to aid urban, usually academic centers who contribute to the raising of awareness of telemedicine in these centres.

Telemedicine has benefited Senegal and many (mostly rural areas) underserved parts of the world. The many health care issues such as HIV/AIDS, malaria, tuberculosis, etc. have led to the adoption of telemedicine, and it is evident how vital it is in extremely disadvantaged areas. (Wooton, 2009). Senegal is in a unique position to continue to implement, improve and build an efficient infrastructure and tele health industry. With the improvement that comes along, Senegal seems pleased to create and improve their tele health systems and telemedicine as a whole.

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## **Corporate Governance and Bank Performance: Empirical Evidence of Banks Listed on Nigeria Stock Exchange.**

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### **Abstract**

This study empirically assesses the effect of corporate governance on the performance of banks listed on Nigeria Stock Exchange. This study uses only listed deposit money banks in Nigeria that have consistently publish their audited annual financial report from 2011 to 2016. A sample of fourteen (14) deposit money banks formed the sample of this study. Board independence, board size, and gender as the independent variables and bank size as a control variable while the performance was proxy with return on asset (ROA) as the dependent variable. A panel data were collected from secondary source through the annual report and account of the banks and was analysed through the support of STATA 13 versions. To this end, we conducted descriptive statistics, correlation matrix and the study adopted OLS multiple regression model after Breusch and Pagan Lagrangian multiplier test for random effect was conducted. The findings of the study reveal that board independence had a negative and insignificant influence on the return on asset, while board size was found to have a negative and significant effect on return on asset of the study banks. The study also shows that board gender had a positive but insignificant impact on return on asset and the size of the banks appear to have a positive and significant influence on the performance of the study banks in Nigeria. This study recommended that the numbers of the board of directors should be reduced since the study found a significant negative effect on performance for larger board size. Also, the policy makers and stakeholders in Nigeria should promote and encourage more female representation in the board of Nigerian quoted banks.

**Key words:** board independent, board size, board gender, bank size, performance, Nigeria

### **Introduction**

In the early years of the 21st century, real interest in the concept of corporate governance began to appear after the financial scandals that took place in the United States and several East Asian countries such as Enron and WorldCom (Almari, 2017). Many financial institutions have either collapsed and or are facing near collapse because of badly functioned subprime mortgage lending

to firms and people with bad and unreliable credit (Lasisi, Mustapha, & Irom, 2018), this problem are attributed to poor management and lack of proper legal framework in Nigeria. According to Akpan and Amran, (2014) most countries have made significant effort to strengthen their corporate governance, transparency and disclosure levels. The collapse of the Nigerian financial institutions was as a result of poor corporate governance standard, corruption and lack of transparency.

Corporate governance is a combination of policies, laws and instructions influencing the way a firm is managed and controlled, it consists of a framework of rules to grant transparency and fairness in the relationship between the firms and its shareholders. According to Dalhat, (2014) corporate governance facilitate and stimulate the performance of firms by creating and maintaining the incentives to motivate insiders to maximize the firm's performance and serve as control mechanism. Performance is the subjective measure which determines how well the organizations use their available resources to generate more revenues. Performance measures the financial soundness and health of the organization in monetary terms. However, According to Erasmus, (2008) as cited in Muchiri, (2016) explain that financial performance is the process of measuring the results of a firm's policies and operations in monetary terms.

Financial performance is the process of measuring the results of a firm's policies and operations in monetary terms. It is used to measure firm's overall financial health over a given period of time. Financial performance is a desirable objective for all profit-oriented banks. The absence of it can indeed spells failure (Yahaya & Lamidi, 2015). Typical measures of financial performance can be attributed to corporate governance mechanism of a bank such as board size, independent directors, board diversity, CEO duality and tenure, board educations, board nationality among other which affect the bank performance negatively or positively.



Motivation to research into the governance of financial institutions is that financial crises are not random events, but are set in motion by the decisions of individuals and institutions operating within a given framework of laws and regulations. This challenge has been attributed partly to the corporate governance. No doubt the fall of Enron, WorldCom, Global Crossing and Rank Xerox in USA, Parmalat in Italy, the Maxwell saga in the UK, Daewoo in Korea, Leisurennet and Regal Bank in South Africa are all pointers to the enormous cost of corporate governance failure.

It is worthy of note that Nigeria is not immune to this challenge of corporate governance failure as various cases of financial scandal governance are increasingly being recorded and published on daily basis. The cases of Cadbury Nigeria Plc, Oceanic bank Plc, Intercontinental bank Plc, Afribank Plc, just to mention a few are part of Nigeria's share of corporate governance failures and recently the liquidity risk problem and the collapse of Skye bank Plc in 2018 is also a fair share of corporate governance problem.

Recently corporate governance practices in Nigeria have received increasing attention. Nigeria regulatory body and business leaders are trying to find solutions that will help Nigeria companies be more competitive on the global market, they have identified corporate governance as a key ingredient of the success formula towards achieving global competitiveness. Given the importance of credibility in financial reporting and good performance has raised the importance of good corporate governance in financial sector in Nigeria.

On the basis of this principle consists of our questions about whether the existence of corporate governance attributes affect the financial performance of deposit money banks in Nigeria. So this study contributes to the growing literature by focusing on the effect of corporate governance on financial performance of the financial companies in developing countries like Nigeria. According



to the above arguments, the study intends to answer the next research question: what is the effect of corporate governance on the financial performance of listed deposit money banks in Nigeria?

The purpose of this study is to examine whether corporate governance rules affect the financial performance of the banks and find out the characteristics of corporate governance in terms of Board independence, board size, and gender on the performance of banks listed on the Nigeria Stock Exchange and also verify the existence of the bank size.

## **Literature Review**

### **Theoretical Framework that Underpin this Study**

The theoretical framework adopted and presented in this study are the agency theory, stakeholder theory and the stewardship theory. Corporate governance is the relationship among shareholders, board of directors and the top management in determining the direction and performance of the corporation.

**Agency theory** is based on the idea of separation of ownership (principal) and management (agent) (Peters & Bagshaw, 2014). It includes the relationship among the many players involved (the stakeholders) and the goals for which the corporation is governed (Kim & Rasiah, 2010). Furthermore, it is concerned with ensuring that agents act in the best interest of the principals.

**Stakeholder's theory** was adopted to fill the observed gap created by omission found in the agency theory which identifies shareholders as the only interest group of a corporate entity (Peters & Bagshaw, 2014). The stakeholders' theory attempts to address the questions of which group of stakeholders deserve the attention of management. Therefore, for a firm to be efficient and effective, they focus more on all factors that will affect the objective of firms.

**Resource dependency theory** concentrates on the role of board directors in providing access to resources needed by the firm, whilst the stakeholder theory focuses on relationships with many groups for individual benefits and the agency theory concentrated on the monitoring and

controlling role of board of directors whereas the resource dependency theory focus on the advisory and counselling role of directors to a firm management (Peters & Bagshaw, 2014). According to resource dependency theory the primary function of the board of directors is to provide resources to the firm. Each of the three theories is useful in considering the efficiency and effectiveness of the monitoring and control functions of corporate governance. But, many of these theoretical perspectives are intended as complements to, not substitutes for, agency theory (Habbash, 2010). Among the various theories discussed, agency theory is the most popular and has received the most attention from academics and practitioners and it has be an instrument to corporate governance development and standard.

## **Review of Past Empirical Literature and Hypotheses Development**

### **Board Independent and Financial Performance**

Board independent is the composition of the board of directors and is a critical feature in establishing a board of firms. The composition is the proportion of non-executive directors (NEDs) to total number of directors on the board of the company (Suffian, Shamsudin, Sanusi, & Hermawan, 2017). According to the agency theory, the presence of outside directors in the board of companies and their supervisory function as independent individuals helps to reduce the conflict of interests between shareholders and managers; so, the more independent the board members are, the less the agency problems will be (Hermalin & Weisbach, 1991). As such, studies documented the effect of board characteristics on financial performance. It is argued that unlike inside directors, outside directors are independent of the company's management (Aghouei & Moradi, 2015). So they perform their supervisory role more effectively and it is expected that independent boards to be in a better position to propel the resources towards performance and play an effective role in improving the performance of firms.

In this regard, Buallay, Hamdan, & Zureiga, (2017) analysis the impact of Corporate Governance on Firm performance of 171 listed companies in Saudi stock exchange from 2012 to 2104. The study used pooled data. The study independent variable is Corporate Governance principals. Firm performance was proxy by ROA, ROE and Tobin's Q. The results of the study tested indicate that there no significant impact for independency of Board of Directors on firm's market performance. Similarly, Borlea, Achim, & Mare, (2017) investigates correlations between board characteristics and firm performances of 55 Romanian non-financial companies listed on the Bucharest Stock Exchange (BSE) in 2012. The result of the study found no statistically significant association between independence of board members and performances represented either by Tobin's Q or ROA.

Emengini, Modebe, & Uche, (2017) examines the effect of drivers of corporate governance on shareholder value of listed manufacturing companies in Nigeria. Data from annual financial reports were analyzed and tested using panel dynamic ordinary least square model and panel unit root tests. Board independence has a positive and non-significant effect on shareholder value Accordingly, the present study, to empirically examine the effect of independence of the board on financial performance of banks in Nigeria, uses the percentage of outside members of the board; so, the hypothesis of the research is proposed as follows: *H1: Board independence has no significant effect on financial firm's performance of listed deposit money banks in Nigeria.*

### **Board Size and Financial Performance**

Board size is the number of board of directors of a company that manage and control both the financial and non-financial activities of a company over a period of their tenure. This study considers board size as a characteristic that can determine corporate governance mechanism and bank performance. Numerous scholars articulate board size and performance with divergent result. For instance, the work of Lasisi et al.(2018) that examine the effect of corporate board

size, risk management on financial performance of fourteen (14) listed deposit money banks in Nigeria for the period of 2011-2016. Corporate board as the independent variable was proxy with numbers of board of directors, while the return on equity (ROE) and earnings per share (EPS) were used to proxy financial performance. The findings reveal that board size, had significant negative effect on return on equity (ROE) and earnings per share (EPS) respectively.

On the other hand, Akpan & Amran, (2014) examines the relationship between board characteristics and company performance (measured by turnover) in Nigeria. The study uses multiple regression technique on 90 sampled firms from the main board of Nigerian Stock Exchange from 2010 to 2012. The empirical evidence of the study shows that board size is positively and significantly related to company performance and the study evidences a negative significant between board women and turnover. Similarly, The study of Buallay, Hamdan, & Zureiga, (2017) analysis the impact of Corporate Governance on Firm performance of 171 listed companies in Saudi stock exchange from 2012 to 2104. The results of the study tested indicate that significant impact was found for the size of the Board of Directors on firm's performance.

More so, Emengini, Modebe, & Uche, (2017) examines the effect of drivers of corporate governance on shareholder value of listed manufacturing companies in Nigeria. Panel data were collected from annual financial reports and analyzed using dynamic ordinary least square model. The study reveals that board size has a negative and non-significant impact on the economic value added which represents the market value of shareholder assets. In order to examine the link between corporate governance and financial performance in Nigeria, the following hypotheses stated in the null form were tested in this study:

*H2: Board size has no significant effect on financial firm's performance of listed deposit money banks in Nigeria.*

### **Board Gender and Financial Performance**

Board gender is defined as gender diversity among the corporate directors on a board. This study view gender in the board composition as the ratio or number of female directors among the board director of the board.

However, Adams and Ferreira (2009) also determine, that an increasing number of female board members induce a higher meeting attendance rate of the male board members, this is based on the positive influence of board gender on firm performance (Eulerich, Velte, & Uum, 2014). However, some paste empirical studies has argued against the impact of female gender on the financial performance of companies. For instance, the study of Irean, Chan and Rozaimah (2017) examine gender diversity and firm's financial performance in Malaysia of firms listed in Bursa Malaysia for the period between 2009 and 2013. Using unbalanced panel data analysis. Gender diversity in boardroom was proxy by Tobin's Q. Four different proxies for gender diversity were used which were (dummy variable for women, the percentage of women on the board, the Blau index, and the Shannon index). The study finds that a higher degree of female representation on the board increases the firm's financial performance.

Oludele, Oloko, & Tobiah, (2016), examine the impact of board gender diversity on the performance of 34 listed manufacturing companies in Nigeria. The result shows that there is a significant positive linear relationship between board gender diversity and financial performance (ROA) of study firms. Another study conducted by Taljaard, Ward, & Muller, (2015) examine whether increased levels of diversity within boards are associated with improved financial performance to shareholders largest 40 companies listed on the JSE from 2000 to 2013. This data was analysed using Muller and Ward's (2013) investment style engine by forming portfolios of companies based on board-diversity constructs. The results show that increased gender diversity shown to have strong associations with improved share price performance.

Eulerich, Velte, & Uum, (2014) examines the relationship between diversity within management boards and corporate performance for the German two-tier system by presenting a comprehensive literature analysis as well as an empirical analysis based on 149 publicly listed German organizations for the financial years 2009, 2010 and 2011. The study finds negative and insignificant effects of board gender on corporate performance. Another study by Akinyomi & Olutoye, (2014) examined the effect of greater diversity of boards on profitability of banks in Nigeria. Using correlational research design, the study randomly selected ten banks in Nigeria and obtained data from audited annual reports of the selected banks. The dependant variable for profitability was return on equity was used as a proxy for profitability (dependent variable) while two indicators of gender diversity were the presence of females in the board of directors as well as the proportion of female in the board of directors. Four control variables applied were bank size, board size, loan to total assets and age of bank. The results of the regression analysis revealed that the presence of female director on the board has a positive but insignificant relationship with banks' profitability. Similarly, the result shows that the proportion of female in the board of directors has a positive but insignificant relationship with profitability in Nigeria.

Based on the literature review and prior empirical evidence on gender diversity, the following hypothesis was derived. *H3: Board gender has no significant effect on financial firm's performance of listed deposit money banks in Nigeria.*

## **Methodology**

The population of this research is the role in all the (14) banks listed on the Nigeria Stock Exchange during the period 2011-2016. A sample of fourteen (14) listed deposit money banks in Nigeria was selected. Census sampling techniques was adopted; the method of sampling is based on criteria that whole population was used for the study. The data used for the analysis were collected from the audited annual report and financial statement of the banks listed in Nigeria Stock Exchange. The listed banks included in the study are Diamond bank Plc, FCMB Plc,

Fidelity bank Plc, First bank Plc, UBA Plc, Zenith bank Plc, Gtbank Plc, Stanbic bank Plc, Sterling bank Plc, Union bank Plc, Wema bank Plc, Unity bank Plc, Access bank Plc and Eco bank Plc. Because the study period is seven years, a panel data model was adopted. We adopted this model because the data comprises time series and cross- sectional data.

### **Variables and Measurement of Variables**

Board size, board independence, board gender are all drivers of and proxies for corporate governance and are derived from the annual financial reports and a control variable of bank size was derive from annual financial statement. The effect of these drivers of corporate governance on financial performance was examined from accounting perspectives. The key parameters used as dependent variables to proxy for financial performance is return on asset (ROA). Therefore, it is necessary to test the hypotheses that have been proposed. Hypothesis testing is conducted according to the methods of research and analysis designed according to the studied variables in order to obtain accurate results.

**Financial Performance (FP) ROA-** is measure by the ratio of profit before interest tax to total asset of bank as done (Lasisi, Mustapha, & Irom, 2018). **Board size (BS)** is measured by the number of the size of the Board of Directors. It is computed as in (Total number of the executives/insiders + total number of the non- executives/independent/outside). **Board independent (BI)** is the ratio of non-executives members of the board to the total number of members from the Board of Directors of the banks. **Board Gender (BG)** is the ratio of the number of female board director to the members from the Board of Directors of the banks. The control variable is the **Bank size (BankS)** which is measure by the natural log. of the value of total asset of the banks.



We conducted descriptive statistics, correlation matrix and the study adopted OLS multiple regression model after breusch and pagan lagrangian multiplier test for random effect was conducted. The econometric model used for study below:

$$FPit = \alpha + \beta_1 BSit + \beta_2 BIt + \beta_3 BGit + \beta_4 BankSit + eit$$

where:  $\alpha$  is the intercept; is the constant parameter that quantifies the influence of all the variables not included in the model on financial performance.  $i$  = the 14 banks listed on Nigeria Stock Exchange, chosen for the econometric models.  $eit$  = is the residual term or the error term which quantifies the influence of the random factors non included in the model.

## Result and Discussion

### Descriptive Statistic from 2011 – 2016.

In Table 1 there is attached the Descriptive Statistics to capture some of the key statistical information that may be immediately seen to the data. The number of observations is 84. The Descriptive Statistics show that the size of the Board of Directors varies between 6 and 20 members; the maximum number of non executive directors is 92% and as low as 47%. An interesting fact is the percentage of women in the total number of members from the Board, the percentage has a high variation, switching from 0.0% for to the maximum value of 65% of the study banks.

*Table 1, Descriptive Statistics*

Variables	Minimum	Maximum	Mean	Standard Dev.
<b>ROA</b>	-0.1068	0.0594	0.0142274	0.0240083
<b>Board Indep.</b>	0.47	0.92	0.645	0.1172116
<b>Board Size</b>	6	20	14.58333	2.729616
<b>Board Gender</b>	0	0.65	0.1963095	0.1248013
<b>Bank Size</b>	19.22	22.56	21.01107	0.7959113

**Note. Sources: Output generated using STATA 13**

### Correlation matrix from 2011 – 2016.

Correlation matrix in Table 2 shows that ROA has insignificant negative correlation with board independent board size and gender. ROA have significant positive correlation with bank size. Board independent is significant negative with board size and board gender at 5% level of significance, while board size is significant positive correlated to board gender at 5% level of significance. No correlation is found above 0.70 between the independent variables which indicates that multicollinearity issue is not a concern in this study.

Table 3  
**Correlation matrix**

Variables size	ROA	Board Indep.	Board Size	Board Gender	Bank
ROA	1				
Board Indep.	-0.0741 0.5030	1			
Board Size	-0.1519 0.1484	-0.6363* 0.0000	1		
Board Gender	-0.0063 0.9549	-0.2714* 0.0125	-0.3268 0.0024	1	
Bank size		0.3749* 0.0004	-0.0794 0.4729	-0.0151 0.8918	-0.2859 0.0084

Note. Sources: Output generated using STATA 13

### Multivariate Analysis

The ordinary least squares (OLS) regression model is used as the method of data analysis. The hausman test revealed a p-value of 0.5610 and this shows that random effect is the fitted model as against fixed effect model and further diagnostic test was conducted for lagrangian multiplier test for random effects and found that the OLS regression model is the most appropriate model for this study.

R-squared is the co-efficient of determination, or the co-efficient of multiple determinations for multiple regressions. The adjusted R-squared is a modified version of R-squared that has been adjusted for the number of predictors in the model. Table 3

shows that the variables explain about 23% and 18% for  $R^2$  and adjusted  $R^2$  respectively of the model and F statistic

5.82 Significance at 1 percent, which indicates that the model is fit. The table on the other hand, indicated the absence of the perfect multicollinearity among the explanatory variables, as shown by the mean VIF of 1.46. The decision criterion for the Variance Inflation Factor is that a value of 10 and above implies the presence of perfect multicollinearity.

Table 3

**Summary of OLS Regression Result for**

<b>Variables</b>	<b>Coefficient</b>	<b>T-value</b>	<b>P-value</b>
Constant	-0.175867	-2.32	0.023
<b>Board Indep.</b>	-0.0463145	-1.75	0.084
<b>Board Size</b>	-0.0031983	-2.78	0.007
<b>Board Gender</b>	0.0324365	1.52	0.132
<b>Bank Size</b>	0.123859	3.92	0.000
Mean VIF			1.46
Hettest			0.0158
Hausman Test			<b>0.5610</b>
Breusch and Pagan Lagrangian Multiplier Test			<b>0.0703</b>
$R^2$			0.2275
Adjusted $R^2$			0.1884
F-Statistics	5.82		0.0004

**Note. Sources: Output generated using STATA 13 @ 5% level of significant**

$$ROA = -0.175867 - 0.0463145BDI - 0.0031983BDS + 0.0324365BDG + 0.123859BSZ$$

### Board independence (BI)

Board independence is measured as the proportion of independent directors on the board. The result indicates that there is a negative and insignificant effect (coefficient of -0.0463145 and p-value = 0.084) of board independence on financial performance. This means that high number of independent director has reduced the financial performance of the study bank and this may be due to lack of banking and finance experience from the outside directors. And it seems logical, because an independent board was showing keen interest about discharging its monitoring role. Clearly, they are not interested in performance testing in order to minimize the risk of managerial

behaviour. This suggests that banks with greater board independence were not improving its performance. The results are partly consistent with findings of Buallay, Hamdan, & Zureiga, (2017) which showed that board independence, is not significantly positively affecting performance. Therefore, *H1: Board independence has no significant effect on financial firm's performance of listed deposit money banks in Nigeria is accepted.*

### **Board size (BSZ)**

Board size is the number of member of the board of directors of the banks. The study points out that board size is significantly and negatively influencing bank's performance, the negative signed (coefficient of -0.00311983 with a (p- value = 0.007). The result indicates that as the board size increases, the likelihood of financial performance decreases. Further, a large board is less effective due to slowness in decision making, is more risk averse and creates a free rider problem and this brought about poor performance. According to the Nigeria code of corporate governance documents that the number of board members has been left to the internal system of the company, but it should not be less than 5 members and not more than 20 either. Thus it can be argued that the board size consider as important dominant determinant of performance. The finding of the study is in support of the study of Lasisi et al.(2018) which revealed that board size has significant negative effect on financial performance. Therefore, *H2: Board size has no significant effect on financial firm's performance of listed deposit money banks in Nigeria is rejected.*

### **Board Gender**

Board gender is the proportion of female in the board to total number of board of directors. The study points out that board gender is insignificantly and positively influencing financial performance of listed deposit money banks in Nigeria, the positively signed (coefficient = 0.0324365 and a P-value = 0.132). The result indicates that as the female board members increases, bank's performance improved slightly. This study also finds the empirical evidence to

support the view that experienced female board members will contribute positively to bank's performance and board's compensation. The study is consistent with study of Akinyomi & Olutoye, (2014) who also concluded that the proportion of female directors has positive and no significant effect on bank performance. Therefore, *H3: Board gender has no significant effect on financial firm's performance of listed deposit money banks in Nigeria is accepted.*

### **Conclusion and Recommendation**

The objective of the study is to examine the effects of corporate governance variables on financial performance of banks in Nigeria. Based on the findings of this study, the study concludes that larger board size has significant negative effect on the financial performance of the listed deposit money banks in Nigeria during the period covered by the study. The study in particular, concludes that board independence has insignificant negative effect on the performance of listed deposit money banks in Nigeria during the period under review. On the contrary, the study concludes that board gender has positive and no significant effect on the financial performance. Though, the control variable of banks size has a positive and significant effect on financial performance listed deposit money banks in Nigeria.

Emanating from the conclusions drawn from this study, the study recommends that the deposit money banks in Nigeria should reduce the size of board of director to an average of (14) because the maximum of twenty (20) members are affecting the performance of the banks especially in terms cost attributable to board of directors and large board is less effective due to slowness in decision making which hinder performance in the long run. The study also recommends that, more female directors should be represented on the board of directors banks listed on Nigeria stock exchange.

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```

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unable to check for update; verify Internet settings are correct.

\* (7 variables, 84 observations pasted into data editor)

```
summarize roa boardind boardsize gender banksize
```

Variable	Obs	Mean	Std. Dev.	Min	Max
roa	84	.0142274	.0240083	-.1068	.0594
boardind	84	.645	.1172116	.47	.92
boardsize	84	14.58333	2.729616	6	20
gender	84	.1963095	.1248013	0	.65
banksiz	84	21.01107	.7959113	19.22	22.56

```
. pwcorr roa boardind boardsize gender banksize, sig star(5)
```

	roa	boardind	boardsize	gender	banksize
roa	1.0000				
boardind	-0.0741 0.5030	1.0000			
boardsize	-0.1591 0.1484	-0.6336* 0.0000	1.0000		
gender	-0.0063 0.9549	-0.2714* 0.0125	0.3268* 0.0024	1.0000	
banksize	0.3749* 0.0004	-0.0794 0.4729	0.0151 0.8918	-0.2859* 0.0084	1.0000

```
. xtset banks year
      panel variable:  banks (strongly balanced)
      time variable:  year, 2011 to 2016
              delta:  1 unit

. xtreg roa boardind boardsize gender banksize, re

Random-effects GLS regression              Number of obs   =          84
Group variable: banks                     Number of groups  =          14

R-sq:  within = 0.0595                    Obs per group: min =           6
      between = 0.4757                      avg           =          6.0
      overall  = 0.2221                      max           =           6

                                Wald chi2(4)      =          13.74
corr(u_i, X)  = 0 (assumed)                Prob > chi2       =          0.0082
```

roa	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
boardind	-.0414662	.027888	-1.49	0.137	-.0961256	.0131932
boardsize	-.0024656	.0012348	-2.00	0.046	-.0048858	-.0000455
gender	.0205324	.0239295	0.86	0.391	-.0263687	.0674334
banksize	.0121535	.0039905	3.05	0.002	.0043323	.0199747
_cons	-.1824576	.0908754	-2.01	0.045	-.3605702	-.004345
sigma_u	.00948642					
sigma_e	.02007113					
rho	.18259835	(fraction of variance due to u_i)				

```
. estimates store random
```

```
. hausman fixed random
```

	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
	(b) fixed	(B) random		
boardind	-.0445107	-.0414662	-.0030445	.020109
boardsize	-.0010476	-.0024656	.001418	.0009349
gender	-.0066575	.0205324	-.0271898	.0215322
banksize	.0161914	.0121535	.0040379	.007344

b = consistent under Ho and Ha; obtained from xtreg  
 B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

```
chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)
        = 2.98
Prob>chi2 = 0.5610
```

```
. xttest0
```

Breusch and Pagan Lagrangian multiplier test for random effects

```
roa[banks,t] = Xb + u[banks] + e[banks,t]
```

Estimated results:

	Var	sd = sqrt(Var)
roa	.0005764	.0240083
e	.0004029	.0200711
u	.00009	.0094864

Test: Var(u) = 0

```
chibar2(01) = 2.17
Prob > chibar2 = 0.0703
```

. regress roa boardind boardsize gender banksize

Source	SS	df	MS	Number of obs =	84
Model	.010882228	4	.002720557	F( 4, 79) =	5.82
Residual	.036958759	79	.000467832	Prob > F =	0.0004
				R-squared =	0.2275
				Adj R-squared =	0.1884
Total	.047840987	83	.000576397	Root MSE =	.02163

roa	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
boardind	-.0463145	.0264864	-1.75	0.084	-.0990343 .0064053
boardsize	-.0031983	.0011496	-2.78	0.007	-.0054866 -.00091
gender	.0324365	.0213154	1.52	0.132	-.0099908 .0748638
banksizes	.0123859	.0031598	3.92	0.000	.0060965 .0186753
_cons	-.175867	.0757538	-2.32	0.023	-.3266512 -.0250827

. estat vif

Variable	VIF	1/VIF
boardsizes	1.75	0.572391
boardind	1.71	0.584826
gender	1.26	0.796500
banksizes	1.12	0.891187
Mean VIF	1.46	

. estat hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of roa

chi2(1) = 5.83

Prob > chi2 = 0.0158

. xtset banks year

panel variable: banks (strongly balanced)

time variable: year, 2011 to 2016

delta: 1 unit

. xtreg roa boardind boardsize gender banksizes, fe

Fixed-effects (within) regression      Number of obs = 84  
Group variable: banks      Number of groups = 14

R-sq: within = 0.0754      Obs per group: min = 6  
between = 0.3070      avg = 6.0  
overall = 0.1627      max = 6

corr(u\_i, Xb) = -0.3260      F(4,66) = 1.34  
Prob > F = 0.2628

roa	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
boardind	-.0445107	.0343818	-1.29	0.200	-.1131562 .0241348
boardsizes	-.0010476	.0015488	-0.68	0.501	-.0041398 .0020446
gender	-.0066575	.032191	-0.21	0.837	-.0709289 .0576139
banksizes	.0161914	.0083581	1.94	0.057	-.0004961 .032879
_cons	-.2806775	.1776426	-1.58	0.119	-.6353524 .0739973
sigma_u	.0139005				
sigma_e	.02007113				
rho	.32416084	(fraction of variance due to u_i)			

F test that all u\_i=0:      F(13, 66) = 1.98      Prob > F = 0.0364

. estimates store fixed