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ICT-Driven Growth and Diversification: The Case of Nigeria's Entertainment Industry

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Abstract

The paper explores the nexus between information and communications technology (ICT)-driven entertainment industry and the growth and diversification of the Nigerian economy, using available quarterly data for the period 2010Q1-2013Q4. Deploying a matrix of four models implemented through the ordinary least squares, and the fully modified OLS regressions, the empirical evidence is in favour of enhanced growth and diversification, driven by the adoption of information and communications technology in the entertainment industry. A comprehensive policy framework is recommended to enhance productivity in the entertainment industry and exploit the gains from the country's integration into the information-driven global economy.

Keywords: Causality, Diversification, Entertainment, Growth, ICT

JEL: C22, EO2, L82, L96, O33

1. Introduction

New thinking in the development literature has consistently linked information and communications technology (hereafter ICT) to economic growth. This is not surprising, given the array of opportunities which advances in technology open for growth, development and the improvement in living conditions.

In recent times, there have been growing concerns that part of the deprivations of developing countries regarding economic growth and improvement compared with the advanced economies lies in the relative insufficiency of ICT in terms of internet connectivity, penetration and infrastructure. ICT is thought to impact economic growth through lower frictions and increased productivity, and these are thought to happen from within and outside the ICT sector (Kraemer & Dedrick, 2001).

Economists have conventionally placed emphasis on the accumulation of labour and capital as the main driving force of expansion in production. Recently however, emphasis has changed and economists now increasingly give more attention to other growth-motivating factors such as the sources of technological change and institutions, following the empirical contributions of scholars including Romer (1990), Grossman and Helpman (1991) and, Aghion and Howitt (1992).

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That growth and development is linked to ICT has been identified by Preker et al. (1999), who show that 40-50% of mortality reductions between 1960 and 1990 is accounted for by technical progress, making it a more important source of gains than higher incomes or higher education levels among women, in addition to large variations in growth rates in cross-country studies. Consequently, ICT (particularly the internet) has basically changed how the world works (Kirkman et al., 2002). The basic thread in new thinking is that the introduction as well as the diffusion of ICT technologies in a form that suits a country's particular needs is considered a prerequisite for economic growth, as well as its active participation in the global economy (Onliner & Sichel, 2000; Jorgenson & Stiroh, 2000).

Despite the perceived role of ICT, there is no empirical regularity in its development and the ability and propensity to adopt it in various spheres (Johansson et al., 2006). Thus huge differences exist in the impact of the use of ICT on economic growth across countries and regions.

The paper is novel in two respects. No previous study has been undertaken on the empirical front to provide estimates on elasticity coefficients on the entertainment industry for Nigeria as it relates to growth. Moreover, previous attempts at investigating the impact of ICT on the growth of the Nigerian economy were not specifically anchored on the entertainment industry as a vehicle through which the impact of ICT can be transmitted to growth.

That the impact of the entertainment industry on growth was not pursued empirically in the past is not without solid foundation. Specifically, data on the entertainment industry has been largely unavailable and therefore robust time series analysis could not be undertaken. Second, the entertainment industry, especially as it relates to film, did not receive prominence until lately, when the structural composition of Nigeria's output (encapsulated in the gross domestic product) was rebased, so that its impact could not be assessed with high degree of precision.

From the foregoing, this paper explores the view that an ICT-driven entertainment industry provides a means for growth and diversification of the Nigerian economy. Following the introduction, the rest of the paper is structured as follows. Section 2 deals with theoretical and empirical literature. In Section 3, the methodological design is presented. The empirical results and discussion are covered in Section 4. The paper is concluded in Section 5.

2. Literature

2.1 Theoretical Underpinning

There is no consensus on the definition of ICT (Schwartz, 1990; Graham & Marvin, 1996). However, Cohen et al. (2002) consider ICT as currently characterized by among others, dynamic technological changes, and a rapidly increasing range of applications and penetration in an increasing number of personal and professional spheres.

Technology, theorized to impact development is presented through innovation, which improves the capabilities of human beings to improve health, knowledge, creativity, and participation in the social, economic, and political life of a community, all of which directly impact economic growth through gains in productivity. Because human capabilities are important in technological innovation, both of them are considered as mutually reinforcing, so that for a society that is ICT-oriented, there are higher probabilities of human development gains.

The impact of ICT on an economy may be both broad and deep in a manner that generates a wide range of new goods, services and production processes (Brynjolfson & Kahin, 2000; Mowery & Simcoe, 2002).

The emergence of new goods and services as well as changes in the characteristics of old goods and services induced by ICT adoption, lead to changes in market structures and competitive conditions which affect and create new growth avenues for producers.

In addition, internal organizations and their relationships are changed when ICT is routinely deployed to re-engineer processes, gain new strategic advantages, or network beyond boundaries (OECD, 2002), leading invariably to huge reduction in transaction costs and more efficient markets (Lee & Clark, 1997).

Although the view that ICT is a major stimulus of economic growth appears now to be commonplace, there is however some substantial disagreement about the precise form of this impact, with two major approaches employed in empirical analysis (Smith, 2002). The argument of the first approach is that ICT drives economic growth when new sectors emerge embodying new technologies. These new sectors exhibit higher productivity growth rates and value added, and consequently impact the overall economy. In addition, the new sectors change the conditions of other sectors through their impact on relative prices, while providing a new set of inputs that raises productivity. In the second approach, ICT is viewed as representing a unique form of capital good, so that higher investments in it complement or replace investments in other capital goods, and consequently raising the capability of sectors and industries using ICT.

2.2 Empirical Investigations

On the empirical front and fuelled considerably by Robert Solow's (1957) seminal work, several investigations have been carried out to examine the impact of ICT on economic performance. Although, there is no empirical regularity in the findings linking growth to ICT, what appeared to have dominated the results is that ICT is growth and performance-enhancing. Among the dissenting results, Berndt et al. (1992) found a negative relationship between the contributions of ICT capital to industrial productivity growth in the United States. Morrison (1997) concluded that the relationship between ICT and economic growth of United States firms was not significant. Investigation by Vijay et al. (2011) on the impact of cellular phones on the productivities of selected transport firms in Ghana did not indicate a positive link.

In several developed and developing countries, the contribution of ICT production and use to growth is well documented.

In the United States, ICT was instrumental to the phenomenal performance of its economy in the late 1990's (Jorgenson & Stiroh, 2001; Stiroh, 2002). Other countries include Sweden, Ireland and Australia which benefited immensely and had their economies increased in the rate of productivity and growth (OECD, 2001; Daveri, 2002). In addition, several countries in the developing world, including Philippines, Malaysia, Thailand and Taiwan have benefited from the production and use of ICT.

The contribution of the growth of ICT capital assets to GDP growth in the OECD countries appeared to have doubled between the period 1990-1995 and 1995-2001 from 0.25 on average to 0.50 percentage points (Ahmed et al., 2004). Belorgey et al. (2006) in a study of 25 OECD countries found that investment in ICT has a positive effect on the labour productivity growth rate. Lau and Tokutsu (1992) found that close to half of aggregate national output growth in the United States for the period 1960 to 1990 was accounted for by investment in ICT.

On the G7 countries, a study conducted by Schreyer (2000) showed that there was remarkable average annual labour productivity growth over the period 1990 to 1996 among the countries (i.e. Germany, Canada, Italy, Japan, US and UK), and this was due to investment in ICT.

Intensity of ICT usage has been found to be growth-inducing. More recent empirical confirmation of this comes from several scholars, including Khuong (2014) who found that intensity of ICT employed in Singapore is positively and significantly associated with average labour productivity and value added. Studies conducted on the United Kingdom by Goodridge et al. (2012) indicated that between 2000 and 2009, sectors with the highest ICT-intensity recorded the highest rate of contribution to value added growth.

Several studies have examined the contribution of ICT to economic development of developing countries in recent years. Kuppusamy and Shanmugam (2007) examined the impact of ICT in Malaysia over the period 1983-2004, and found that ICT investment significantly improved the country's economic growth. On the Korean economy for the period 1971 to 2000, Kim (2003) found that ICT capital had a strong positive effect on the growth of labour productivity in the long run, while contributing 16.3% to the growth in output.

For Nigeria, Akwani (2005) asserts that the telecom industry is the fastest growing employer of labour while the impact of ICT has been felt in such areas as poverty reduction and social empowerment, foreign investment, and the environment. Kajogbola (2004) found a positive relationship and significant impact of ICT adoption on the performance of selected firms in Nigeria.

3. Materials and Methods

3.1 Data Sources and Description of Variables

Our sample encompasses quarterly data from 2010-2013 covering gross domestic product; information and communication; arts, entertainment and recreation; private sector demand deposit and broad money supply. The use of the sample was motivated by the imperative of testing the hypothesis that there is no significant impact of the entertainment industry on Nigeria's economic growth, and underscored on the absence of data on entertainment from periods pre-dating 2010. All the data are from the *Statistical Bulletin* of the Central Bank of Nigeria. The descriptive statistics of the variables used for estimation are presented in Table 1A of the Appendix.

Our measure of economic growth is gross domestic product; ICT was proxied by the contribution of ICT to GDP; public trust was computed as public sector demand deposit as a proportion of broad money supply; inflation was measured as quarterly percentage change in implicit price deflator.

Our measure of public trust is a resonation of Williamson's (1995) hypothesis that the existence of long-term contracts is symptomatic of a developed economy. It is indicative of the confidence that people have when dealing with other parties, the implication of which is that the level of investment would be improved if this trust existed. Several scholars have thus tended to design frameworks which reflect the nature, soundness and development of a country's institutions. Clague et al. (1996, 1999), for instance developed a measure of property rights called 'contract intensive money'. Computed as currency held in circulation as a proportion of broad money supply, it follows that a high proportion of the money supply being held in financial institutions indicates the existence of long term transactions taking place, so that the greater this proportion, the more trust people have in making these transactions.

Closely following the foregoing argument, we construct an index of "public trust" as a proxy for institutional development, measured as private sector demand deposit as a proportion of broad money supply. This relates to how much the private sector is willing to put in the custody of financial institutions. The more the public is willing to deposit, the higher is the level of trust in the financial system, other things being equal. It needs to be stressed that this measure of public trust originating from a financial perspective is linked inevitably to economic growth via its impact on availability of loanable funds and consequently on investment. Thus, economic diversification, from the point of view of funds availability, is aided by the level of trust that economic agents have and thus a driver of growth. This index is amply in consonance with empirical findings, which link growth to financial development (e.g. DeGregorio & Guidotti, 1995; Levine, 1998). In addition, this index is predicated on the imperative of the financial system as a vehicle for mobilizing funds for investment in telecommunication infrastructure which has been found to exert a positive and significant impact on economic growth (Norton, 1992).

3.2 Model Specifications and Estimation Procedure

The impact of ICT-driven entertainment industry on growth and diversification is investigated using the following specifications:

$$GDP_t = \alpha_0 + \alpha_2 ICT_t + \alpha_3 INF_t + \alpha_4 PT_t + \mu_t \quad (1)$$

$$GDP_t = \alpha_0 + \alpha_2 ICT_t + \alpha_3 ENT_t + \alpha_4 INF + \alpha_5 PT_t + \mu_t \quad (2)$$

$$GDP_t = \alpha_0 + \alpha_1 ENT_t + \alpha_2 INF + \alpha_3 PT_t + \mu_t \quad (3)$$

$$GDP_t = \alpha_0 + \alpha_1 (ENT * ICT)_t + \alpha_2 INF + \alpha_3 PT_t + \mu_t \quad (4)$$

where,

GDP = Gross Domestic Product;
ICT = Information and Communications Technology;
INF = Inflation;
PT = Public trust;
ENT = Entertainment; and
μ_t = a Gaussian white noise disturbance term.

Two analytical techniques, i.e. the Ordinary Least Squares (OLS) and the Fully Modified Ordinary Least Squares (FMOLS) were utilized to investigate the impact of the covariates on the target variable. The estimations start with a set of variables which influence economic growth, i.e. information and communications technologies, inflation (accounting for macroeconomic stability), public trust (accounting for institutional soundness) and entertainment. To test the hypothesis that ICT is not a significant determinant of economic growth, we estimated equation 1.

To determine whether the entertainment industry is one of the channels through which ICT improves economic growth, we retain the existing regressors in equation 1 and add a variable of entertainment in the growth model, captured by the contribution of arts, entertainment and recreation. Equation 2 was consequently estimated to check the movement of the coefficient of ICT. A weakening of this coefficient is indicative that some proportion of the positive impact of ICT development on economic growth is transmitted through entertainment. It is well possible that both the coefficients of ICT and entertainment in equation (2) are statistically significant, a result that strengthens the argument that both indicators are independently instrumental in the growth process. To improve on this premise, we dropped the ICT variable in equation (2) and estimated equation (3) to see if in the absence of ICT, entertainment has a significant impact on growth. Lastly, we introduced an interaction term between ICT and entertainment and estimated equation (4), dropping the individual ICT and entertainment variables (to avoid multicollinearity problem), with a view to determining whether the impact of entertainment on economic growth is reinforced by enhanced ICT performance.

Diagnostic tests were consequently conducted on all the estimated models, i.e. goodness-of-fit, the joint significance of estimated coefficients, the serial correlation, heteroscedasticity, normality of residuals, and specification error tests. To determine the stability of the estimated coefficients, the cumulative sum of recursive (CUSUM) and cumulative sum of squares of recursive residuals (CUSUMSQ) tests were implemented.

4. Empirical Results and Discussion

4.1 Empirical Results

The results of the unit tests are presented in Table 1B of the Appendix. The results suggest that for the ADF test with intercept (Panel A), all the variables are stationary at first difference. The same can be said about the PP test, except for inflation which tends to be stationary at level. An examination of the results of the test with intercept and a linear trend (Panel B) shows evidence in favour of stationarity at first difference for all the variables. On the other hand, gross domestic product (GDP), entertainment and public trust are stationary at level while inflation and ICT are stationary at first difference in the PP test. A test of cointegration is thus warranted to establish the presence or otherwise of a long-term relationship among the variables to avoid the incidence of spurious regression. The cointegraton tests results (see Table 1C of the Appendix) suggest that there is a long-run equilibrium relationship among the variables employed. The null hypothesis of no cointegration is rejected at the 5% significance level, as indicated by both the maximal eigenvalues and trace test statistics. From the results, there are three cointegrating vectors as indicated by both test statistics, on the basis of which the variables in levels are used for estimation.

The results of estimated equations (1) through (4) are presented in Tables 1 and 2 respectively. Due to the substantial similarity in the estimated regression results for the OLS and FMOLS framework, only the latter is analysed, while the former provides a consistency check.

Table 1: Estimated Regression Results

Dependent Variable: GDP; Estimation Method: OLS

	Equations			
	1	2	3	4
Intercept term	3.708922*	4.807982*	9.015660*	7.303144*
ICT	0.800849*	0.598366*	-	-
Public trust	-0.004754	0.001420	-0.011072	-0.008611
Inflation	-0.002372**	-0.002378*	-0.002525***	-0.001884
Entertainment (@ 2 lags)	-	0.192497*	0.304735**	-
ICT* Entertainment	-	-	-	0.242688*
Diagnostic Statistics				
R^2	0.92	0.97	0.80	0.89
Adjusted R^2	0.90	0.97	0.74	0.87
SER	0.045385	0.024320	0.067416	0.053715
F-statistic	45.09129	93.45044	13.27174	31.14222
	(0.000002)	(0.000000)	(0.000805)	(0.000011)
DW	1.52	1.67	1.50	1.65
JB	1.125001	1.320514	0.534812	1.450039
	(0.569783)	(0.516719)	(0.765362)	(0.484315)
BPG [χ^2]	3.447824	3.009261	2.588173	1.936229
	(0.3276)	(0.5563)	(0.4596)	(0.5857)
ARCH [χ^2]	0.217085	0.937199	0.639246	2.347060
	(0.6413)	(0.3330)	(0.4240)	(0.1255)
W [χ^2]	11.13346	4.554530	8.645425	13.41215
	(0.2667)	(0.3361)	(0.4706)	(0.1448)
RESET (t-stat.)	1.277863	1.367670	0.863458	0.761884
	(0.2302)	(0.2086)	(0.4103)	(0.4637)

Notes: *, ** and *** indicate statistical significance at the 1%, 5% and 10% levels respectively. Probability value is in parenthesis. SER: Standard error of regression; DW: Durbin-Watson test for autocorrelation; JB: Jarque-Bera test for normality of residuals; BPG: Breusch-Pagan-Godfrey test for heteroscedasticity; ARCH: Engle's test for conditional heteroscedasticity. W: White's test for heteroscedasticity; RESET: Ramsey's Residual Error Specification Test.

Source: Authors' computations

Table 2: Estimated Regression Results

Dependent Variable: GDP; Estimation Method: FMOLS

	Equations			
	1	2	3	4
Intercept term	3.284014*	4.991579*	8.933452*	6.963849*
ICT	0.858931*	0.577621*	-	-
Public trust	-0.001971	-0.000426	-0.008841	-0.004677
Inflation	-0.002553*	-0.002595*	-0.002386**	-0.001920**
Entertainment (@ 2 lags)	-	0.179369*	0.346723*	-
ICT* Entertainment	-	-	-	0.278309*
Diagnostic Statistics				
R^2	0.90	0.97	0.75	0.85
Adjusted R^2	0.86	0.95	0.66	0.80
SER	0.048577	0.026679	0.072525	0.058422
DW	1.69	1.20	1.33	1.89
JB	0.530554	1.256842	1.357173	1.478245
	(0.766993)	(0.533433)	(0.507334)	(0.477533)

Notes: *, ** and *** indicate statistical significance at the 1%, 5% and 10% levels respectively. Probability value is in parenthesis. SER: Standard error of regression; DW: Durbin-Watson test for autocorrelation; JB: Jarque-Bera test for normality of residuals.
Source: Authors' computations

4.2 Discussion

As previously emphasized, equation 1 was estimated to test the hypothesis that ICT is not a significant determinant of economic growth, bearing in mind the possible role of the entertainment industry as one of the channels through which ICT improves growth, and a source of economic diversification. The results indicate that ICT is positively related to growth and is statistically significant at the 1% level, with all the possible mechanisms as previously discussed. Interestingly, the coefficient of the public trust is not statistically significant, though negative, suggesting that public confidence takes a long time to build and this is most likely the case, because in all the results from equation (1) through (4), the coefficient of the level of trust is not statistically significant; and when it is underscored on the period of investigation (2010Q1-2013Q4), the result is plausible.

The coefficient of the new control variable introduced (inflation) is in consonance with the prediction of theory; it is negatively related to growth and is statistically significant at the 5% level. This result is consistent across all the equations except (4).

We next wish to find out whether the entertainment industry is one of the channels through which ICT improves economic growth and thus the diversification of the economy. In equation (2), the existing explanatory variables in equation 1 are retained and a variable of entertainment is introduced. The estimated results indicate that the coefficients of ICT, inflation and entertainment are all statistically significant and correctly signed. Thus both ICT and entertainment are important variables explaining the movement in economic growth. However, an examination of the movement of the coefficient of ICT indicates a weakening from 0.800849 to 0.598366. The implication of this is that some proportion of the positive impact of ICT on economic growth is transmitted through entertainment.

It is important that because both coefficients of ICT and entertainment in equation (2) are statistically significant, further examination is warranted to enable us conclude if both indicators have quite independent impact on the growth process. Consequently, the ICT variable in equation (2) is dropped and equation (3) is estimated. The coefficient of entertainment turns out not only statistically significant (at the 5% level) but strengthened in the absence of ICT (from 0.192497 to 0.304735). The logical conclusion here is that the two variables tend to be self-reinforcing, although each has an independent impact on growth. To buttress this argument, equation (4) is estimated and a pair-wise causality test conducted to determine the possibility of bilateral causation between the two variables. In equation (4), an interaction term between ICT and entertainment is introduced while dropping the individual ICT and entertainment variables to avoid multicollinearity problem. The empirical result indicates that the interaction between entertainment and ICT improves the growth of the economy. It is important to note that the impact of entertainment on growth in the absence of ICT is higher (compare the coefficient of entertainment in equation (2) with (3)). This result is highly interesting and suggestive that ICT impact on economic growth is mediated by the role of the entertainment industry and that the enhancement of the entertainment industry is a sure mechanism for diversifying the economy, with all its attendant benefits.

From the estimated results of the impact of ICT and the entertainment industry on Nigeria's economic growth present, certain conclusions can be drawn.

These two areas are critical to economic diversification and thus to job creation, income generation and poverty reduction. It is clear that these areas tend to perform better on the average than several other sectors of the economy. This is adjudged by the relative strength of the country's entertainment industry in recent times. It is known for example that the entertainment industry in Nigeria has a wide spread, to the African region and even the Diaspora. The film industry is the third largest in the world after Hollywood and Bollywood, raking in some US$250 million annually. Its average annual production of 550 albums, record sales averaging 10 million in 2005 and 30 million in 2008, coupled with estimated 1200 concerts and musical shows every year with a combined annual turnover of US$105.5 million, it is incontestable that the entertainment industry (encompassing film and music sub-sectors) is a significant contributor to the growth and diversification of the Nigerian economy. Thus, the estimated results are consistent with the view that Nigeria's *Nollywood* is a potent instrument in its economic drive (Ebelo, 2014), and consequently on export diversification, thereby providing a medium through which the non-oil sector of the economy can be deepened.

A test of stability was conducted to assess the usefulness for policy of the estimated coefficients in our regressions. To achieve this, the cumulative sum of residuals (CUSUM) and the cumulative sum of squared residuals (CUSUMSQ) tests were carried out. Both plots are presented in Figures 1A through 1D of the Appendix. As shown by the figures, all tests are confirmatory that all the estimated regression coefficients are stable over the period of investigation.

The pair-wise Granger Causality test results are presented in Panels A through F of Table 3.

Table 3: Granger Causality Test Results

Panel A: Causality from ICT to Growth		
Hypothesis	1 Lag	2 Lags
ICT ↛ GDP	0.02217	10.3785*
Panel B: Causality from Growth to ICT		
Hypothesis	1 Lag	2 Lags
GDP ↛ ICT	23.6056*	22.0362*
Panel C: Causality from Entertainment to Growth		
Hypothesis	1 Lag	2 Lags
ENT ↛ GDP	0.00020	1.24759
Panel D: Causality from Growth to Entertainment		
Hypothesis	1 Lag	2 Lags
GDP ↛ ENT	29.6766*	32.0816
Panel E: Causality between ICT and Entertainment		
Hypothesis	1 Lag	2 Lags
ICT↛ ENT	0.24294	6.79121**
ENT ↛ ICT	5.23473**	11.6077*

Note: ↛ denotes "does not Granger-cause". * and ** represent 1% and 5% levels of significance respectively.
Source: Authors' computations

As shown in Panel A of Table 3, ICT Granger-cause economic growth at 2 lags. At both lags economic growth tends to Granger-cause Information and Communications technology, as indicated by the results in Panel B. In Panel C, there is no flow of causality from entertainment to economic growth, implying that growth in Nigeria is not predictable using the entertainment variable.

There is flow of causality from growth to entertainment (Panel D). Thus, using economic growth, the trend and pattern of the entertainment industry can be predicted. Panel E presents an interesting result. At 2 lags, there is evidence of bilateral causality between entertainment and information and telecommunications technology. This result is affirmative that either variable can be employed in the prediction of the other.
Importantly, it reinforces the regression results in equations (2) and (3), implying that the two variables in the regression have a feedback relationship. Consequently, entertainment and information and telecommunications technology can be mutually predicted on the basis of the information available from each other. Overall, the influence of the major variables of interest, i.e. ICT and entertainment on the target variable i.e. economic growth, and on each other, tends to be conclusive from both the regression and causality results under the period of investigation, a strong indication that the diversification of the Nigerian economy using the ICT-driven entertainment industry is achievable and worthwhile.

5. Conclusion

In this paper, the role that ICT can play in enforcing economic growth and diversification for the Nigerian economy was explored with specific reference to the entertainment industry. Using quarterly data for the period 2010Q1-2013Q4, a long-run relationship was found between economic growth and associated variables. A positive and statistically significant relationship was found to exist between ICT and growth in the baseline model.

In addition, there is empirical evidence that some proportion of the positive impact of ICT on economic growth is transmitted through entertainment, implying that diversification, driven by the adoption of information and communications technology in the entertainment industry is applicable for the Nigerian economy.

In the absence of ICT, the estimated coefficient of entertainment turns out not only statistically significant but strengthened, indicating that the entertainment industry has an independent and statistically significant impact on growth. The implication of this is that the entertainment industry is a source of diversification of the Nigerian economy and a powerful impetus for job creation, income generation, poverty reduction, in addition to providing the mechanism for deepening the non-oil sector.

The empirical results indicate that between ICT and growth, there is bidirectional causality. In addition, causality flows from growth to entertainment. There is evidence of bilateral causality between entertainment and information and telecommunications technology.

Overall, indications are strong and affirmative that the diversification of the Nigerian economy using the ICT-driven entertainment industry is achievable.

The need for future empirical researches in the area of the present investigation is however called for. Specifically, further studies which explore the impact of the entertainment industry on growth and as a source of economic diversification using extended sample (as data becomes available) will be an interesting extension of the present work. It is likely that the entertainment industry has differential impacts on different sectors of the economy. Because of this, an exploration into the role of the entertainment industry on employment, service exports, and income distribution are crucial for policy and likely to provide useful links in the entertainment-diversification nexus.

Based on the empirical findings, a comprehensive policy framework is vital which addresses issues relating to the entertainment industry, especially as it relates to the deployment of ICT in order to enhance productivity, promote indigenous culture and rebrand the economy. Policies which promote investment in ICT and investment in human capital to exploit the gains originating from greater integration of the country into the information-driven global economy will help nurture the goal of economic growth and diversification. All of these measures will however need to be adopted with due regards to an increase in the level of employment, and the drastic reduction in poverty, with their attendant consequences in Nigeria.

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Appendix

Table 1A: Descriptive Statistics, 2010Q1-2013Q4

	GDP	ENT	ICT	INF	PT
Mean	17096.37	11.76467	1847.086	-0.124244	0.287283
Median	16372.57	11.32000	1835.630	-2.820469	0.380119
Maximum	21812.60	19.99000	2445.910	29.48667	0.415413
Minimum	12993.80	6.030000	1402.540	-14.20037	0.000355
Std. Dev.	2502.356	3.784128	294.6783	13.32080	0.179492
Skewness	0.207483	0.570953	0.356813	1.194377	-1.040151
Kurtosis	2.164387	2.651913	2.255157	3.092318	2.104760
Jarque-Bera	0.544028	0.890696	0.665033	3.571671	3.205694
Probability	0.761844	0.640601	0.717117	0.167657	0.201323
Sum	256445.5	176.4700	27706.29	-1.863662	4.309245
Sum Sq. Dev.	87664970	200.4748	1215694.	2484.212	0.451045
Observations	15	15	15	15	15
Correlation Matrix					
GDP	1.0000	0.9027	0.9328	-0.2107	-0.7223
ENT	0.9027	1.0000	0.9587	-0.1046	-0.6720
ICT	0.9328	0.9587	1.0000	0.0019	-0.7175
INF	-0.2107	-0.1046	0.0019	1.0000	-0.0597
PT	-0.7223	-0.6720	-0.7175	-0.0597	1.0000

Note: GDP = Gross domestic product; ENT = entertainment; ICT = Information and communications technology; INF = Inflation; PT = Public trust; EDU = Education.
Source: Authors' computations

Table 1B: Unit Root Test Results

Panel A[‡]

	ADF		PP	
Variable	L	FD	L	FD
GDP	0.092358	-3.228569**	0.788968	-6.180936*
Entertainment	-0.484560	-6.615253*	1.154149	-4.535714*
ICT	1.915827	-7.251377*	-1.171864	-4.208167**
Inflation	-2.147632	-2.958493***	-6.251775*	-9.132636
Public trust	-0.344542	-3.898833**	-0.506758	-3.898833**

Panel B[Ψ]

	ADF		PP	
Variable	L	FD	L	FD
GDP	-2.982621	-5.411458*	-2.665204	-6.823162*
Entertainment	-0.552826	-16.85499*	-2.763900	-4.860426*
ICT	1.806925	-3.712736**	-4.103726**	-3.815699
Inflation	-2.105481	-12.79288*	-5.95221*	-9.187605
Public trust	-1.659970	-4.056884**	-1.659970	-4.452806**

Note: L represents level, FD first difference; [‡]with intercept, [Ψ]with intercept and a linear trend; *, ** and *** denote rejection of the null hypothesis at 1%, 5% and 10% level of significance respectively.

Table IC: Johansen Cointegration Test Results

Hypothesis		Eigen value	λ_{max}	5% critical value	λ_{trace}	5% critical va
Null	Alternative					
r = 0	r ≥ 1	0.979362	54.32887*	33.87687	127.0173*	69.81889
r ≤ 1	r ≥ 2	0.932262	37.68944*	27.58434	72.68839*	47.85613
r ≤ 2	r ≥ 3	0.845059	26.10596*	21.13162	34.99895*	29.79707
r ≤ 3	r ≥ 4	0.314393	5.284310	14.26460	8.892989	15.49471
r ≤ 4	r ≥ 5	0.227221	3.608679	3.841466	3.608679	3.841466

r indicates the number of cointegrating vectors. * indicates rejection of the null hypothesis at 5% level of significance.
Source: Authors' computations

Figure 1A: Stability Test Results (Equation 1)

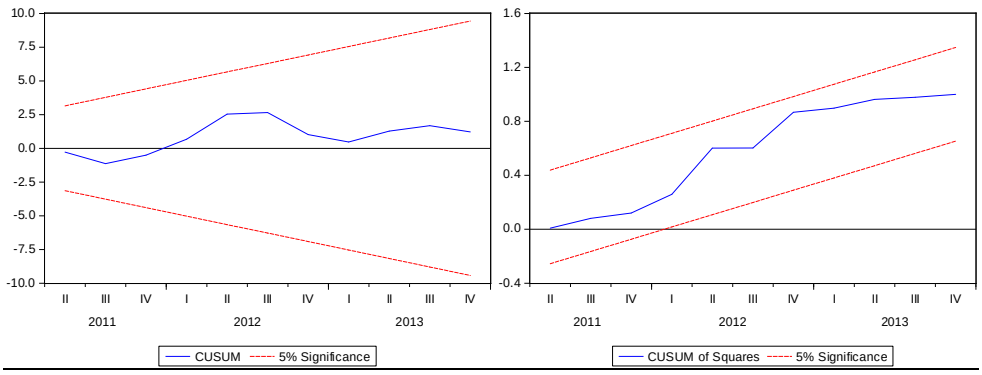


Figure 1B: Stability Test Results (Equation 2)

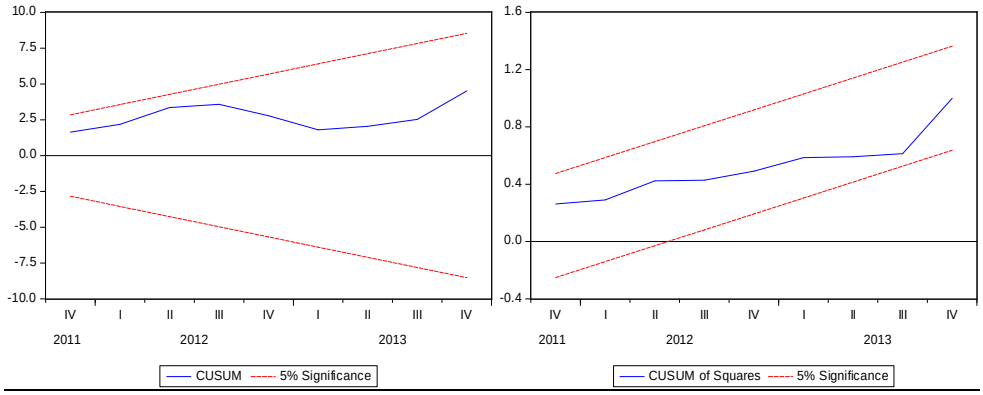


Figure 1C: Stability Test Results (Equation 3)

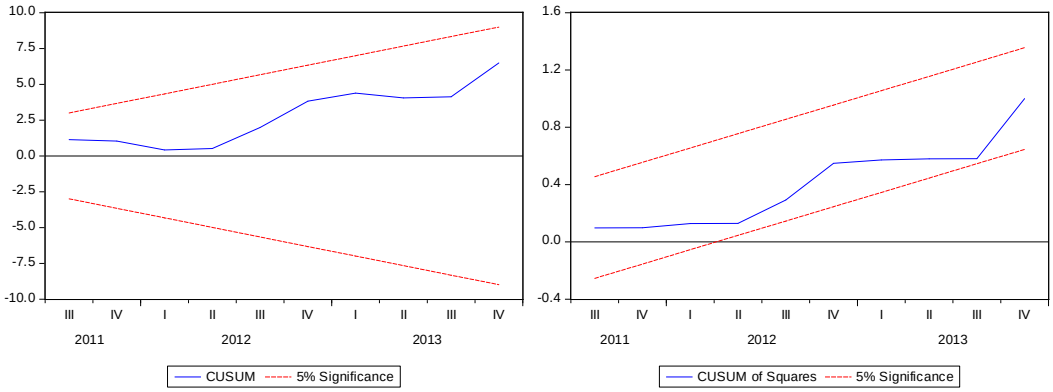
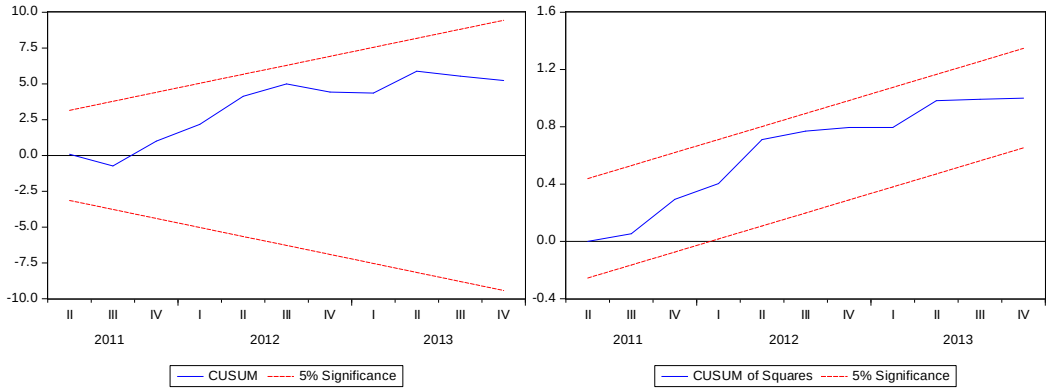


Figure 1D: Stability Test Results (Equation 4)



Source: Authors' computations