THE MODERATING ROLE OF DIGITALIZATION ON ENTERPRENEURSHIP, ENTERPRENEURSHIP FINANCING AND ECONOMIC GROWTH NEXUS IN NIGERIA

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Abstract: The study examined the moderating role of digitalization on entrepreneurship growth nexus in Nigeria covering the period 1990-2021. The study majorly aimed at investigating the interaction impact of digitalization and entrepreneurship on growth, and the interaction impact of digitalization and entrepreneurship financing on economic growth in Nigeria. Employing the restricted Autoregressive Distributed Lag (ARDL) model in analyzing the data, the result of the study revealed that digitalization interacts with entrepreneurship to have a significant positive impact on economic growth in Nigeria. The study also found that entrepreneurship has a positive impact on economic growth while entrepreneurship financing negatively impact on economic growth in Nigeria. Furthermore, the study revealed that the interaction between digitalization and entrepreneurship financing has not impacted significantly on the growth of the Nigerian economy. This explains the importance of direct financial assistance to the entrepreneurs which target the small and medium entrepreneurs (SMEs) in order to enhance their financial status which improve their production. Also, government should invest more in research and development, to boost innovations and digital technology in the economy.
Keywords: Entrepreneurship, Entrepreneurship financing, digitalization and economic growth.

1. Introduction

Continuous and stability in the growth of an economy has been well documented in literature as important for poverty reduction. Notable growth theorists such Romer (1986) have identified improvement in growth not only as a key determinant of poverty reduction, but as critical for improvement in overall wellbeing. Thus, successive governments in Nigeria have played tremendous role in ensuring stability in the growth rate of the Nigerian economy by making policies promoting private sector participation in trade and investment and allocating resources for the growth and development of the economy, (Etuk, Etuk & Baghebo, 2014). However, the government is the not the only participant in ensuring the growth of the economy, there is also the involvement of private entrepreneurs who dominate the establishment of small and medium enterprises (SMEs). The need for poverty reduction has stimulated the need for active participation of the private entrepreneurs, for the growth of the economy. This is vital giving the fluctuations in the growth rate of the Nigerian economy in recent years.

A noteworthy feature about the fluctuations in the growth rate of the Nigerian economy is that it has been occurring periodically in a more or less regular fashion. In recent periods, real GDP growth was 2.21% in 2019 which is a 0.29% increase from 2018; it fell to -1.79% in 2020 mainly as a result of the corona virus outbreak. Again, it increased to 3.65% in 2021 and later declined to 3.25% in 2022 (African Development Bank, 2023). The fluctuations in economic growth in the country have necessitated the need for more robust and innovative approach in growth driven entrepreneurship activities in the country. Such innovation is feasible through the process of digitalization of entrepreneurship activities.

The outcome of the digital world order propelled by globalization is the product of digital innovative efforts in productive activities. Digital innovation has introduced many new products, changed style of production, trading and business activities including payment systems, drifting towards use of technology and digital methods (Oginni, 2013). Precisely, many products are sold and delivered online such as e-books, tools, music and others. In addition, payments for many of these products and services can be done in many online platforms that are more efficient and effective (Ivanović-Đukić, Stevanović & Rađenović, 2019). In Nigeria, digitalization in entrepreneurship activities and transactions is gaining prominence, as a result, the easiness entrepreneurs who have embraced this innovation carry out banking services and other businesses, trade and investments as well as a safer and quicker access to funds, among others has placed digitalization on a more elevated pace (Ayo, 2010). The prominence is because of the accompanied benefits to entrepreneurs and households as well as to the economy at large. According to Chijioke (2016) digital products and services including payment systems are driving forces that are changing the landscape of entrepreneurship in Nigeria, as it has blurred the boundaries between different entrepreneurs, consumers and even the unbanked. He further opine that digitalization has also enabled the use of electronic and digital banking system and made existing financial services available in different packages. Thereby, removing some of the huddles faced by entrepreneurs in terms of the platform to operate or market their products and also raised new entrepreneurs.

Early theoretical postulates such as (Schumpeter, 1934) have supported the fact that entrepreneurship is vital for the growth of an economy. These theories posited that entrepreneurship as a process provides new jobs, inventions, as well as increasing output and income and thereby, influencing economic growth. However, entrepreneurs in Nigeria are confronted with many challenges among which are financing, (Oke & Aluko, 2015). These challenges restrict them from contributing fully to the growth of the Nigerian economy. Notwithstanding, studies have found that a significant relationship exist between entrepreneurship and economic growth on one hand, and between digitalization and economic growth on the other hand (Onyejiaku, Ngong & Onwumere, 2023; Ivanović-Đukić, Stevanović & Rađenović, 2019). However, these empirical studies have shown varied results relating to the nexus between entrepreneurship and economic growth in developing countries such as Nigeria, with studies revealing either positive or negative impact.

Despite many studies supporting positive relationship between entrepreneurship and economic growth, entrepreneurship in Nigeria is still at a developing stage and have little pronounced contribution to the growth of the economy. This has raise doubts whether such positive relationship exists in Nigeria, giving the slow and fluctuating growth of the Nigerian economy amidst the increasing role of digitalization. As a result, it becomes necessary to examine the relationship between entrepreneurship, entrepreneurship financing and economic growth in Nigeria and the moderating role of digitalization in the relationship. Thus, this study contributes to the literature on entrepreneurship and economic growth by examining the moderating role of digitalization in the entrepreneurship growth nexus in Nigeria.

2. Literature Review
Theoretical literature
One of the theories supporting the relationship between technology innovation via digitalization and economic growth is the endogenous growth theory developed by Romer (1986). The theory explains the long run growth rate of an economy on the basis of endogenous factors. As pointed out by Romer, (1986) the endogenous

growth models emphasize technical progress resulting from the rate of entrepreneurship investment, the size of the capital stock and the stock of human capital. It assumes that technological advancement is based on the creation of new ideas which in this study are the entrepreneurship ideas. According to the theory, private investment in form of entrepreneurship investment in research and development is the most important source of technological progress. Thus, the theory incorporates both technology innovations through digitalization and entrepreneurship capital as propellers of economic growth in an economy.

In addition, the first theory explaining the relationship between entrepreneurship and economic growth is the theory of economic development by (Schumpeter, 1934). According to Schumpeter, entrepreneurship innovation and ideas contribute significantly to economic growth. The ideas by entrepreneurs are what produce goods and services which able to meet up with the daily needs of individuals, organizations and the government. These goods and services are produced through the mechanism of innovation in the economic cycle. This theory is based on the idea of creative destruction created by entrepreneurial activity.

Empirical literature

Many empirical studies have found positive and significant relationship between entrepreneurship and economic growth. Onyejiaku, Ngong & Onwumere, (2023) examined the long-term association between entrepreneurship and Nigerian economic development in the digitized era from 1991-2020. The study adopted the fully modified, dynamic and conical co-integration ordinary least squares regression and the study found a positive relationship between entrepreneurship and economic growth in Nigeria.

Sabba & Shereteh, (2021) investigated the impact of entrepreneurship on economic growth in eight Middle East and North Africa countries (Algeria, Egypt, Jordan, Lebanon, Morocco, Palestine, Tunisia, Turkey) from 2003-2019. The study adopted the system GMM technique, and the result revealed that there is a positive relationship between entrepreneurship and economic growth, supporting the fact that entrepreneurship promotes economic growth.

Moreover, the role of digitalization in influencing the entrepreneurship growth relationship has gain prominence in growth related studies. Dabbous, Barakat & Kraus (2023) examined the impact of digitalization on entrepreneurial activity and sustainable competitiveness for 34 countries from 2015-2018. The study employed the fixed-effects model with Driscoll-Kraay standard errors and the results show that digitalization positively impacts on entrepreneurial activity and sustainable competitiveness. The study further revealed that entrepreneurial activities drive sustainable competitiveness. The study revealed that connectivity, internet use, and digital integration are the aspects of digitalization that influence sustainable competitiveness.

Iwedi, Kocha, & Wike, (2022) investigated the effect of digitalization of banking services on the Nigeria economy using data from 2009-2020. The study adopted the multiple regression technique to determine the significance of the relationship between digital banking service channels and economic performance in Nigeria. The result shows that web pay and mobile pay have a significant relationship with Nigeria economic growth, implying that digitalization of banking service are significantly related with economic growth in Nigeria.

In addition, Olurinola, Osabohien, Adeleye, Ogunrinola, Omosimua and Alwis (2021) investigated the determinants of digitalization and its impact on innovation in Nigeria. The study applied the logit regression and propensity score matching on data sourced from the World Bank 2014/2015 enterprise survey. The result of the logit regression revealed that size of the firm, educational qualification of the top manager of the firm, business age, employment growth and sector of operation are the major significant determinants of the extent to which firms digitalized in Nigeria. On the other hand, the result from the propensity score matching found that digitization is positive and significant in explaining the level of firms' innovation in Nigeria. This means that an increased level of ICT increase the level of firms' ability to innovate.

Ivanović-Đukić, Stevanović & Rađenović, (2019) examined the contribution of different types of innovative entrepreneurship such as new products entrepreneurship and new technology development entrepreneurship to economic growth in the European Union regions. The regions were created by the application of clustering

criterion which measures the level of digitization by the digital economy and society index. The study employed the hierarchical regression models in order to investigate the effect of different types of innovative entrepreneurship on economic growth, on panel data for the period 2010-2017. The result of the study confirmed differences in contribution of the certain types of entrepreneurship to economic growth in the EU regions, as well as, the influence of digitization on the relationship between entrepreneurship and economic growth.

Muchiri (2018) determine the magnitude to which small and medium enterprises have adopted mobile banking in Nairobi County, and to establish the magnitude to which SMEs utilize the different services offered by the mobile banking and to establish the association between usage of m-banking services and SME performance. He used a descriptive type of survey design research method aimed at finding out effects of m-banking adoption on performance of SMEs in Nairobi County. The population targeted in his research study was 176 SMEs in Nairobi County using primary data collected. The study revealed that ease of use, cost effectiveness, convenience; security of the service, accessibility and diversity has enabled SMEs to continue to use mobile banking services. The study also revealed that mobile banking has increased customer base because of easy method of payments, more time to carry out other business activities, easy access to funds in the bank, increased business transactions, increased profits and increased business efficiency.

Eniola, (2014) investigated the role and contribution of small and medium enterprises performance in the national development in Nigeria. The study is a general review on the performance of SMEs and its contribution in the development of the Nigerian economy with no analytical technique. The study revealed that the role of SMEs performance in the growth of the Nigerian economy cannot be overemphasized as they have contributed to the growth and development of the Nigerian economy.

The study contributes to literature by introducing two interaction variables – digitalization and entrepreneurship and digitalization and entrepreneurship financing in order to explain the role of digitalization on the entrepreneurship-growth nexus in Nigeria.

Methodology

Research Design

The study used data covering the period 1990 to 2021. The study period is chosen due to data availability for the Nigerian economy. The study adopted the ex-post facto design. The choice of this type of design is because the study will use existing data that have been collected by the World Bank data-(World development indicators, 2021) and the Central Bank of Nigeria 2021 statistical bulletin. Thus, econometrics analytical tool was adopted in obtaining, analysing and interpreting data relating to the objectives of the study.

Model specification

The function form of model specifying the relationship between entrepreneurship, entrepreneurship financing and economic growth is specified as follows;

GDPGR = f (SEM, ICT, GFCF, FSME, INF)..1

Equation 1 is transformed to the econometric linear regression form specified as follows:

$$GDPGR_t = \beta_0 + \beta_1 SEM_t + \beta_2 INTUSE_t + \beta_3 FSME_t + \beta_4 INF_t + \beta_5 INT_1 + \beta_6 INT_2 + \varepsilon_{it}..(5)$$

where; t = 1, 2… 33 (years – 1990-2021). ε the error term. The coefficients β_1… β_5 are elasticities because they measure the rate of change, β_0 is the intercept. INT_1 is the first interaction term (internet use*entrepreneurship financing) and INT_2 the second interaction term (internet use*number of self employed). The model used for the analysis is the ARDL with the adoption of the bound test for cointegraton. The variables used in the study were checked to ascertain the order of integration. The interaction variables explaining the moderating role of digitalization are included in the ARDL interaction equation stated below.

$$\Delta GDPGR_t = \beta_0 + \beta_1 \sum_{i=1}^{n} GDPGR_{t-1} + \beta_2 \sum_{i=i}^{n} \Delta SEM_{t-i} + \beta_3 \sum_{i=i}^{n} ICT_{t-i} + \beta_4 \sum_{i=i}^{n} GFCF_{t-i} +$$

$$\beta_5 \sum_{t=i}^{n} INF_{t-i} + \beta_6 \sum_{t=i}^{n} ICT*SEM_{t-i} + \beta_7 \sum_{t=i}^{n} ICT*FSME_{t-i} + \beta_8.ECM_{t-1} ....(6)$$

The coefficient of the error correction (ECM_{t-1}) indicates the percentage of the error corrected each year that is, the speed of adjustment. In equation 6 the signs of β_2 to β_4 are expected to have positive relationship with GDP growth rate. B_6 and B_7 are the interaction terms which test the moderating role of digitalization on entrepreneurship-growth relationship and entrepreneurship financing-growth nexus; the variable will test if entrepreneurship and entrepreneurship financing will positively impact on economic growth when it interact with digitalization variable. To test for the stationarity of the data, the Augmented Dickey-Fuller (ADF) test was employed.

Table 3.1. Description of Variables

Variables	Description	Source of Data
GDPGR	GDP growth rate.	WDI (2021)
SEM (self employed, used to measure entrepreneurship)	This is ratio of self employed as a ratio of total employment	WDI (2021)
INTUSE (internet use used to measure digitalization)	This is ratio of ICT goods used to total goods used.	WDI (2021)
INF (inflation rate)	Ratio of gross fixed capital formation to GDP	WDI (2021)
FSME (used to measure enterpreneurship financing)	Commercial credits to SMEs	CBN (2021)

Source: Author's computation

Results and Discussion

Table 1: Augmented Dickey-Fuller test

Variable	Level	1st difference	5% critical values	Integration
GDPGR	1.214625	-3.983909**	-1.952910	I(1)
FSME	-2.281179	-6.823439**	-2.644302	I(1)
SEMP	-42.74905**	-	-2.960411	I(0)
INTERNET USE	0.134463	-2.072412**	-1.952473	I(1)
INF	-1.269655	-4.691347**	-1.952473	I(1)

Source: Author's computation

Table 1 is the Augmented Dickey-Fuller unit root test result. The result accepted the presence of unit root for GDP growth, SME financing, internet use and inflation with the exception of self-employed persons, and thus were differenced. The mixture of I(0) and I(1) variables supported the use of the ARDL bound test for long run relationship, as shown in table 2.

Table 2: F-Bounds Test   Ho: No levels relationship

Test Statistics	Value	Significance	I(0)	I(1)
F-statistic	25.87135	10%	-1.952910	3.8
K	0	5%	-2.644302	4.6
		2.5%	-2.960411	5.39

	1%	-1.952473	6.44

Source: Author's computation

The bound test in table 2 revealed the presence of equilibrium relationship among the variables, as the F-statistics exceeds the lower and upper bound critical values.

Table 2: ARDL Model in which digitalization is interacted with entrepreneurship and entrepreneurship finance

ECM Regression: Restricted Constant, no trend

Variable	Coefficient	Std. error	p-value
FSME	-0.107400 ***	0.027589	0.0007
SEMP	2.522259***	0.337201	0.0000
INTERNET USE	11.20520***	3.278902	0.0024
INF	-0.050132	0.032435	0.1358
*INTERNETUSE*SEMP*	0.134725**	0.040352	0.0029
*INTERNETUSE*FSME*	-0.00000113	0.000972	0.7908
*CointEq(-1)**	-0.1168618**	0.015904	0.0000

Diagnostics

Serial Correlation LM Test	
Breusch-Godfrey (Obs*R-sq)	2.096299 (Pr. Chi-Sq. = 0.3508)
Heteroskedasticity	
Breusch-Pagan-Godfrey (Obs*R-sq)	5.760338 (Pr. Chi-Sq = 0.5690)
Ramsey RESET test	

Source: Author's computation

The short run ARDL result revealed that entrepreneurship financing is significant with a negative impact on economic growth. A 1% rise in commercial banks loan to the SMEs leads decrease in economic growth by 0.107% in Nigeria. This may be attributed to how the loans are effectively utilized and whether the loans got to the targeted entrepreneurs (Etuk, Etuk & Baghebo, 2014). Also, the number of self-employed persons is significant and positive, 1% rise in self employed persons leads to an increase in economic growth by 2.522% in Nigeria Internet use measuring digitalization also has a significant positive impact on economic growth in Nigeria, implying that a 1% rise in internet use (digitalization) increases economic growth by in Nigeria 11.205%. This finding is expected and agrees with previous empirical studies such as (Onyejiaku, Ngong & Onwumere, 2023; Sabba & Shereteh, 2021) that have examined the impact of entrepreneurship on economic growth and found a positive significant relationship between entrepreneurship and economic growth.

The interaction of internet use and number of self employed persons is positive and statistically significant, implying digitalization is strengthening the impact of entrepreneurship on economic growth in Nigeria. Thus, a 1% rise in the interaction between digitalization and entrepreneurship will boost increase in economic growth by 0.134% in Nigeria. The result is in tandem with studies that have revealed the role of digitalization in boosting entrepreneurship growth relationship, such studies are (Iwedi, Kocha, & Wike, (2022 and Olurinola, et. al, 2021). However, the interaction of internet use and SME finance is negative and insignificant. Implying that digitalization has not influenced the financing of entrepreneurship in Nigeria. This could be attributed to lack of transiency of many of the entrepreneurs and the financing companies. It could also be attributed to the failure of many entrepreneurs to embrace the digital payment and transaction platforms.

All the variables are jointly statistically significant in explaining economic growth, given the F-statistic and its associated p-value. The Breusch-Godfrey statistic is an indication of the absence of autocorrelation. The

assumption of homoskedasticity is satisfied, based on the ARCH statistic which is not significant at the conventional levels and the estimated model does not suffer from misspecification as indicated by the Ramsey RESET test. Lastly, the study tested for the stability of the estimated parameters using the CUSUM test and the stability of the result was established. The results are shown in figure 1 and figure 2 respectively.
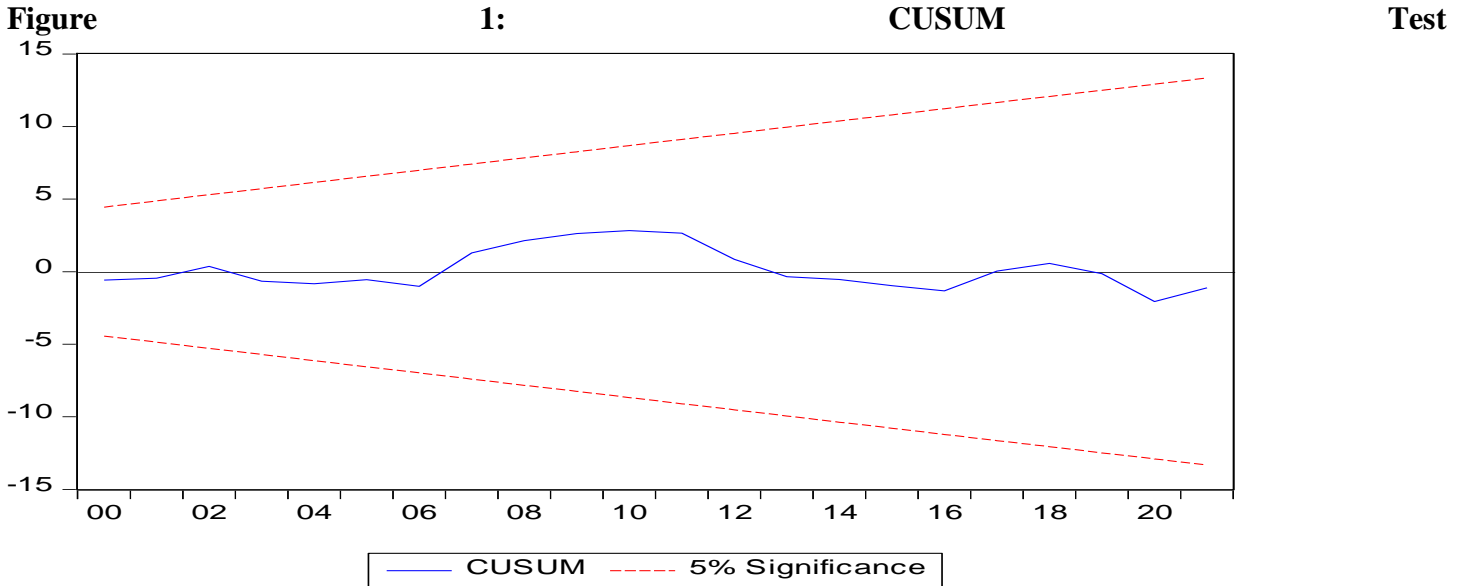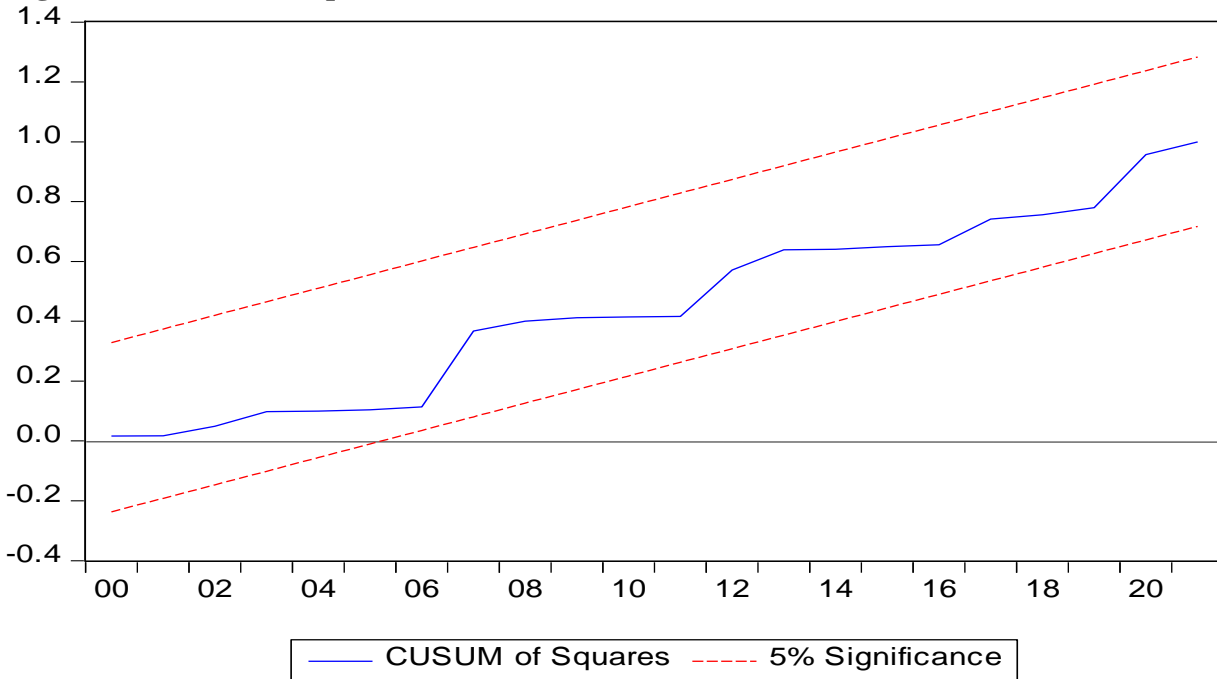
Figure 1: CUSUM Test

Figure 1: CUSUM of Squares

The stability of the estimated coefficients is clearly shown in the CUSUM and CUSUM of Squares lines which are within the 5% critical bounds.

5. Conclusion and Recommendations.

The study examined the moderating role of digitalization on entrepreneurship growth nexus in Nigeria covering the period 1990-2021. The study majorly aimed at investigating the interaction impact of digitalization and entrepreneurship on growth, and the interaction impact of digitalization and entrepreneurship financing on economic growth in Nigeria. Digitalization was measured by internet use, while entrepreneurship was measured using number of self employed in Nigeria. Entrepreneurship financing was measured using commercial bank loans to the SMEs in Nigeria, and GDP growth rate is the proxy for economic growth. The study employed the Autoregressive Distributed Lag (ARDL) model in analyzing the data, however, due to the short time period covered by the study, the restricted short run ARDL was used.

Thus, the result of the study revealed that digitalization interacts with entrepreneurship to have a significant positive impact on economic growth in Nigeria. The study also found that entrepreneurship has a positive impact on economic growth while entrepreneurship financing has a negative significant impact on economic growth in Nigeria. The result further revealed that the interaction between digitalization and entrepreneurship financing has not impacted significantly on the growth of the Nigerian economy.

This explains the importance of more financial aids that will target the entrepreneurs especially the small and medium entrepreneurs (SMEs) in order to enhance their financial status which improve their production. Also, government should invest more in research and development, to boost innovations and inventions in the economy. Enabling environments for entrepreneurs to operate should be encouraged by the government, this involves more infrastructural development which will broaden the internet services and digital technology to every part of the country.

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