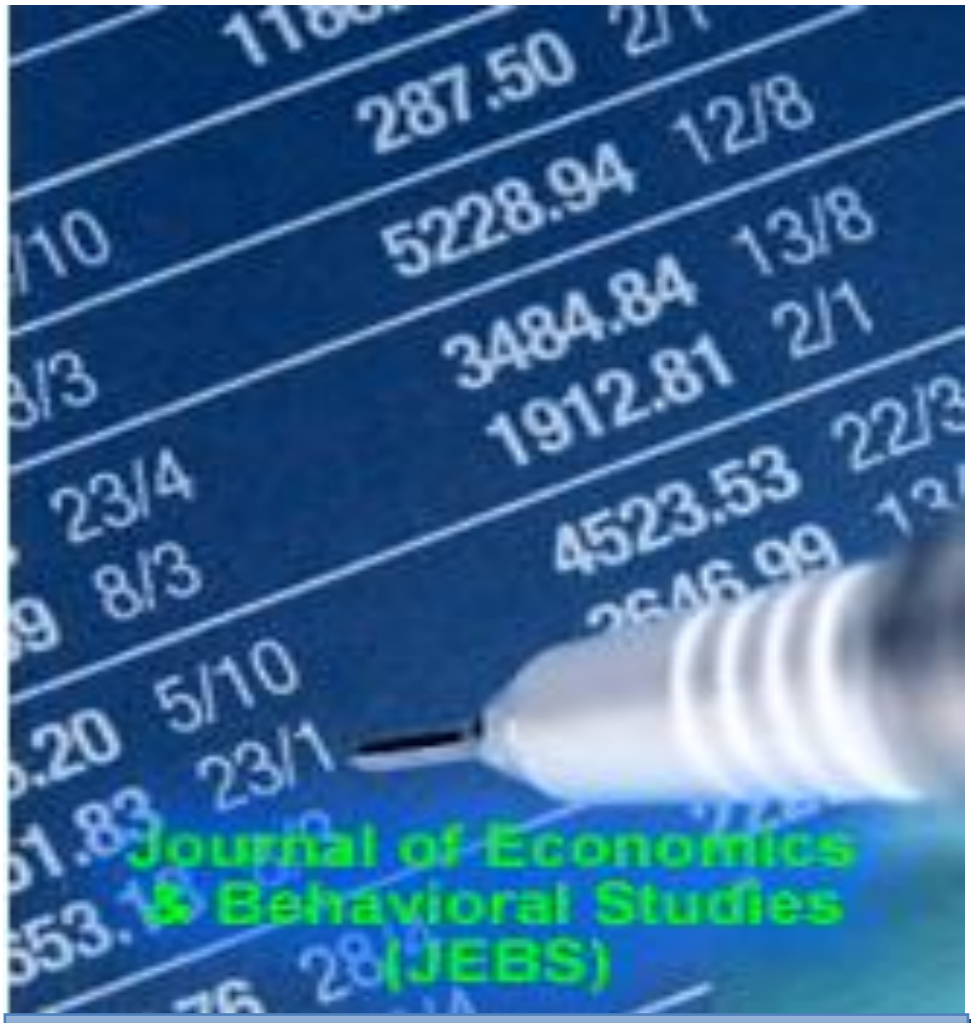

Vol. 12 No. 1 ISSN 2220-6140

Editorial

Journal of Economics and Behavioral Studies (JEBS) provides distinct avenue for quality research in the ever-changing fields of economics & behavioral studies and related disciplines. Research work submitted for publication consideration should not merely limited to conceptualization of economics and behavioral developments but comprise interdisciplinary and multi-facet approaches to economics and behavioral theories and practices as well as general transformations in the fields. Scope of the JEBS includes: subjects of managerial economics, financial economics, development economics, finance, economics, financial psychology, strategic management, organizational behavior, human behavior, marketing, human resource management and behavioral finance. Author(s) should declare that work submitted to the journal is original, not under consideration for publication by another journal, and that all listed authors approve its submission to JEBS. Author (s) can submit: Research Paper, Conceptual Paper, Case Studies and Book Review. Journal received research submission related to all aspects of major themes and tracks. All submitted papers were first assessed by the editorial team for relevance and originality of the work and blindly peer-reviewed by the external reviewers depending on the subject matter of the paper. After the rigorous peer-review process, the submitted papers were selected based on originality, significance, and clarity of the purpose. The current issue of JEBS comprises of papers of scholars from Turkey, Nigeria, USA, Zimbabwe and South Africa. Exchange rate risk and financial sector performance, effects of wireless mobile phone technology on economic growth, role of intrapreneurship on the growth of iron and steel manufacturing companies, political interference in the administration of service delivery, development of financial markets in Africa were & economic growth and unemployment nexus were some of the major practices and concepts examined in these studies. Current issue will therefore be a unique offer where scholars will be able to appreciate the latest results in their field of expertise, and to acquire additional knowledge in other relevant fields.

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PAPERS

Journal of Economics and Behavioral Studies (JEBS)
Vol. 12, No. 1, February 2020 (ISSN 2220-6140)

The Exchange Rate Risk and Financial Sector Performance: Evidence from Nigeria

KOLAPO T. Funso[1], Naheem Abiola Lawal[2]
[1]Faculty of Management Sciences, Ekiti State University, Ado-Ekiti, Nigeria
[2]Institute of Graduate Studies, Istanbul Aydin University, Istanbul Turkey
realvega1959@gmail.com, bodiatic@gmail.com

Abstract: This article looked at the connection between exchange rate risk and financial sector performance in Nigeria using time series data from 2008Q1 to 20017Q4. The study employed Autoregressive Conditional Heteroskedasticity (ARCH), and Granger Causality tests as estimation techniques. Financial intermediation index was used as the dependent variable while risk from exchange rate, risk from consumer price index and risk from interest rate were used as the independent variables. The findings from the study showed that exchange rate risk (EXR) coefficient value was -0.276230 with p-value of 0.0000, implying that EXR was negative and significant to influence FII. The risk from financial intermediation index reveals a coefficient value of -5.213590 and the p-value of 0.000 implying that when financial intermediation index increases, volatility or risk reduces which means that financial intermediation index was not a risky variable which was significant during the study period. However, the study concluded that the shock from exchange rate moves at a negative and significant direction to financial intermediation index of the economy. It is also concluded that exchange rate and financial intermediation index does not have uni or bi-directional relationships between each other. It is recommended that the Government and the Apex Bank of Nigeria are encouraged to increase the stabilization measurement for exchange rate to cushion its risk and by so doing; this could improve financial sector performance.

Keywords: *Exchange, Risk, Financial Intermediation Index, and Granger Causality.*

1. Introduction

The exchange rate movement in the financial sector performance and other sectors of the economy cannot be belittled. Armitage, Wold and Weissle (2002) are of the view that exchange rate fluctuations endanger firms' performance most especially financial institutions. An upward movement of foreign exchange in any economy will have an adverse effect on all the sectors, thereby resulting to price instability and soften growth of the economy. Exchange rate measures a country currency in terms of other countries' currencies. The essence of this is to allow international trade between two or more countries because the world is now a global village and no nation is self-sufficient. Meanwhile, exchange rate risk has been seen a fundamental issue affecting every sector of the Nigerian economy. This risk arises from the untold fluctuation of foreign exchange. Nzioka and Maseki (2017) defined exchange rate risk as an exposure of an institution to the fluctuation of foreign exchange rates. In Nigeria, exchange rate has been moving in a significant upward direction since the 1980s. Recently, in the last quarter of 2015 to the first and period 1 & 2 of the second quarter of 2016, the Nigerian official exchange rate to Dollar was ₦197 after which oscillated in the period 3 of the second quarter to ₦283. It was ₦313 at the beginning of quarter 3 of 2016 which was later stabilized at ₦305 at the end of the quarter three to the fourth quarter.

Meanwhile, it was fluctuating from ₦258 to ₦455 at the start of the first quarter to the end of the quarter of 2016 in the foreign market. This has left Nigeria business environment, including the banking sector to experience the high variation in the foreign exchange rate as Nigeria Naira depreciates against the key currency of US Dollar. Since businesses could source their input and sale globally, the risk or variation of foreign exchange rate has affected them, and this has called for the relevant authority to introduce various measures to mitigate the variation in foreign exchange rate. Despite the series of measurement on exchange rate risk, prices have not return to normal nor reduce to the minimum level and this in turn affecting the performance of financial sector and other sectors of the economy. However, empirical literature has shown that few articles had been written on the exchange rate risk and financial sector performance in different countries most importantly in the developing countries such as Ngerebo (2011); Runo (2013); He, Fayman & Casey (2014); Shaofang & Matej (2014); Sayedi (2014); Isaac (2015); Ahmed (2015); Ekinci (2016); Mansyur (2017); and Nzioka & Maseki (2017). Most of them have looked at the internal exchange risk factors on financial sector performance while some looked at the external factors.

2. Literature Review

Levine, Loayza and Beck (2000) studied the connection between financial intermediation and economic growth using dynamic panel techniques, and their findings revealed that financial intermediary components was positively connected with growth. Ngerebo (2011) wrote on the foreign exchange fluctuation on bank intermediation role in Nigeria from 1979-2004. Regression and correlation analyses were used. The study found that there exist positive association-ship between foreign exchange and bank intermediation role. Solakoglu and Demir (2009) also examined the connection between exchange rate exposure and financial sector in Turkey. Binary logistic method was used, and the result indicated that family ownership indicates a vital role in the exposure of the exchange rate. Furthermore, Runo (2013) studied the connection between exchange risk and oil companies' profitability. Correlation and regression analysis were employed as estimation techniques. The results showed that the risk from exchange greatly affects profitability. The risk was found to higher variance in forecasting the profit of these firms and exhibits a positive connection. Nonetheless, Shaofang and Matej (2014) focused on financial derivatives and US bank risks from 1997 to 2012 using pooled regression model were. It was found that financial derivatives positively related to Bank Holding Companies' systematic risk exposures. The result further revealed that higher interest rate, credit derivatives and exchange rate correspond to greater systematic risk.

He et al. (2014) investigated foreign currency instabilities on bank profitability in the US over a 40-year period. They used regression analysis to examine the broad objective. The result revealed that commercial banks are affected by the fluctuations from foreign exchange. Similarly, Sayedi (2014) focused on the effect of credit risk, market power, the exchange rate on the profitability of Nigeria banks between 2006 and 2011. Linear regression analysis was employed as the estimation technique. The findings revealed that market power has a positive and significant effect, exchange rate exhibits a positive and insignificant effect, while credit risk has a negative and insignificant effect on profitability of bank performance. Aspal and Dhawan (2014) wrote on financial performance assessment of banking sector in India from 2007 to 2012 using CAMELs ranking method on the selected banks. The rating results among the private banks revealed that 6 out of the banks show excellent performance in India. More so, their findings have not been consistent due the time period covered and the methodology. This however prompted this study to further re-examine exchange rate risk and financial sector performance in Nigeria. More so, Isaac (2015) studied the exchange rate risk impact on the performance of banks in Nigeria from 1997-2013. The study employed OLS as the estimation technique. The findings revealed the exchange rate risk and bank performance have significant association-ship.

Ekinci (2016) focused on the credit and market risks on the performance of banks in Turkey using weekly data from 2002 to 2015. The study employed generalized autoregressive conditional heteroscedastic (GARCH) method. The findings revealed that credit risk was to negative and insignificant, foreign exchange risk was positive and insignificant, while market risk is significantly positive on the performance of bank in Turkey. Continuously, Lagat and Nyandema (2016) studied exchange rate variations on financial performance of Nairobi banks from 2000 to 2013. The study employed correlation and multivariate regression as estimation techniques. The result discovered that exchange rates have positive relationship with financial performance indicators during the study period. In the same view, Osundina, Osundina, Jayeoba and Olayinka (2016) investigated the relationship between exchange rate volatility and Nigeria banks' performance from 2005 to 2014. ARCH-LM, fixed and random effect and Huasman test were employed in this study. The study showed that the fluctuations from the exchange rates revealed insignificant impact on bank profitability. Mansyur (2017) focused on the financial risk on banks' financial performance in Indonesia from 2011 to 2015. The study employed path analysis, and the findings revealed that liquidity and exchange risks does not affect the performance of banks while credit risk and interest risk were significant but moving in a negative and positive directions respectively.

3. Methodology

Secondary data were employed and sourced from the statistical bulletin of the Central Bank of Nigeria (CBN) from the first quarter of 2008 to the last quarter of 2017. This period marks a rising movement in the exchange of Naira against other currencies of the world, particularly the key currencies. The study adapted

the work of Isaac (2015), he carried out an investigation on the exchange rate risk impact on bank performance in Nigeria from 1997-2013. The model for the study was specified in panel form as follows:

PAT = F (ER, INF, INT, TA) ----------1

Where:

PAT = Profit after Tax
ER = Exchange rate
INF = Inflation rate
INT = Interest rate
TA = Total asset of the bank

However, the above model was re-modified into a time series, functional model where the financial performance was used as the dependent variable, and it was proxy with the Financial Intermediation Index (FII) of the shareholders' equity while risk from exchange rate, risk form interest rate, and risk from consumer price index were used as the independent variables. The model is presented as follows:

FII = f (EXR, INTR, CPI) ----------2

Where

FII = Financial Intermediation Index
EXR = Risk from Exchange Rate
INTR = Risk from Interest Rate
CPI = Risk from Consumer Price Index

The econometric form of the model is presented as:

$FII = \eta_0 + \eta_1 EXR + \eta_2 INTR + \eta_3 CPI + \varepsilon_t$ ----------3

Where

η_0 = Intercept
$\eta_1 - \eta_3$ = Shift Parameters and ε_t = error term at period t

4. Results and Discussion of Findings

Stationarity Result

Table 1: ADF-Test

Variable	Integration Order
FII	1(0)
INR	I(1)
EXR	I(2)
CPI	I(2)

Source: Author's compilation (2019)

Augmented Dickey Fuller test was used to carry out the stationarity of the variables employed in this study. The result revealed that the financial intermediation index used as the proxy for financial performance was stationary at level. However, interest rate was not stationary at level, but when converted to the first difference, it became stationary. The exchange rate and consumer price index were stationary at the second difference during the study period.

Autoregressive Conditional Heteroskedasticity (ARCH)

Table 2: ARCH Result

Predictor Variable: FII
GARCH = C(4) + C(5)*RESID(-1)^2 + C(6)*GARCH(-1) + C(7)*INR + C(8) *CPI

Variable	Coefficient	Std. Error	z-Statistic	Prob.
@SQRT(GARCH)	-5.213590	0.000150	-34658.49	0.000
C	173.2182	0.004688	36946.39	0.000
EXR	-0.276230	0.004771	-57.89522	0.000
	Variance-Equation			
C	367.8655	5.792603	63.50608	0.000

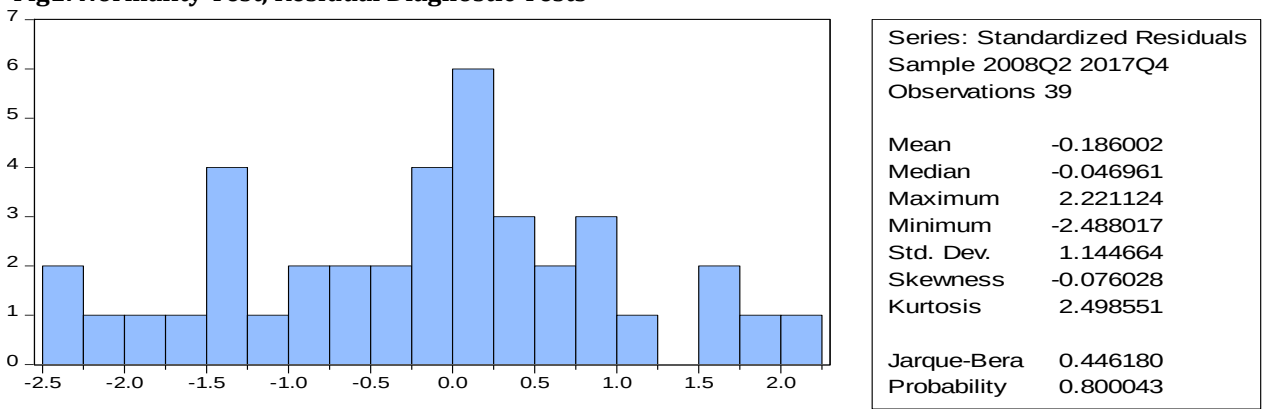
RESID(-1)^2	0.357354	0.014625	24.43386	0.000
GARCH(-1)	-0.126858	0.009444	-13.43319	0.000
INR	26.64262	2.296167	11.60308	0.000
CPI	-2.621770	0.215131	-12.18686	0.000
R-squared	0.588612	Adjusted R-squared		0.565758

Source: Author's computation (2019)

The table above shows the auto-regressive conditional heteroskadasticity (ARCH) result and the result revealed that the square root of GARCH (@SQRT(GARCH)) which shows the standard deviation of financial intermediation index or the risk from financial intermediation index reveals a coefficient value of -5.213590 and the p-value of 0.000 implying that when financial intermediation index increases, volatility or risk reduces which means that financial intermediation index was not a risky variable, and it was significant during the study period. Meanwhile, the EXR coefficient value was -0.276230 and its p-values are 0.000. This implies that EXR was positive and significant to influence FII. This also means that the shock coming from exchange rate moves at a negative and significant direction to the financial intermediation index of the economy. The variance equation result revealed that the coefficient of RESID(-1)^2 (ARCH) value was 0.357354 and its p-value was 0.000 indicating that ARCH effects was positive and significant.

This also connotes that there exist ARCH effect or the internal shock of FII can influence the volatility of financial intermediation index in the model. The coefficient value of GARCH(-1) was -0.126858 with p-value of 0.000 meaning that GARCH(-1) which also refers to as the internal cause was negative and significant. This means that financial intermediation index is affected with GARCH effects during the study period. Interest rate and CPI used as the external causes or factors in this model revealed the coefficient value INR was 26.64262 with the p-value of 0.0000 implying that interest rate was positive and significant to the standard deviation or volatility of financial intermediation index. The consumer price index coefficient value was -2.621770 and its p-value is 0.0000. This indicates that consumer price index as an external cause was negative and significant to the volatility of financial intermediation index during the study period.

Fig1: Normality Test, Residual Diagnostic Tests



This figure shows the normality test of the variables employed. It was showed that the JB value is 0.446180 and its prob. value is 0.800043 which means that variables are normally distributed during the study period.

Table 3: Heteroscedastic Test

Heteroskedasticity Test: ARCH			
F-stat	0.739622	Prob. F(1,36)	0.3955
Obs*R-squared	0.764996	Prob. Chi-Square(1)	0.3818

Source: Author's compilation (2019)

This shows the report of hetoeroskedasticity test and the result from the observed R-squared probability chi-square values are 0.764996 with the p-values of 0.3818 which implies that the null hypothesis is failed to be rejected at 5% level of significance that the residual does not have ARCH effects.

Table 4: Autocorrelation Test

Auto-correlation	Partial Correlation		AC	PAC	Q-Stat	Prob*
. |*. |	. |*. |	1	.139	.139	.8141	.367
.*| . |	.*| . |	2	-.107	-.129	1.3065	.520
. | . |	. | . |	3	.036	.074	1.3649	.714
**| . |	**| . |	4	-.235	-.277	3.8788	.423
***| . |	**| . |	5	-.394	-.330	11.189	.048
.*| . |	. | . |	6	-.071	-.057	11.430	.076
.*| . |	.*| . |	7	-.083	-.179	11.774	.108
. | . |	.*| . |	8	-.050	-.087	11.902	.156
. |*. |	. | . |	9	.165	-.037	13.345	.148
. |** |	. | . |	10	.219	.039	15.991	.100
. | . |	.*| . |	11	-.015	-.138	16.003	.141
. | . |	.*| . |	12	-.044	-.160	16.117	.186
. |*. |	. | . |	13	.075	.029	16.462	.225
. | . |	. | . |	14	-.032	.007	16.528	.282
. |*. |	. |** |	15	.084	.215	16.997	.319
. |*. |	. |*. |	16	.156	.140	18.681	.286

Source: Author's compilation (2019)

The above table displays the absence of autocorrelation and partial correlation in the variables employed during the study period.

Table 5: Pairwise Granger Causality Result

Null Hypothesis:		F-Statistic	Prob.
No causality between INR and FII	37	.07743	0.9257
No causality between FII and INR		3.51322	.0417
No causality between EXR and FII	37	.53991	.5880
No causality between FII and EXR		.09446	.9101
No causality between CPI and FII	37	.15087	.8606
No causality between FII and CPI		3.99167	.0283
No causality between EXR and INR	42	.44788	.6424
No causality between INR and EXR		1.07311	.3523
No causality between CPI and INR	42	2.51210	.0948
No causality between INR and CPI		.77310	.4689
CPI does not Granger Cause EXR	42	2.70852	.0798
No causality between and CPI		6.78841	.0031

Source: Author's compilation (2019)

The Pairwise Granger Causality Test Presented in the table above revealed that interest rate to financial intermediation index value was 0.9257 implying that interest rate does not granger cause financial intermediation index. The p-value of financial intermediation index to interest rate was 0.0417 meaning that financial intermediation index can granger cause interest rate. That is, there exist a uni-directional connection between financial intermediation and interest rate. The p-value of exchange rate to financial intermediation index was 0.5880 and financial intermediation index to exchange was 0.9101. This indicates that there is no uni or bi-directional connection between EXR and FII vise-a-viz. it also indicates that there is uni-directional relationship between financial intermediation index and consumer price index that is FII can granger cause CPI, but CPI does not granger cause FII. The result of exchange rate and interest rate revealed that there exist no uni or bi-directional relationship between EXR and INR. More so, CPI and interest rate reveal that they free move to each other. That is, they did not granger cause one another during the study period. Also, the p-values of consumer price index and exchange rate were 0.0798 indicating that at 5% consumer price index does not granger cause exchange rate. The p-value of exchange rate and consumer price index was 0.0031 implying that the EXR can granger cause CPI. This connotes that there exists uni-directional connection between the EXR and CPI during the study period.

5. Conclusion and Recommendations

This study studied the connection between exchange rate risk and financial performance in Nigeria. Several empirical reviews were being reviewed in the literature to identify the unfilled gap. Meanwhile, the findings have revealed directional connection between exchange rate and financial performance proxy with financial intermediation index and some other variables such as exchange rate, interest rate and consumer price index. However, the study concluded that the shock from exchange rate moves at a negative and significant direction to the financial intermediation index of the economy. It is also concluded that exchange rate and financial intermediation index do not have uni or bi-directional relationship between each other. The study further concluded that interest rate and consumer price index have significant effect to the volatility of financial intermediation index during the study period. The study recommended that the Government and the Apex Bank of Nigeria should introduce to increasing the stabilization measurement for exchange rate to cushion its risk and by so doing; this could improve on the performance of the financial sector. Also, the slight bi-directional relationship between consumer price index and exchange rate could be used as a measuring factor in curbing the risk from foreign exchange, that is, when consumer price index reduces, foreign exchange rate reduces and when it increases, foreign exchange rate could also increase.

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Journal of Economics and Behavioral Studies (JEBS)
Vol. 12, No. 1, February 2020 (ISSN 2220-6140)

The Effects of Wireless Mobile Phone Technology on Economic Growth in Nigeria

Onochie Jude Dieli[1], Mika Kato[2], Solomon Osho[3], Oluwagbemiga Ojumu[4]
[1,3&4]Prairie View A&M University, USA
[2]Howard University, USA
gsosho@pvamu.edu

Abstract: This research studies the effects of wireless mobile phone technology on economic growth in Nigeria. Nigeria is made up of 37 states including the capital territory. The phone ownership and subscription rate per state increased with the availability of wireless mobile phone technology. After deregulation of telecom industry, wireless technology has become widely available, e.g., cellular phone ownership rate per state rose to approximately 80 percent of the population in 2015. This study shows that the availability of wireless mobile phone technology helps to reduce the cost of learning and implementing world technology frontier and thus that it promotes smoother transfer of technology from technologically-advanced countries to Nigeria and brings significant growth in the economy Using the industry-level (NAICS) and the state-level (37) data in two respective econometric models, the study finds that the availability of wireless technology increased transfer of technology measured by the volume of imports and spurred growth in Nigeria. Moreover, it finds that the benefit of the wireless technology is greater for lower income groups and thus the technology helped to reduce distributional inequality of economic benefit.

Keywords: *Transfer of technology, economic growth, mobile phone technology.*

1. Introduction

The Nigerian telecom industry is a non-manufacturing industry that passes different stages of growth and development in its lifecycle. It started as a natural monopoly but later opened up to competition. As more and more new technology and deregulation spurred competition in the industry, this has led to the development of market segments. The market in the telecom industry is often segmented into three categories namely long distance, local and wireless services. In their survey, Green and Teece (1998) used this approach to study the telecom market segmentations of the United Kingdom, Australia, United States and New Zealand. Their study synthesized the regulatory framework and the development of competition in the four countries. They also studied the impact and speed at which competition had evolved in different segments of the markets. In contrast, Nigeria's Communications Commission in 2010 carried out what they called "a Determination of Dominance". They considered two methods of phone communication in Nigeria, namely the mobile telephone and the International Internet Connectivity (IIC) methods. They organized the two methods and produced four major market segments—voice, data, upstream and downstream. NCC further divided these four market segments into various sub-segments as shown in Table 1.

Table 1: Telecom Market Segments

Serial Number of Market Categorization	Market Segment	Sub-Segment
1	Voice	-Mobile Telephone (includes messaging) -Fixed Line Telephone
2	Data	-transmitting data by Fixed lines, Data Transmission: by retail Services and by Leased Lines -Mobile telephone Data (Using Dongles

[1]Funding Source: The Ryoichi Sasakawa Young Leaders Fellowship Fund
Nippon Foundation Tokyo Japan sponsored and provided the funding for the study at Howard University, Washington, DC USA

		/Data Cards/Tablets, and using internet through mobile phone connections e.g. 3G/GPRS/Edge
3	Upstream Segments	-Spectrum -Tower sites - Equipment for the Network - broadband/Internet Access in wholesale capacity - Leased Lines and Transmission in wholesale Capacity
4	Downstream Segments	-The Device operating system which include handset. M-commerce include applications and content)

Source: NCC website; 2013

Furthermore, the purpose of the dominance determination survey was to assist the Commission in determining whether certain telecommunications service providers were in a position of market dominance in selected telecommunications market segments in Nigeria within the meaning of the Nigerian Communications Act of 2003. It found that none was in dominance, not even NITEL. In line with its policy of openness, transparency, fairness and participatory regulation, the commission informed stakeholders in September 2012 of its intent to conduct a study on the level of competition in the relevant markets of Nigeria's Telecommunications Industry. It held meetings with a cross section of industry operators. The meetings were one-on-one interactive sessions. The commission later organized an enlarged stakeholders' forum where it sensitized players in the industry. This forum provided them the chance to make constructive contributions on the trends in Nigeria's telecommunications market. Data was collated from the operators during this period (NCC, 2013).

Prior Studies: Hunya (2000) agrees that there is a privatization and deregulation related FDI upswing in the 1990s in the Central and Eastern European Countries (CEECs) that target sectors based on resource endowment. This is accompanied by the introduction of a new world technology frontier in the recipient economy. This technology when transferred to the local suppliers in the domestic economy brings to par the level of domestic technology with the world technology frontier and leads to welfare gains (Garrick and Gertler, 2004). It should also be added here that the ability of absorption of the recipient nation may also influence the mechanism of transfer. The rate of the technology transfer also counts, as argued by Aggarwal (2013). This rate of transfer increases with the fall in cost of transfer, which is also enhanced by R&D and education. Aghion and Howitt, (2009) argue that countries that invest in the adoption of new technology, grow and make headway while others who do not, otherwise stagnate. The research hereby contributes to the literature by showing that availability of mobile phone technology, education and research help to reduce the cost of technology transfer in Nigeria and thereby enhanced growth. According to the ministry of trade and industry classification (2013), large firm was defined as companies with at least 500 employees.

While some studies have stressed the significance of personal contacts and networks in technology transfer, it is imperative to stress that the major mechanism for technology transfer has been the international exchange of goods and services as in international trade which closes up the gap between world technology frontier and the technology of the recipient nation (Aggarwal, 2013). It is a well-known fact that the new products are usually developed by firms in recipient countries through extensive investment in rigorous research and development (R&D). For a larger return on this extensive investment in R&D, Jamison, Douglas and Jansen (2001) suggest that there should be a program to increase the elasticity of output to justify the huge investment. The model predicts that if the cost of technology transfer is too high, no technology transfer occurs and we have no growth. On the other hand, if the cost of technology transfer is sufficiently small, technology transfer is enhanced and positive growth is achieved. So the question is what are the factors that can reduce the cost of technology transfer, i.e., the cost of learning the world technology frontier? This research will attempt to explain the cost of technology transfer by the availability of mobile technology and the level of education (or human capital stock).

Mobile Technology: Greater access to mobile technology makes communication and transfer of information cheaper and easier, hence, economic growth. Vanags and Gravelis (2014) found a positive effect of 4G investment on growth using Swedish and Estonian data.

Education (Human Capital): The higher the level of a worker's education is, the lower the cost of learning the new technology. Nelson and Phelps (1966) argued that human capital has a positive role in facilitating the adoption of new technologies.

2. Method

Transfer of technology is the process of transferring scientific knowledge, skills, and methods of manufacturing for practical purposes in industry. Most scholarly literatures agree that telecommunications technologies greatly assist in knowledge acquisition (Norton, 1992; Leff, 1984 and Jensen, 2007). The advent of satellite technology drastically reduces the cost of acquiring telecommunications equipment and products. This is seen in the role wireless mobile telephone technology plays in communications and information dissemination in the world. A contemporary example is that mobile phone technologies also enable the internet, which is a less expensive source of knowledge (Jerbashian and Kochanova, 2012). By implications, there may be a positive relationship between mobile phone technologies and technology transfer. Hence, the availability of technology boosts output and creates growth. With the above analysis at-hand in this study, the current research study will attempt to investigate the effect of mobile phone technology on transfer of technology and economic growth. First, using the industry-level data, we studied the effect of mobile phone technology on technology transfer measured by the volume of imports for seventeen industries for the time period of 1999 to 2017. Then, we also study using the state-level data, the impact of mobile phone technology on economic growth for 36 states and the Federal Capital Territory in Nigeria for the time period of 1999 to 2017.

For the first test on the effect of mobile technology on technology transfer, we used the following model:

$$\text{transfer}_{it}=\alpha_i+\beta_0\text{mph}_{it}+\beta_1\text{X}_{it}+\beta_2\text{dpn}_{it}+\beta_3\text{edu}_{it}+\varepsilon_{it} \quad (1)$$

Where transfer_{it} is the volume of technology transfer to industry i at time t measured by the volume of imports by industry i at time t, mph_{it} is the mobile phone subscription rate at time t, X_{it} are control variables for all industries i at time t, dpn_{it} is the dependence on mobile phone technology for industry i at time t, α_{it} are the sector unobserved effects, edu_{it} is the number of the population with high school education and above that is employed divided by the total population at time t and ε_{it} is the error term. For the second test on the effect of mobile technology on per-capita GDP growth rate, the following models were specified:

$$\text{growth}_{jt}=\beta_0+\beta_1 gdp_{99jt}+\beta_2\text{X}_t+\beta_3\text{mph}_{jt}+\beta_4\text{mph}_{jt}*\text{gdp}_{99j}+\beta_5\text{edu>hs}_{jt}+\beta_6\text{lgfrm}_{jt}+\beta_7\text{Z}_{jt}+\varepsilon_{jt} \quad (2)$$

Where growth_{jt} is the growth rate of per capita GDP at time t-1 of state j, X_t are the control variables at time t such as tariff and inflation. Z_{jt} is the state j's population growth rate at time t and the state j's investment as share of GDP at time t. The variable mph_{jt} is the mobile phone ownership rate as a percentage of the population at time t for state j, gdp_{99j} is the initial per capita GDP at 1999 for state j, edu>hs_{jt} is education level above high school at time t for state~~s~~ j, lgfrm_{jt} is the number of firms with equal or greater than 500 employees at time t in states j and ε_{jt} is the error term. In the model, the interest and emphasis is on the coefficients of the interaction parameters β_3, and also β_4 .

Measures and Data: For the first model in equation 1, the study used data for seventeen industry sectors classified using North American Industry Classification System (NAICS) and International standard industrial classification (ISIC). For the second model (2) data for thirty-six states and FCT in Nigeria are collected and studied. For both models, the period of focus is from 1999 to 2017. The major limitation of this study is that the dependence rates on mobile phone technology of industry sectors are calculated based on the US data due to the non-availability of such data for Nigeria. The intuition behind the use of US data for other countries is based on the assumption that economic sectors behave alike globally. For example, Jebershan and Kochanova (2012) applied the US mobile phone technology dependence rates to the European industry sectors. This current study applied the US rates to Nigeria industry sectors; however, the study admitted that there is a possibility that the US industry structure may differ slightly from that of Nigeria.

Transfer of Technology: In many studies, transfer of technology is measured by the volume of import or the FDI. They are carriers of new technology from the world frontiers of technology (see for example, Saggi, 2002; Keller, 2004). Since FDI data is not available at the industry level, in this study, transfer of technology to each industry sector is measured by the volume of import by each industry sector. The data is obtained from the Nigerian Federal Ministry of Industry, Trade and Investment and the Nigerian Federal Office of Statistics.

Mobile Phone Subscription Rate: For the first test model equation 1, the Nigerian mobile phone subscription rate is the number of mobile telephone subscribers per 100 persons obtained from the 2013 World Bank data. For the second test for equation 2, the state-by-state mobile phone use was calculated as a percentage of each state's total population that own mobile telephone for Nigeria's 36 states and Federal Capital Territory. The data sets used were obtained from the 2016 Nigerian General Household Survey and the Federal Office of Statistics; Table 2 offers the basic statistics on the percentage mobile phone subscription rate by state in Nigeria in 2016

Table 2: Percentage of Mobile Phone Subscription Rate by State in Nigeria, 2016

No	State	Population	%mph	No	State	Population	%mph
1	Kano	9,383,682	81	27	Abia	2,833,999	76
2	Lagos	9,013,534	89.56	28	Ekiti	2,384,212	89
3	Kaduna	6,066,562	88	29	Kwara	2,371,089	70
4	Katsina	5,792,578	80	30	Gombe	2,353,879	88
5	Oyo	5,591,589	88	31	Yobe	2,321,591	88
6	Rivers	5,185,400	89	32	Taraba	2,300,736	84
7	Bauchi	4,676,465	88	33	Ebonyi	2,173,501	69
8	Jigawa	4,348,649	89	34	Nasarawa	1,863,275	68
9	Benue	4,219,244	86	35	Bayelsa	1,703,358	80
10	Anambra	4,182,032	89	36	Abuja (FCT)	1,405,201	81
11	Borno	4,151,193	80	37	Cross River	2,888,966	84
12	Delta	4,098,391	83				
13	Niger	3,950,249	85				
14	Imo	3,934,899	88				
15	Akwa Ibom	3,920,208	82				
16	Ogun	3,728,098	87				
17	Sokoto	3,696,999	85				
18	Ondo	3,441,024	89				
19	Osun	3,423,535	82				
20	Kogi	3,278,487	89				
21	Zamfara	3,259,846	82				
22	Enugu	3,257,298	84				
23	Kebbi	3,238,628	72				
24	Edo	3,218,332	83				
25	Plateau	3,178,712	83				
26	Adamawa	3,168,101	87				

Telecom Technology Dependence Rate: A measure of an industry's dependence on telecommunication, hereafter called telecom dependence rate, was computed as the share of expenditures on telecommunications out of the total expenditure on intermediate inputs (Jerbashian and Kochanova, 2012). The variable reflects each industry's current state of telecom technology adoption**.** Using the North America Industry Classification System (NAICS), we first classified all industries in Nigeria into seventeen industry sectors. Due to non-availability of this kind of complex data in Nigeria, the U.S. data set was employed to estimate the telecom dependence of Nigerian industries. The use of the US data for Nigerian economic sectors is based on the assumption that sectors behave alike worldwide. The data set used are from individual state's agencies in charge of data (from 37 of them) and Nigeria's Office of Statistics, Abuja. Jerbashian and Kochanova (2012) also use the U.S. data based on this assumption to estimate the dependence rates for industries in OECD (Organization for Economic Co-operation and Development) countries.

Economic Growth: In most countries, a naïve measure of economic growth rate would be the per capita GDP growth rate. The 37 states of Nigeria's per capital's GDP growth rates are collected and this variable can represent the rate at which output per person grows in each state, which when aggregated, indicate the total economy's growth trend. The data set used are from individual state's agencies in charge of data (from 37 of them) and Nigeria's Office of Statistics, Abuja.

Education: For the first test of model equation 1, education is measured as a stock variable which is the number of the population with a minimum of high school education, and above that is employed divided by the total population of the country at time t using data obtained from Nigeria's Office of Statistics (2016), Abuja, Nigeria. For the second test using equation 2, education is measured at the state level using the number of people with a minimum of high school education divided by the total population of the state at time t. The data for high school educational level were obtained from UNESCO PARIS 6 – 7 September 2012 Action Plan Nigeria and Federal Ministry of Education, Nigeria which offers the basic statistics. Most firms that employ more than 500 in Nigeria are financial institutions and multinational companies. They are mainly in joint ownership with foreigners. These large firms are concentrated in Lagos, Ogun (South West, Nigeria), Abuja (FCT), Rivers, Akwa Ibom, and Bayelsa (Southern region - the oil region). The state-by-state list of firms with more than 500 employees was obtained from the Federal Office of Statistics, Abuja Nigeria, 2016.

3. Results

The descriptive statistics and definitions of variables are presented in Table 3. Table 4 and Table 5 are the correlation matrices for the variables in the volume of import regression and variables in the state economic growth regression. The correlation matrixes do not show unusual or strange noise. In Tables 6 and Table 7, the main econometric results are presented from the baseline specifications (1) and (2) and are estimated using least squares method. For transfer of technology (1), this study identified four models a, b, c and d. In model 'a', we dropped these variables: tariff, expenditure on education, terms of trade and control for inflation. In model 'b', we dropped inflation, expenditure on education, terms of trade and control for tariff. In model 'c', we control for expenditure on education and drop others. Finally, we dropped other variables and control for terms of trade. For economic growth, we used two models 'a' and 'b'. In 'a', we also dropped tariff and control for inflation and drop inflation in 'b' and control for tariff.

Industry-Level: It is the total import of goods and services in each sector or industry in Nigeria (1999-2017). Sectors' Telecoms dependency ratio the share of real expenditure on telecoms out of total expenditures on intermediate inputs in US industries averaged over the period 1999-2017. Source: Author's calculations using 1997-2013 - 15 industries (XLSX), 71 industries (XLXS), 2007-389 industries (XLSX) from Bureau of Economic Analysis. Web site http://www.bea.gov/industry/io_annual.htm

State – level Variables

GDP Growth Rate: The annual percentage growth rate of GDP at market prices based on constant local currency. Nigeria is constituted by 36 Federal States and a Federal Capital Territory (Abuja) with yearly GDP figures (1999-2017). Source: States' office of statistics (2017), Nigerian Bureau of Statistics, Abuja (2013) and Nigerian vision 20:2020 Document (2012).

GDP Per Cap It: It is the gross domestic product of each state divided by the population of the respective states (1999-2017). Source: states' Office of Statistics (2017), and Nigeria's Bureau of Statistics (2017). GDP_{99}, it is the initial GDP per capita of the beginning year of study (1999) of each state that is assumed to be the value of per capita GDP for the 15 years (1999-2017).

Investment as a Share of GDP: This is the share of investment in total production. It is derived by computing gross capital formation as percentage of GDP for the 36 states and Abuja (1999-2017). Source: states' Office of Statistics (2013) and States' Ministry of Economic Planning (2017).

Mobile Phone Subscription: The mobile phone subscription as a percentage of the states' population (1999-2017). Source: Nigeria Bureau of Statistics, General Household Survey (2017).

State Population Growth Rate: It refers to the rate of increase in each of the 36 states' population during the period 1999-2017 and expressed as percentage of the states' population (1999-2017). It shows births and deaths (1999-2017). Source: National Population Commission, Abuja, Nigeria (2017).

Education: This refers to the number of people with high school education and above in each state of the federation divided by the total population of the state. Source: Federal Office of Statistics (2017).

Education: This refers to the number of the employed people with high school education and above in the country divided by the total population of Nigeria at time t. Source: Federal Office of Statistics, Abuja, Nigeria (2017) and Ministry of Education (2017).

Inflation Rate: This is measured as annual percentage increase in the general price level for goods and services in Nigeria (1999-2013). Source: Central Bank of Nigeria Bulletin (2017) and Global Finance site (2017).

Investment as a Share of GDP: This is the share of investment in total production. It is derived by computing gross capital formation as percentage of GDP for Nigeria (1999-2017). Source: Ministry of Economic Planning (2017).

Population Growth Rate: It refers to the increase in Nigeria's population during the period 1999-2017 and expressed as percentage of the population at the start of the period 1999-2017. It shows births and deaths (1999-2017). Source: National Population Commission, Abuja, Nigeria (2017).

Tariff Rate: Nigeria had used over the years two restrictive policy instruments to protect domestically produced goods from competitive imports. They are tariffs and quota. Tariffs are rates used to raise the price of imported goods to make them look more expensive to consumers. Source: World Bank staff estimates using integrated trade solution system (1999-2017) and Nigerian Department of Customs and Exercise (1999-2017).

Terms of Trade: This refers to the ratio of an index of Nigeria's export prices to the index of its import prices (1999-2017). The changes in terms of trade were derived using base year 2000 =100 at Net Barter terms of trade World Bank data set (2013) and Federal Ministry of Industry, Trade and Investment, Abuja, Nigeria (2017). In regression model equation 1, the dependent variable is volume of import which is the main measure of technology transfer over the period 1999 to 2017 and it is in logarithm form. The variable mph is the factor that can reduce the cost of technology transfer. The estimates of the coefficients of dependence on mobile phone technology and mobile phone subscription rates in models a, b, c, and d are positive they are for models a, b, c, and d: [2.816 (1.012), 2.826 ((1.011), 2.627 (1.010), 2.821 (1.012) and .005(0.006), 0.004(0.006), 0.001(0.006), 0.004(0.006)] respectively. The mobile phone subscription is significant at 10% and the coefficient of the industry dependence rate is significant at 1%. This implies that availability of mobile phone technology reduces cost of transfer of technology and dependence on it increases volume of import that carries the technology. Population growth rate is positive in all the models: (0.004(0.568), 0.038(0.640), 0.075(0.562) and 0.056(0.648) which implies that as population increases, rate of import increases.

Table 3: Summary Statistics

Variable					
Industry level	**Obs.**	**Mean**	**SD**	**Min**	**Max**
Volume of import	255	6.811	1.752	2.661	12.538
Mobile phone dependence	255	.0893	.1715	0	.7341
Country level					
Inflation	255	11.587	3.954	5.4	18.9
Tariff	255	15.419	6.221	10	24.32
Education	255	.2750	.1023	1323	4914
Population growth rate	255	2.373	.2569	1.94	2.75
Terms of trade	255	139.973	41.909	59.6	35693
Investment as share of GDP	255	24.906	3.166	20.19	31.921

Mobile subscription rate	255	28	27	0	77
State level (36 states and FCT)					
State citizens with above high School education	555	.316	.202	.332	.586
State GDP growth rate	555	4.336	2.678	.65	13
State GDP per capita	555	1379.716	2007.057	108.43	16433
State GDP_{99}	555	1201	1461.2	140.9	6345.2
State Investment as share of GDP	555	23.793	13.243	8	58
State population growth rate	555	3.238	1.072	2.14	9.3
State percentage mobile phone Subscription rate by State	555	21.635	16.615	1	89.56
Large firms	555	29.870	111.81	0	1000

Investment as a share of GDP is negative and significant at 10% level in the four models. The coefficients are (-0.012(0.034), -0.111(0.032), -0.009(0.034), -0.009(0.032). The interpretation is that import decreases domestic investment. The inflation variable is negative and significant at 10% level in model 'a' which implies that its decrease encourages more importation.

Table 4: Correlation Matrix of the Variables in Transfer of Technology Regression

	LOGVIMP	MPH	DPN	POPGRAT	INVSGDP	INFLTION	TARIFF	EDU	TRMSFTDE
LOGVIMP	1								
MPH	0.0359	1							
DPN	0.2143	-0.0193							
POPGRAT	-0.0144	-0.6065	0.0293	1					
INVSGDP	-0.0257	-0.0854	-0.0044	-0.1336	1				
INFLTION	-0.012	-0.3543	0.0176	0.1458	0.0954	1			
TARIFF	-0.0289	-0.8054	0.0383	0.704	0.1101	0.3389	1		
EDU	0.156	0.5633	0.3276	-0.0352	-0.118	-0.128	-0.5171	1	
TRMSFTDE	0.031	0.7196	-0.0378	-0.2223	-0.2223	-0.9205	-0.9205	0.3934	1

The coefficient is (-0.000(0.030) to the three places of decimal. The tariff variable has negative coefficient -0.005(0.033) in model 'b' and it is significant at 10% level. In model 'c', employee education level from master's degree is positive 0.000(0.000) to the three places of decimal and it is significant at 1% level. This means that education enhances foreign trade. In model 'd' terms of trade is positive with coefficient 0.001(0.004) and significant at 10% level. This implies that stronger exchange rate of naira improves importation. Using various checks - fixed and random effects, the values did not change and the test is good from Tables 6a, 6b, and 6c.

Table 5: Correlation Matrix of the Variables in State Economic Growth Regression

	STEGRATE	MPH	INVSGDP	STPGRTE	LRGFRMS	GDP_{99j}	GDP99j*Mph	Eduhs	INFLTION	TARIFF
STEGRATE	1									
MPH	0.684	1								
INVSGDP	0.823	0.482	1							
STPGRTE	0.113	0.2057	-0.0515	1						
LRGFRMS	0.4992	0.4822	0.3981	-0.0001	1					
GDP_{99j}	0.4663	0.2958	0.4632	0.5917	0.1522	1				
GDP_{99j}*Mph	0.5725	0.601	0.4942	0.6511	0.3787	0.849	1			

Eduhs	-0.1608	-0.497	-0.0047	-0.0446	-0.0999	-0.000	-0.1793	1		
INFLTION	-0.0466	-0.157	-0.0261	-0.0256	0.0024	-.0000	-0.0579	0.788	1	
TARIFF	-0.162	-0.232	-0.0435	-0.0925	0.0205	0.0000	-0.1494	0.287	0.3389	1

The baseline specification is split into model 'a' and 'b' as stated earlier in Table 7a and Table 7b. The dependent variable - state growth$_{jt}$ is the growth rate of per capita GDP at time t-1 of state j, which is the main measure of growth. In this model, the variable mph$_{jt}$ is the percentage of the state population that own mobile phones. It tries to capture how mobile phone technology impacts on economic growth. The interaction term of mph and GDP$_{99j}$ per capita is used to find whether the marginal impact of the mobile phone technology on economic growth depends on its initial GDP level for the 36 states and Federal Capital Territory of Nigeria for the period of study. In model 'a' regression, we dropped the variable tariff and control for inflation and in model 'b' regression; we dropped the variable inflation and control for tariff. The estimates of the coefficients of mobile phone subscription rates in models 'a' and 'b' are positive and significant at 1% level. They are [.067 (.007), .066(.007). This means that the mobile phone technology enhances economic growth. The coefficients of GDP$_{99j}$ are 0.0004(0.000) and 0.0003(0.000) for models 'a' and 'b' respectively. They are positive and significant at 1% level. It shows that there is an increase in economic growth rate. However, the coefficients of the interaction between mph$_{jt}$ with GDP$_{99j}$ per capita are negative and significant at 1% level. They are -0.000013(0.000), -0.0000128(0.000) representing models (a) and (b) respectively.

The coefficients' values have negative signs meaning that the interaction is negatively related to growth rate. The independent variable, investments as a share of GDP coefficients are positive and significant at 1% level for model 'a' and 'b'. This means that rise in investment leads to rise in economic growth. This depicts growth as a long-term phenomenon. State population growth rate has positive coefficients in model 'a' and 'b' and they are significant at 1% level. The results for both models 'a' and 'b' are 0.324(0.090) and 0.322(0.089), respectively. The implication is that an increase in state population increases economic growth rate. The sizes of large firms also show positive relationship with economic growth for both models. They are significant at 1% level and the values are: 0.003(0.000) and 0.003(0.000), respectively. This shows that as the number of large firms' increases, then economic growth rate increases. The variable level of education above high school is positive and significant at the 1% level. The positive coefficient of education variable confirms what Nelson and Phelps (1966) said in the literature about the positive impact of human capital on economic growth. The values are 0.007(0.013) and 0.037(0.017) for models 'a' and 'b' respectively. This depicts that education helps in absorption of the new mobile technology in the economy and this increases the economic growth rate. The tariff variable in model 'b' is negative and significant at the 1% level. The coefficient is -0.031(0.013).

This implies that decrease in tariff encourages economic growth. The inflation variable in model 'a' is positive but not significant. In order to find how the new mobile phone technology impacts on each individual state's economic growth, by taking the partial derivative of (2) with respect to mobile phone subscription rate as follows:

$$\frac{\partial y_{jt}^{*}}{\partial mph_t} = \beta_3 + \beta_4 GDP_{99j}. \qquad (3)$$

The study found that β_3 is positive showing that mobile phone subscription rate is positively related to economic, growth while β_4 is negative implying that the interaction of mobile phone subscription rate. The initial GDP$_{99j}$ are negatively related to economic growth. Note that the negative sign of $\beta_4$does not depict an inverse relationship between the mobile phone subscription and economic growth since the actual value of (2) depends also on the positive magnitude of the coefficient of β_3. On net, the impact is found to be positive for all states. Moreover, because of the negative sign of β_4, it is observed that states with less GDP$_{99j}$ per capita value have greater marginal impact of mobile phone technology than those with higher GDP$_{99j}$ per capita (see Table 6a-). In order to rule out a bias effect for the results, some specification checks (fixed effects and random effects) are carried out and the values did not change, which confirmed that the tests are efficient. The correlation matrix as earlier stated does not indicate unpleasant noise.

Fixed Effects: The intuition behind fixed effects within regression is to remove the pernicious effect of omitted variable bias. Usually, one needs to be worried about unobservable factors that are correlated with the variables that one included in the regression. The fixed effect models are good checks for omitted variable

bias. Here, obtaining multiple observations about each industry and looking at the effect of different variables within the industry is treated. In order to check whether the OLS results have omitted variable bias, industry and state levels fixed effects tests are conducted on the two baseline specifications (1) and (2). In model equation 1, the estimates of the coefficients of mph_t and dpn_{it} variables do no change much and are significant. The intercept coefficient is positive and significant at the 1%, level while other controlled variables do not change much also. In the growth model, the interaction of mobile subscription rate and GDP_{99j} per capita is positive. Its intercept coefficient is positive, as well, and significant at the 1% level. This confirms that the results are qualitatively the same without omitted variable bias and do not change much in values as in Table 7b and Table 7b. The fixed effects results based on Hausman specification test is efficient than random effect.

Table 6a: Econometric Results of Baseline Specification Ordinary Least Squares Results of Technology Transfer as Panel Estimation with Additional Explanatory Variable

Variables	Model a	Model b	Model c	Model d
Mobile Subscription Rate$_t$	0.005*	0.004*	0.001*	0.004*
	(0.006)	(0.006)	(0.006)	(0.006)
Dependence on Mobile Tech$_{it}$	2.816***	2.820***	2.627***	2.821***
	(1.012)	(1.011)	(1.010)	(1.012)
Population Growth Rate$_t$	0.004*	0.038*	0.075*	0.056*
	(0.568)	(0.640)	(0.562)	(0.648)
Investment as share of GDP$_{it}$	-0.012*	0.111*	-0.009*	-0.009*
	(0.034)	(0.032)	(0.034)	(0.037)
-Cons	6.802***	6.764***	6.36***	6.486***
	(1.897)	(1.849)	(0.249)	(2.452)
Inflation$_t$	- 0.000*	-	-	-
	(0.030)			
Tariff$_t$	-	-0.005*	-	-
		(0.033)		
Education $_t$	-	-	0.001 ***	-
			(0.000)	
Terms of trade $_t$	-	-	-	0.001*
				(0.004)
Number of Industries	17	17	17	17
Number of Observations	255	255	255	255
R-Squared:	0.1518	0.0519	0.0642	0.0519

Dependent Variable: Log of Volume of Import and the levels of significance are 1%, 5% and 10%. The standard errors are robust and reported in parenthesis. The sample period is 1999-2016 (17 years).

Table 6b: Industry Fixed Effects Results of Technology Transfer as a Panel Estimation with Additional Explanatory Variable

Variables	Model a	Model b	Model c	Model d
Mobile Subscription Rate$_t$	0.004***	0.004***	0.003**	0.004*
	(0.001)	(0.002)	0.002)	(0.002)
Dependence on Mobile Tech$_{it}$	0.495*	0.571*	0.719**	0.681*
	(1.484)	(1.545)	1. 480)	(1.533)
Population Growth Rate$_t$	0.038*	0.042*	0.056**	0.062*
	(0.141)	(0.158)	(0.141)	(0.159)
Investment as share of GDP$_{it}$	-0.012	-0.012*	-0.011*	0.011*
	(0.009)	(0.009)	(0.009)	(0.010)
-Cons	6.894***	6.904***	6.767***	6.752***
	(0.477)	(0.474)	(0.484)	(0.647)
Inflation$_t$	0.001	-	-	-

	(0.008)			
Tariff$_t$	-	-0.001* (0.009)	-	-
Education $_t$	-	-	0.001 ** (0.000)	-
Terms of trade $_t$	-	-	-	0.000* (0.001)
International Call Rate$_t$	-	-	-	-
Number of Industries	17	17	17	17
Number of Observations	255	255	255	255
R-Squared: (a) within 0.0720, between: 0.0088, Overall 0.0049(b)0.0719,0.1159,0.0088(c)0.0763,0.0628,0.0330 (d)0.0724,0.0702 and 0.0157.				
Hausman Tests chi2 (1)	0.24	0.12	0.29	0.11
Prob> chi2	(0.6234)	(0.7268)	(0.8633)	(0.7439)

Dependent Variable: Log of Volume of Import and the levels of significance are 1%, 5% and 10%. The standard errors are robust and reported in parenthesis. The sample period is 1999 -2017 (18years).

Table 6c: Industry Random Effects Results of Technology Transfer as Pane Estimation with Additional Explanatory Variable

Variables	Model a	Model b	Model c	Model d
Mobile Subscription Rate$_t$	0.004*** (0.001)	0.004* (0.006)	0.003** (0.002)	0.004* (0.002)
Dependence on Mobile Tech$_{it}$	1.152* (1.254)	2.820* (1.011)	1.269* (1. 259)	1.311* (1.282)
Population Growth Rate$_t$	0.025* (0.141)	0.038* (0.640)	0.048* (0.141)	0.060* (0.160)
Investment as share of GDP$_{it}$	-0.012 (0.008)	-0.011* (0.035)	-0.011* (0.009)	-0.010* (0.010)
-Cons	6.870*** (0.619)	6.764*** (1.849)	6.728*** (0.630)	6.674*** (0.752)
Inflation$_t$	0.001 (0.008)	-	-	-
Tariff$_t$	-	-0.005* (0.033)	-	-
Education $_t$	-	-	0.011 * (0.000)	-
Terms of trade $_t$	-	-	-	0.001* (0.001)
Number of Industries	17	17	17	17
Number of Observations	255	255	255	255
R-Squared: (a) within 0.0712, between 0.0545 0verall 0.0411 (b) 0.0712, 0.539 and 0.0438 (C) 0.0758,0.0670 and 0.0571(d) 0.0717, 0.0535 and 0.0454				

Dependent Variable: Log of Volume of Import and the levels of significance are 1%, 5% and 10%. The standard errors are robust and reported in parenthesis. The sample period is 1999-2017 (18years).

Random Effect: Random effect is efficient in controlling for a constant unobserved heterogeneity over time, especially when it is correlated with independent variables. The assumption is that the individual specific effects are uncorrelated with the independent variables. In this study, random effect of variables is conducted for industries and states (provinces). In regression model equation 1, the coefficients of the mobile phone subscription rate and the telecom dependence rate are positive and significant. In the regression equation 2, the mobile phone subscription rate is positive and significant at the 1%, level. The interaction coefficient and other independent variables do not change much and are significant. The random effect assumption as stated above holds. Therefore, the test results are good and efficient in Table 7c and Table 7c.

Table 7a: Econometric Results of Baseline Specification Ordinary Least Squares Results of Nigerian 37 States Economic Growth as Panel Estimation with Additional Explanatory Variable

Variables	Model a	P |t|	Model b	P |t|
Mobile Subscription Rate$_{jt}$	0.066***	0.000	0.066***	0.000
	(0.007)		(0.007)	
State Investment as share of GDP$_{jt}$	0.127***	0.000	0.127***	0.000
	(0.007)		(0.007)	
States Pop Growth Rate$_{jt}$	0.324***	0.000	0.322***	0.000
	(0.090)		(0.089)	
No of Large Firms$_{jt}$	0.003***	0.000	0.003***	0.000
	(0.000)	(0.000)		
GDP$_{99j}$	.0004***	0.000	0.0003***	0.028
	(0.000)		(0.000)	
GDP$_{99j}$* Mobile Subs.Rate$_{jt}$	-0.000013***	0.000	- 0.0000128***	0.000
	(0.000)		(0.000)	
Education$_{jt}$	.005**	0.505	0.024***	0.023
	(0.013)	(0.017)		
-Cons	-1.675***	0.031	-2.691***	0.002
	(0.775)		(0.847)	
Tariff$_t$	-		-0.031	0.018
			(0.013)	
Inflation$_t$	0.003	0.839	-	
	(0.014)			
State	37	37	37	37
Number of Observations	555	555	555	555
R-squared	0.8055		0.8075	

Dependent Variable: Economic Growth and the levels of significance are 1%, 5% and 10%. The standard errors are robust and reported in parenthesis. The sample period is 1999-2017 (18years).

Table 7b: State Fixed Effects Results of Nigerian 37 States Economic Growth as a Panel Estimation with Additional Explanatory Variable

Variables	Model a	P |t|	Model b	P |t|
Mobile Subscription Rate$_{jt}$	0.007**	0.159	- 0.001	0.749
	(0.005)		(0.004)	
State Investment as share of GDPj$_t$	-0.156***	0.000	- 0.139***	0.000
	(0.044)		(0.039)	
States Pop Growth Rate$_{jt}$	-0.208***	0.303	0.074	0.685
	(0.202)		(0.181)	
No of Large Firms$_{jt}$	0.001***	0.002	0.002***	0.000
	(0.000)		(0.000)	
GDP$_{99j}$	-0.002	0.000	0.002	0.000
(0.000)	(0.000)			
GDP$_{99j}$* Mobile Subs.Rate$_{jt}$	0.00000260**	0.043	0.00000300**	0.009
(0.000)	(0.000)			
Educations$_{jt}$	-0.056	0.000	-0.023	0.000
	(0.007)		(0.007)	
-Cons	7.878***	0.000	7.284***	0.000
	(0.799)		(0.719)	
Tariff$_t$	-		-0.046***	0.000
			(0.004)	
Inflation$_t$	0.001	0.817	-	
	(0.005)			
State	37	37	37	37

Number of Observations	555	555	555	555

R-squared (a) within 0.6562, between 0.0000, overall 0.0000; (b) within0.7235, between 0000, overall 0.0024

Hausman Test:	Chi2 (6) =43.30	Chi2(6) = 56.07
	Prob>chi2 = (0.0000)	Prob> chi2 = (0.0000)

Dependent Variable: Economic Growth and the levels of significance are 1%, 5% and 10%. The standard errors are robust and reported in parenthesis. The sample period is 1999 -2017 (18years).

Table 7c: State Random Effects Results of Nigerian 37 States Economic Growth as Panel Estimation with Additional Explanatory Variable

Variables	Model a	P |t|	Model b	P |t|
Mobile Subscription Rate$_{jt}$	0.013***	0.006	0.005	0.302
	(0.005)		(0.004)	
State Investment as share of GDP$_{jt}$	0.097***	0.000	0.094***	0.000
	(0.016)		(0.015)	
States Pop Growth Rate$_{jt}$	-0.403***	0.002	- 0.461***	0.000
	(0.132)		(0.124)	
No of Large Firmsj_t	0.002***	0.000	0.002***	0.000
	(0.000)		(0.000)	
GDP$_{99j}$	0.001***	0.000	0.001	0.000
(0.000)		(0.000)		
GDP$_{99j}$* Mobile Subs.Rate$_{jt}$	0.000000224	0.861	0.000000910	0.432
(0.000)		(0.000)		
Education$_{jt}$	-0.052	0.000	-0.012	0.000
	(0.001)		(0.007)	
-Cons	5.227***	0.000	4.730***	0.000
	(0.685)		(0.634)	
Tariff$_t$	-		-0.046***	0.000
			(0.004)	
Inflation$_t$	-0.000	0.943	-	
	(0.005)			
State	37	37	37	37
Number of Observations	555	555	555	555

R-squared (a) within 0.6327, between 0.7038, overall 0.6998; (b) within 0.7040, between 6747, overall 0.6767

Dependent Variable: Economic Growth and the levels of significance are 1%, 5% and 10%. The standard errors are robust and reported in parenthesis. The sample period is 1999-2017 (18years).

4. Conclusion

The findings of this study proffer empirically insightful answers to the research questions. Firstly, research question: "Did availability of telecom technology help to increase transfer of world frontier technology by reducing the cost of technology transfer?" This study shows that as the availability of mobile phone technology increases, the volume of import increases and more technology is transferred. Thus, the findings by Freund and Weinhold (2002, 2004) and Arrow (1969) are reconfirmed by the study's empirical result. Secondly, research question: "Did availability of telecom technology help to spur growth in Nigeria?" Yes, the availability of mobile phone technology enhances economic growth in Nigeria. Some of the control variables do not exhibit significant change in values and are significant at the 10% level. The result finding suggest a positive relationship between economic growth and mobile phone subscription rate implying that mobile phone availability effects economic growth positively. The Nigerian economic growth rate has been on the rise since implementation of its deregulation policy in telecom industry in 1999.

Which brought increased use of mobile phone technology, the economy under Goodluck Jonathan administration was rated as the biggest economy in Africa by the World Bank, 2014. The administrations after his own is duty bound to sustain the growth. The finding also reiterates what Alf and Gravelis (2014) find between mobile phone technology and growth in Sweden and Estonia. Thirdly, the research question "Did education increase economic growth?" Education in the transfer of technology model is measured by the total number of employees with high school education in the country divided by the total population of the country at all time. The result also find that the coefficient of this variable is positive, signifying a positive correlation between volume of import and expenditure on education. This implies that education enhances international trade which carries technology from the world frontiers of technology to the recipient industry. In the growth model, education is measured by the number of people with above high school degrees as a ratio of the total population of the state. The coefficient is positive and significant indicating that human capital accumulation leads to a positive economic growth.

Finally, the research question: "Did the availability of mobile phone technology help to reduce distributional inequality of economic benefits?" The finding suggests that the availability of mobile phone technology increases state economic growth by different marginal weights. However, these marginal weights statistical significance across the states in both 90% and 95% confidence intervals could not be ascertained because the covariance has to be estimated using bootstrap. It is therefore left for future research. The study observes that the marginal impact of mobile phone technology is higher in states with lower GDP_{99j} per capita than states with higher GDP_{99j} per capita, thereby bridging the gap between the rich states and poor states as in Tables 7a-7c, Figures 1a-1b and Figure 2. Therefore, technology helps to reduce distributional inequality of economic benefits. In fact, this does not necessarily imply reduction in inequality among rich and poor classes of these societies in the respective rich and poor states. Take for example, Nigeria's rich oil states Bayelsa, Rivers, Akwa Ibom, Delta and commercial capital – Lagos still record huge percentages of poor classes of citizens. To find the impact on mobile phone technology on class inequality, a research is needed that will study individuals' income data. However, unfortunately such data is not available at this time.

Figure 1a: Mobile Phone Technology Impact on Per Capita GDP Growth

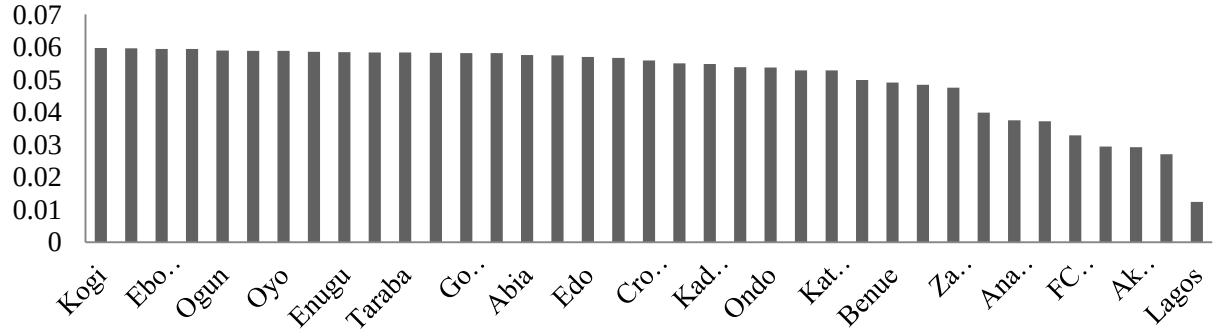


Figure 1b: Mobile Phone Technology Impact on Per Capita GDP growth

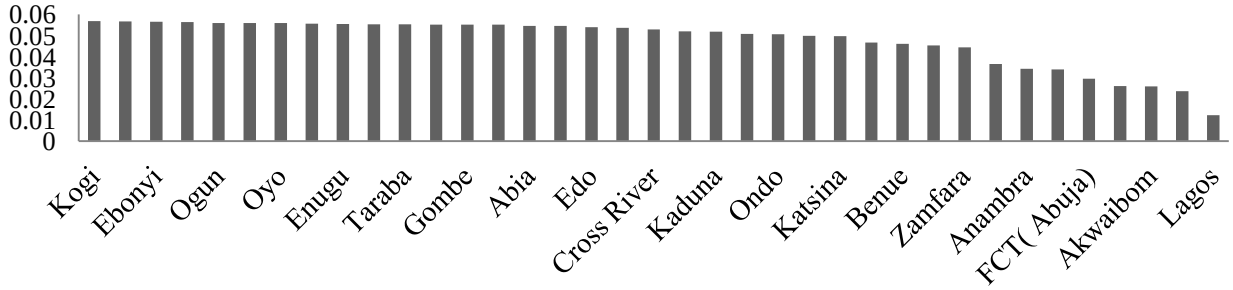
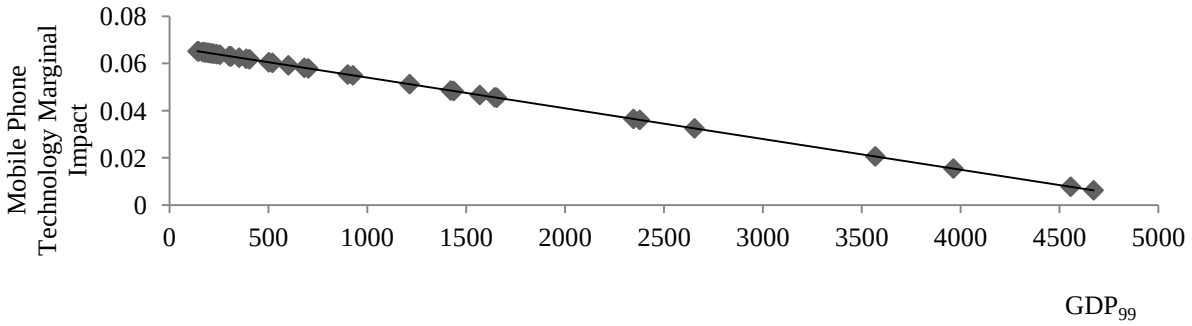


Figure 2: Mobile Phone Technology Marginal Impact on GDP



5. Recommendations

The following recommendations are proffered for these current studies:

- Telecom in Nigeria should continue as a deregulated sector in order to enhance competiveness and fully generate economic growth both in the short and long run.
- Telecom industry in Nigeria should continue to attract new and improved technologies that will help to increase transfer of world frontier technology by further reducing the cost of technology transfer.
- The Nigeria government should encourage sustained investment in the telecom area that will spur growth and development in all sectors of the Nigerian economy.
- Finally, the availability of mobile phone technology will help to reduce distributional inequality of economic benefits in Nigeria. Therefore, this study proffers that the government of Nigeria should engage in policy that will promote technology transfer and the incubation in all sectors of the economy.

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Journal of Economics and Behavioral Studies (JEBS)
Vol. 12, No. 1, February 2020 (ISSN 2220-6140)

The Role of Intrapreneurship on the Growth of Iron and Steel Manufacturing Companies in Bulawayo, Zimbabwe

Alex Madzikova, Gwendoline Vusumuzi Nani
Graduate School of Business, National University of Science and Technology (NUST), Zimbabwe
alex.madzikova@gmail.com, gwendoline.nani@nust.ac.zw,gweni.nani@gmail.com

Abstract: This study sought to find out the role of intrapreneurship on the growth of iron and steel manufacturing companies in Bulawayo, Zimbabwe. A post-positivist paradigm, a mixed method approach and a cross sectional design were adopted for the investigation. Three hundred and fifteen (315) middle management and supervisory staff drawn from twenty-two (22) iron and steel manufacturing companies in Bulawayo participated. Multiple stratified random sampling and heterogeneous purposive sampling were used to choose two hundred (200) respondents for the quantitative study and eight participants for the qualitative study respectively. Questionnaires and in-depth interviews were the data collecting instruments for quantitative and qualitative data respectively. Quantitative data was analysed using descriptive and inferential statistics and qualitative data was thematically analysed. Findings revealed that innovativeness, proactiveness, and risk taking were the key dimensions of intrapreneurship. Both quantitative and qualitative analyses showed the prominent measures of company growth in the iron and steel manufacturing companies as financial, employee numbers, productivity, and product range. Statistically intrapreneurship was found to be correlated to the growth of the iron and steel manufacturing companies. The study drew the following conclusions. Firstly, intrapreneurship is not a preferred strategy for driving growth in the iron and steel manufacturing companies in Bulawayo. Secondly, financial and product range were identified as the key measures of company growth. Thirdly, company support for intrapreneurship and individual's intrapreneurial disposition were statistically linked to company growth. The study recommended that companies should motivate and support employees' innovativeness, proactiveness, and risk taking through ideas, actions and work. Measurement of company growth should be expanded to include qualitative measures.

Keywords: *Company growth, intrapreneurship, iron, steel manufacturing.*

1. Introduction

Zimbabwe, once boasted of a diversified manufacturing sector made up of specialised sub-sectors. These included the manufacturers of foodstuffs, beverages, drugs, clothing, building materials, wood and furniture, chemicals, metal and metal products, leather and household products, plastics and packaging materials (Confederation of Zimbabwe Industries (CZI), 2018). The metal and metal products manufacturing subsector included aluminium, copper, iron, steel and other metal manufacturers (Zimbabwe Economic Policy Analysis and Research Unit (ZEPARU), 2014). However, for a decade, the manufacturing sector in Zimbabwe recorded below 50% capacity utilisation levels [Confederation of Zimbabwe Industries, (CZI) (2009-2018). The once highly industrialised Zimbabwean economy, second only to South Africa, declined into an informal economy (Mlambo, 2017; Dube, 2011; Stoneman, 1990). Drastic policy shifts, high costs of production, foreign currency shortages, lack of concessionary funding, aged equipment, competition from cheap imports were some of the factors blamed for the poor performance of the manufacturing sector in Zimbabwe [CZI, 2018].

Bulawayo, which was once the industrial hub of Zimbabwe, suffered the most serious deindustrialisation as companies closed at a faster rate than other cities and towns [Mbira, 2015]. According to Deloitte (2017), globally, the iron and steel making industry was one of the most technologically advanced industries. Gonzalez & Kaminski (2011) assert that the iron and steel industry is very complex and is intrinsically linked with the world economy at large. Steel consumption is a key indicator of national development, which motivated global manufacturing giants to maintain a continuous interest in the steel industry (Singal, 2018; Pal, 2013). Gonzalez & Kaminski (2011) further state that steel products are needed by many industries, such as automotive, construction, and other manufacturing sectors. The Zimbabwe Economic Policy Analysis Research Unit (ZEPARU) (2014) pointed out that various types of steel are used in infrastructural construction as the core structure, reinforcement or as accessories.

According to Matinde (2014), steel is also used as a raw material in the manufacture of finished products like automobiles, appliances, tools, tubular products, beams, bars and sheets. The Government of Zimbabwe's Transitional Stabilisation Programme (TSP), also projected that Zimbabwe's iron and steel companies had potential to earn US$1 billion from exports, enough to offset the import bill of US$350 million (Ministry of Finance, 2018). Previously, through Zimbabwe Agenda for Sustainable Socio-Economic Transformation (ZIMASSET) Blueprint, the Government of Zimbabwe had also pinned the growth of the manufacturing sector on the revival of the iron and steel sector (Ministry of Finance, 2013). Notwithstanding the global surplus in iron and steel output, Zimbabwe like other developing resource rich countries, realised the need to shift from being an exporter of raw metal ores to an exporter of fully beneficiated finished products. ZEPARU (2014) established that in Zimbabwe and for the period 2009 to 2011, the contribution of iron and steel manufacturing to the engineering and metals gross output was poor (less than 5%). However, the iron and steel subsector had potential to become the mainstay of the engineering and metals sector. The Government of Zimbabwe planned to set up new iron and steel companies (Zimbabwe Agenda for Sustainable Socio-Economic Transformation (ZIMASSET), 2013). Furthermore, the Government of Zimbabwe prioritised resuscitation and expansion of struggling existing iron and steel plants (Transitional Stabilisation Plan (TSP), 2018). The motivation for these various attempts to develop the iron and steel sector was pinned on a desire to benefit from the country's estimated 30-billion-ton ore reserves (ZEPARU, 2014).

ZEPARU (2014) noted that innovation and technology adoption were inevitable for development of Zimbabwe's iron and steel sector. Enhanced technologies, economies of scale and new innovations needed to be considered in iron and steel operations (ZEPARU, 2014]. The Government of Zimbabwe has in time past rolled out bailout initiatives and introduced policy interventions to prop up struggling manufacturing companies. Notable examples of the yesteryear bailout initiatives were the US$70 million Zimbabwe Economic Trade Revival Facility (ZETREF) launched in 2010 (Mudarikiri, 2012) and the US$40 million Distressed Industries and Marginalised Areas Fund (DIMAF) launched in 2011 (Samukange, 2015). On policy interventions, the government introduced import substitution and export promotion Statutory Instruments (Control of Goods (Open General Import Licence) (No.2) (Amendment Notice No.8), 2016; Control of Goods (Open General Import Licence) (Amendment Notice, No.5), 2017). The performance of Bulawayo manufacturing companies improved after each government intervention, but the high-performance level could not be sustained. Matinde (2014) opined that iron and steel companies in Zimbabwe were not growing due to a lack of long term strategies that focused on value addition of local iron and steel products. Prior to this study, intrapreneurship had been scantily studied in developing countries. It was particularly interesting to note that published studies on intrapreneurship in Africa were few. This showed slow permeation of the concept into the continent. Therefore, this study sought to establish if intrapreneurship, as a long term strategy, played a key role on the growth of iron and steel manufacturing companies in Bulawayo, Zimbabwe. This study was guided by the following primary and secondary research objectives.

Primary Objective: The primary objective of the study was to find out the role of intrapreneurship on the growth of iron and steel manufacturing companies in Bulawayo, Zimbabwe.

Secondary Objectives: The primary objective was supported by the following secondary objectives.

- To identify key dimensions of intrapreneurship.
- To identify key measures of company growth.
- To find out if there is a significant relationship between intrapreneurship and the growth of iron and steel manufacturing companies in Bulawayo, Zimbabwe.
- To find out the extent to which intrapreneurship contributes to the growth of iron and steel manufacturing companies in Bulawayo, Zimbabwe.

2. Literature Review

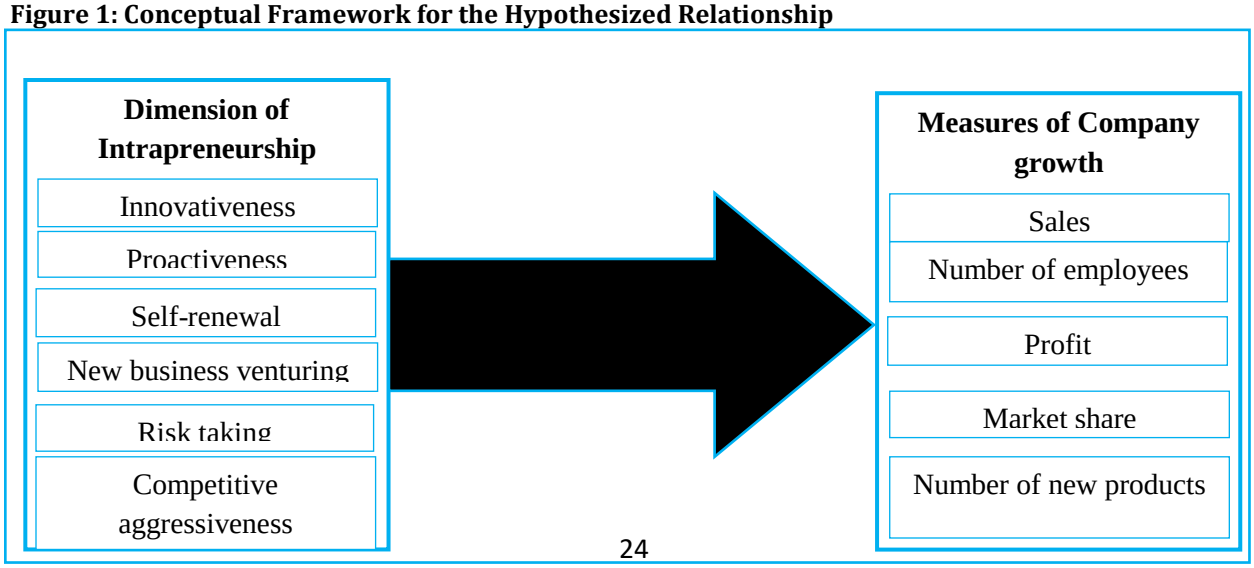
According to Deloitte (2015), the implementation of business ideas or solutions to problems within an existing business entity is called intrapreneurship. In general, intrapreneurship is defined as entrepreneurship practised within existing companies (Azami, 2014; Nicolaidis & Kosta, 2011; Stefanovici, 2012; Antoncic & Hisrich, 2003). A more comprehensive definition is that: Intrapreneurship represents the initiation and implementation of innovative systems and practices within an organisation, by some of its staff

under the supervision of a manager who takes the role of an intrapreneur, in order to improve the economic performance of the organisation, by using a part of its resources, namely those that previously have not been used in an appropriate manner (Maier & Zenovia, 2011). Intrapreneurship has also been severally defined as a portfolio of innovation strategies within an existing organisation or emergent behavior divorced from customary ways (Zhao, 2013; Nicolaidis & Kosta, 2011; Antoncic & Hisrich, 2003). According to de Jong & Wennekers (2008), intrapreneurship refers to employee initiatives in organisations to undertake something new for the business, without being asked to do so. Intrapreneurship embraces the "freedom to fail" and enable the partakers to be adventurous (Buekens, 2014). The focus of intrapreneurship is on innovation and risky activities (Azami, 2013). Intrapreneurship is motivated by challenges and accomplishment while risk is moderated by being shared with the employing company (Birkemalm & Jansson, 2018).

Theoretical Framework: Historically, entrepreneurship is credited with reshaping the business world through implementing new business ideas within the existing business entity or by starting a new venture (Maier & Zenovia, 2011). However, intrapreneurship, a growing and evolving concept, is taking over credit for business initiatives done within existing business entities (Birkemalm & Jansson, 2018). Intrapreneurship is an offshoot of entrepreneurship and at the same time falls within the domain of employee behaviour (de Jong & Wennekers, 2008). One of the theories underpinning this study is organisational citizen behaviour (OCB). OCB relates to individual, discretionary actions by employees that are outside their formal job requirements (Pickford & Joy, 2016). This theory advocates that employees with organisational citizenship are self-motivated, forward thinking and go beyond their normal job functions. This extra mile approach helps companies grow.

Conceptual Framework: Various dimensions of intrapreneurship and various measures of company growth were identified in literature. Various dimensions of intrapreneurship proposed by various scholars include: (1) innovativeness; (2) proactiveness; (3) self-renewal; (4) new business venturing; (5) risk taking; and (6) competitive aggressiveness. Innovativeness is concerned with continual renewal of products or services or processes or procedures or techniques while proactiveness is concerned with attempts to stay ahead of competition in business aspects (Antoncic & Hisrich, 2003). Employees' proactive behaviour is a critical determinant of long term organisational success (de Jong & Wennekers, 2008). Self-renewal is the flexibility to adapt to the environmental changes. This is achieved through strategic reformulation, reorganisation and organisational change (Antoncic & Hisrich, 2003). New business venturing is the creation of new businesses within the existing organisation (Atheya & Arora, 2015). Risk taking is premised on the fact that there is disruption of the status quo, which at times is done without top management approval (Jong, Parker, Wennekers, & Wu, 2011) posing a career risk for the individual intrapreneur. However, Alipour, Idris & Karimi (2011) contend that all levels across the company including leaders, managers and employees must have a desire to take a risk. Competitive aggressiveness is when a company challenges and competes with its competitors in order to be noticed and dominate (Antoncic & Hisrich, 2003). Figure 1 shows a conceptual framework, which depicts intrapreneurship dimensions as antecedents to company growth.

Figure 1: Conceptual Framework for the Hypothesized Relationship



Based on critical analysis of past studies on dimensions of intrapreneurship, innovativeness, risk taking, and proactiveness were selected as the most prominent dimensions. This study sought to test if these identified key dimensions of intrapreneurship had an impact on the growth of iron and steel manufacturing companies in Bulawayo, Zimbabwe.

Factors that Influence Intrapreneurship: Individual, organisational and environmental factors have been identified as major influences to intrapreneurial activity in companies whereby the environmental factors are there to ignite the interaction between the individual and organisational factors (Ogidi, 2014). According to Alipour, Idris & Karimi (2011), organisational factors that help to create intrapreneurship in companies include: organisational structure; organisational culture; management support; reward and recognition; and resource availability. Organisational structure defines authority levels, span of control, hierarchy, communication channels, decentralization level among other structural issues that affect innovation environment greatly. Organisational culture are values, beliefs, opinions, and behaviours, which should be positive to support intrapreneurship. Management support is at the core of facilitating intrapreneurship by availing adequate resources and ensuring there is buy-in into intrapreneurial initiatives throughout the company. Reward and recognition motivate employees to take risks associated with intrapreneurial behaviours. Resource availability is a function of the quantity of both tangible and intangible resources that influence the company's ability to engage in intrapreneurial activities with the companies having more resources able to take higher risk intrapreneurial adventures (Alipour, Idris & Karimi, 2011).

Company Growth: According to Gruenwald (2015), business practitioners and academics have differing views on company growth. Business practitioners view company growth as a complex qualitative process of internal development whereas academics view company growth as a simple quantitative attribute. Lee, Brown & Schlueter (2016) pointed to the existence of different growth episodes, different growth trajectories, and different growth triggers. The differences in growth trajectories led Tajnikar, Ponikvar & Bonca (2016) to note that there are growing and fast-growing companies. Penrose, cited in Lockett, Wiklund, Davidsson & Girma (2011), identified organic and acquisitive growth as the two eminent types of company growth. Organic growth is expansion of an existing company by starting new business ventures, driven by the actions of entrepreneurs (later recognized as intrapreneurs). In a study of Dutch companies by Zhou & de Wit (2009), an integrated analysis of individual, organisational and environmental determinants of company growth revealed that only individual and organisational determinants affect company growth. Similarly, Sarlija, Pfeifer, Jeger & Bilandzic (2016) argued that there are four determinants of nonlinear, temporal company growth and these are individual, company, organisational and industry or environmental.

Why Measure Company Growth? Company growth is used as a gateway to introducing innovation and technical changes (Garcia-Manjon & Romero-Marino, 2012). Studies done in France and Italy found that innovative companies grow more than non-innovative companies (Colombelli, Haned & Le Bas, 2013; Cucculelli & Ermini, 2012). The importance of correctly measuring company growth is revealed in a study by Gruenwald (2015), which concluded that company growth is a complex phenomenon that cannot be sufficiently explained by a simple linear model. Acquisitive growth is externally driven by actions of management to acquire other existing companies (Lockett et al., 2011). The researcher recruited facilitators at strategic levels in the iron and steel manufacturing companies to improve access and administration of the questionnaires. Before qualitative data was collected, pilot interviews were conducted with three participants. The facilitators were coached on how to draw the respondents in a random, unbiased way by using a raffle system.

The researcher physically delivered and collected the questionnaires to and from some identified facilitators who had direct contact with the individual respondents. There is no universal formula to measure company growth as different companies use different measures. Business practitioners and academics advocate for qualitative and quantitative measures respectively (Gruenwald, 2015). The focus of intrapreneurship is on innovation and risky activities (Azami, 2013). Intrapreneurship is motivated by challenges and accomplishment while risk is moderated by being shared with the employing company (Birkemalm & Jansson, 2018). Some of the specific and holistic ways of measuring company growth are tracking growth in sales, profits, product range, production capacity, number of employees, and number of stations (Gerald &

Elisifa, 2013). From the reviewed studies, the most popular measures of company growth are sales, followed by employment levels.

3. Methodology and Data Issues

This study adopted a post-positivist view as a deterministic philosophy in which causes determine the effects (Creswell, 2014). The post-positivist paradigm enabled the researcher to: (1) have the ability to see the whole picture; (2) assume a learning role; (3) value problem setting over problem solving to get good outcomes; (4) be reflexive and not dogmatic or too authoritative; and (5) value dialogue (Ryan, 2006).

Research Approach: The mixed methods approach was used in the study primarily for the purpose of: (1) triangulation; (2) complementarity; (3) development; (4) expansion; and (5) initiation (Ragab & Arisha, 2018; Cameron, 2015; Saunders, et al., 2016; Teddlie & Tashakkori, 2006). According to Cameron (2015), the utility of mixed methods is that they: (1) maximise strength while reducing limitations of single methods; (2) are dependent on the research questions; (3) increase research validity; and (4) optimize use of resources.

Research Design: A cross-sectional design which involves the collection of either quantitative or qualitative data or both on more than one case was the preferred design. The cross-sectional design takes a 'snapshot' view of the research problem at a particular point in time by eliciting the perspectives of a number of people (Saunders et al., 2016; Greener, 2008; Sekaran, 2003). Quantitative data was collected on the two main variables of intrapreneurship and company growth and their elements. This study sought to establish if sales, number of employees, number of new products introduced, market share, and profits were recognised measures of company growth in the iron and steel manufacturing companies in Bulawayo, Zimbabwe. The cross sectional design also allowed for the collection of qualitative data. Quantitative and qualitative variables were examined to detect patterns of association (Bryman, Bell, Hirschsohn, Dos Santos, du Toit, Masenge, Van Aardt & Wagner, 2017).

Population: The population of a study encompasses individuals who hold the information the researcher wishes to obtain in order to address the research question (Ragab & Arisha, 2018). In this study, the researcher relied on the membership database on the Engineering, Iron and Steel Association of Zimbabwe (EISAZ) website to establish the population of the study. The EISAZ had 136 registered companies in Zimbabwe of which 22 companies were from Bulawayo. The 22 companies in Bulawayo fell into five specialised sub-categories of: (1) billets and shafts, (2) bolts and support systems, (3) machining and fabrication, (4) castables and foundry, and (5) wire drawing, fencing and reinforcements. According to Pindiriri (2018), the 22 registered iron and steel manufacturing companies in Bulawayo had in their employ approximately 315 people in supervisory and middle management positions. The 315 members of supervisory and middle management were the study population. It was therefore imperative that if intrapreneurship existed in the companies, the supervisory and middle management members were at the heart of its processes.

Sampling Frame: The sampling frame is a list of individuals or units, within the population, from which the sample is drawn (Greener, 2008). All the 22 iron and steel manufacturing companies in Bulawayo were part of the sampling frame. The sampling frame was demarcated into five strata of specialised sub-categories identified for the iron and steel manufacturing companies in Bulawayo. The identified five strata were (1) billets and shafts, (2) bolts and support systems, (3) machining and fabrication, (4) castables and foundry, and (5) wire drawing, fencing and reinforcements. The sampling frame was composed of 315 people with different job specifications in their employing companies like Engineer, Accountant, Buyer, Foreman, Human Resources Officer, and Chemist. The study was structured to include people from all departments in the iron and steel manufacturing companies for generalisability of the results.

Sampling Techniques: Non-biased selection of respondents and participants for quantitative and qualitative data collection respectively from all the five sub-categories in the iron and steel manufacturing sector was done. This study employed both probability and non-probability sampling for quantitative and qualitative data collection respectively. According to Saunders et al. (2016), stratified random sampling is chosen on the basis that: (1) the sample should represent the population; (2) the research does not require face-to-face

contact; (3) the sampling frame contains all relevant strata; and (4) the sampling frame contains no periodic patterns. The number of samples drawn per strata was determined mathematically using ratio calculations to spread the required sample. This was followed by another ratio calculation to spread sample requirements in proportion to the company sizes.

Sample Size: The sizes of samples for quantitative and qualitative data collection differ due to: (1) nature of the data collected; (2) method and tools of data analysis; and (3) required results. Similar to Creswell's (2014) assertion, this study did not deem differing sample sizes for quantitative and qualitative data to be a problem as the two's purposes are generalisation for population and gaining in-depth perspectives respectively. Using Raosoft sample size calculator (2004), at a margin of error (tolerance) of +/-5% and confidence level (uncertainty) of +/-95%, and a population of 315 people, a minimum of 174 respondents were required for the quantitative data collection. At 99% confidence level and holding all other variables constant, a minimum of 214 respondents were needed. Using the law of averages, the researcher targeted and distributed questionnaires for quantitative data collection to 200 respondents picked from the five identified strata. For the qualitative data collection, purposive sampling was used to pick participants from each identified stratum. Respondents perceived to hold valuable information in each stratum were targeted (Saunders et al., 2016). Three samples were drawn from the machining and fabrication strata as the single largest strata. The castables and foundry stratum also had two participants as the second respondent was a referral. The sample size for the qualitative data collection was eight.

Data Collection: In this study both quantitative and qualitative data were gathered from people in supervisory and middle management positions. The quantitative and qualitative data was collected concurrently (Ragab & Arisha, 2018; Cameron, 2015; Creswell, 2014; Teddlie & Tashakkori, 2006). The QUAN and QUAL methods were intended to establish causal relationships and explain relationships respectively at the same time (Teddlie & Tashakkori, 2006). Respondents and participants were drawn from each of the identified five strata. For quantitative data collection, multiple stratified random sampling was the most appropriate technique for selecting respondents. For collecting qualitative data, heterogeneous purposive sampling was used to pick respondents perceived to hold valuable information in each stratum. Heterogeneous purposive sampling is chosen for the exploratory qualitative study when: (1) the focus is to identify key themes; and (2) there is no need for the sample to proportionally represent the population (Saunders et al., 2016). The quantitative data collection was preceded by a pilot study with ten respondents to check for relevance and any ambiguity.

Methods used to generate new ideas and the attitude towards risk taking by employees portrayed companies that did not want to move away from their traditional ways of improving operations. Would be respondents were also appraised of the reasons for conducting the study and ethical issues surrounding the study were explained. According to Dikko (2016), to achieve study credibility and trustworthiness, pilot testing of the research instrument is done in conditions similar to the actual test conditions. The researcher conducted face-to-face interviews with eight purposively selected participants. The participants were arbitrarily coded using a combination of three letters and two digits. For example, key informant one was designated as ISK01. Interviews of consenting participants were recorded while for others who were not willing to be recorded, notes were taken of their answers. Deeper follow up probing questions were used to seek further clarifications and to motivate the participant to go into deeper thought. This allowed for rich descriptive data in the participants' own words (Taylor, Bogdan & DeVault, 2016) to be gathered.

Validity: Kothari (2004) summarised validity as the capacity of the instrument to measure something without bias or errors. The validity of the questionnaire was reviewed by a research supervisor for readability, feasibility, clarity, layout, style, and wording. According to Greener (2008), a reliable questionnaire produces auditable, consistent, and repeatable results from different people.

Reliability: The questionnaire's scales were subjected and passed a Cronbach's Alpha test, yielding the value, 0.70, an indication that the instrument was reliable (Creswell, 2014).

Credibility and Trustworthiness of Qualitative Data: To improve the trustworthiness of the qualitative results, triangulation of the data was achieved by interviewing multiple participants from different strata in

the iron and steel manufacturing sector and drawing themes after converging the various participants' answers. Member checking, described as taking the final report to the participants to solicit their opinion on the accuracy of the report (Creswell, 2014), was also done. Multiple regressions analysis was employed. The positives of the role played by intrapreneurship on company growth were well articulated by the participants, but a lot of reservations existed on the extent to which free flow of ideas and risk taking were allowed in the iron and steel manufacturing companies in Bulawayo.

4. Empirical Findings

Quantitative and qualitative data were presented and analysed separately, before they were combined to yield the overall analysis. As directed by Sekaran (2003), user friendly and interactive software programs were used for data analysis. Empirical findings were arranged according to objectives and presented separately for quantitative and qualitative data.

Quantitative Data Presentation and Analysis: Quantitative data collected using questionnaires was analysed using the Statistical Package for Social Sciences (SPSS) 16.0 package. For the testing of the significance of the relationship between intrapreneurship and company growth, Pearson's correlation was used. For checking the extent of the relationship between intrapreneurship and company growth, multiple regressions analysis was employed.

Secondary Objective 1: To Identify Key Dimensions of Intrapreneurship: Factor analysis showed that intrapreneurship level in the iron and steel manufacturing companies was through 31.92% company support for innovativeness, 19.25% individual innovativeness, 18.71% individual proactiveness, and lastly 16.86% company support for risk taking. Similar to Jong et al. (2011), the four preceding intrapreneurial factors explained 86.74% of the dimensions of intrapreneurship also designated as innovativeness, proactiveness, and risk taking.

Secondary Objective 2: To Identify Key Measures of Company Growth: Financial and product range measures were subjected to a principal component analysis to test their significance in measuring company growth. The factor analysis confirmed that company growth is linked to financial and product range measures. Similar to what was proposed by Zhou & de Wit (2009), the construct of financial measures identified in this study is made up of a combination of increases in sales, market share, and profits. Company growth was previously ascribed to product range and new product introductions in studies by Gerald & Elisifa (2013) and Cucculelli & Ermini (2012) respectively. Measures of company growth were attributable to 42.48% financial and 27.21% product range. Financial and product range measures explained 69.69% of the measures of company growth.

Secondary Objective 3: To find out if there is a significant relationship between intrapreneurship and the growth of iron and steel manufacturing companies in Bulawayo, Zimbabwe. The Pearson Correlation test was used to find out the level of significance between intrapreneurship and company growth. Table 1 shows the Pearson correlations.

Table 1: Pearson (r) Correlations N=89

	Company Support for Intrapreneurship	Individual's Intrapreneurial Disposition	Measures of Company Growth	Innovation-driven Company Growth	Risk-taking based Company Growth
Company Support for Intrapreneurship (CSI)	1				
Individual's Intrapreneurial Disposition (IID)	0.044	1			

Measures of Company Growth	0.177	0.547**	1		
Innovation-driven Company Growth	0.178	0.260*	0.437**	1	
Risk-taking based Company Growth	0.304**	-0.009	0.350**	0.271*	1

*Correlation is significant at the 0.05 level (2-tailed); i.e. p value less than 0.05.
**Correlation is significant at the 0.01 level (2-tailed); i.e. p value less than 0.01.
Source: Primary data

A very strong correlation (Accept p-value less than 0.01) was observed on relationship between: (1) individual's intrapreneurial disposition and measurement of company growth (r= .547**); and (2) company support for intrapreneurship and risk taking based company growth (r= .304**). A strong correlation (Accept p-value less than 0.05) was also observed between individual's intrapreneurial disposition and innovation-driven company growth (r= .260*). The strong relationships between intrapreneurship and company growth revealed in this study agreed with Garcia-Manjon & Romero-Marino's (2012) tying up of company growth to introduction of innovation and technical changes. Similar studies were also done in France and Italy by Colombelli, Haned & Le Bas (2013) and Cucculelli & Ermini (2012) respectively to confirm that innovative companies grew more than non-innovative companies. The resultant company growth was actively measured by intrapreneurs as emphasised by Gruenwald (2015). On the other hand, deliberate company support for intrapreneurship helped the companies to grow through risk taking.

Secondary Objective 4: To find out the extent to which intrapreneurship contributes to the growth of iron and steel manufacturing companies in Bulawayo, Zimbabwe. In order to establish the extent to which intrapreneurship was related to company growth, predictor model(s) were developed using multiple regression analysis. Multiple regression was adopted because there are more than one predictor and dependent variables. Two models were developed to predict (1) innovation-driven company growth and (2) risk- taking based company growth. Table 2 shows the multiple regression model of innovation-driven company growth.

Table 2: Multiple Regression Model for Innovation-Driven Company Growth N=89

a. Predictors: (Constant), Individual's Intrapreneurial Disposition (IID)

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	T	Sig.
1	(Constant)	0.822	1.020		0.805	0.423
	IID	0.545	0.217	0.260	2.512	0.014

b. Dependent Variable: Innovation-driven Company Growth

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	F	Sig.
1	0.260	0.068	0.057	1.008	6.311	0.014

c. Excluded Variables: Company Support for Intrapreneurship (CSI)

Model		Beta In	T	Sig.
1	CSI	0.167	1.625	0.108

CSI - Company Support for Intrapreneurship
IID – Individual's Intrapreneurial Disposition
Source: Primary data

It was also noted that the statistical significance levels for individual's intrapreneurial disposition and company support for intrapreneurship were 0.014 and 0.108 respectively. Company support for intrapreneurship was rejected from model 1 (Accept a p-value below 0.05). Overall, the regression model 1 was significant at 0.014 (Accept p-value below 0.05). Although statistically significant, the level of

contribution of individual's intrapreneurship disposition to company growth was low (Adjusted R square = 0.057). This indicated that other factors, not included in the model contributed more to company growth than individual's intrapreneurship disposition. Company support for intrapreneurship (Beta = 0.167) was excluded from the model because its contribution to company growth was far lower than individual's intrapreneurship disposition (Beta = 0.260). Due to the low level of contribution of individual's intrapreneurship disposition to company growth, the Confederation of Zimbabwe Industries (2018) was vindicated for pinning hope for growing the iron and steel sector together with the rest of the manufacturing sector on addressing macro-issues.

The key macro issues nominated for correction were: (1) policy inconsistencies; (2) high costs of production; (3) foreign currency shortages; (4) funding challenges; (5) antiquated equipment; (6) unstable macroeconomic environment; (7) competition from cheap imports; and (8) corruption. Further regression analysis showed that spotting opportunities that bring business to the company ahead of others was linked to company growth. However, action oriented items like starting new things and changing ideas into reality were not related to company growth. This implies that the individual employees in the surveyed companies were not voluntarily involved in performing activities that promoted company growth. This contradicted what was posited by Sarlija et al. (2016) that individuals are determinants of company growth. A second variant of company growth is driven by risk taking. Table 3 shows the regression model of risk-taking based company growth.

Table 3: Multiple Regression Model for Risk-Taking Based Company Growth N=89

a. Predictors: (Constant), Company Support for Intrapreneurship (CSI)

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	T	Sig.
2	(Constant)	1.463	.348		4.203	0.000
	CSI	0.262	0.088	0.304	2.977	0.004

b. Dependent Variable: Risk-taking based Company Growth

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	F	Sig.
2	0.304	0.092	0.082	0.752	8.862	0.004

c. Excluded Variables: Individual's Intrapreneurial Disposition (IID)

Model		Beta In	T	Sig.
2	IID	-0.023	-0.221	0.825

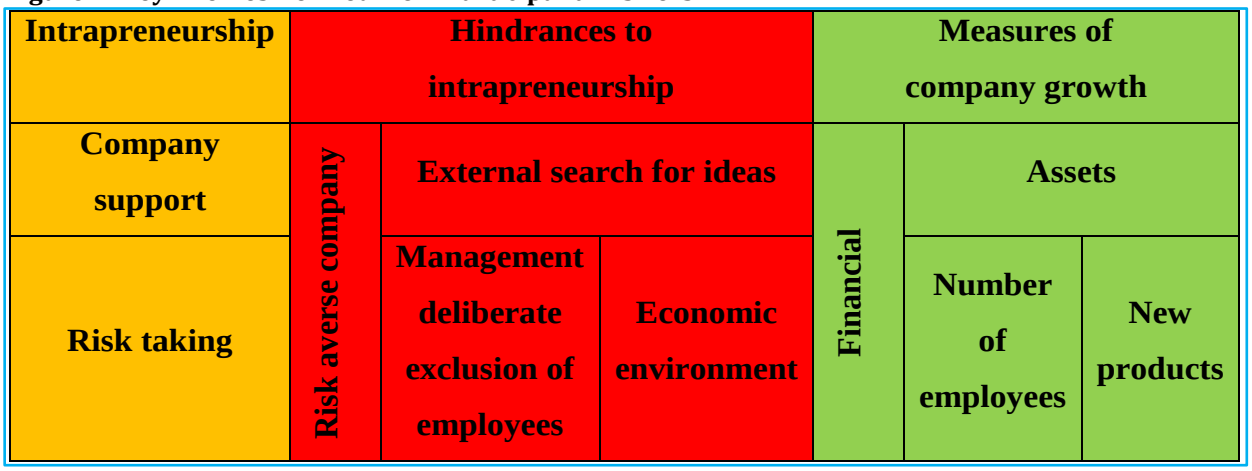
CSI - Company Support for Intrapreneurship
IID – Individual's Intrapreneurial Disposition
Source: Primary data

The statistical significance levels for individual's intrapreneurial disposition and company support for intrapreneurship to risk-based company growth were 0.825 and 0.004 respectively. Individual's intrapreneurial disposition was rejected from model 2 (Accept p-value below 0.05). Overall, the regression model 2 was significant (Accept p-value below 0.01). This study confirmed results of similar studies done in Dutch (Zhou & de Wit, 2009) and Indian (Seshadri & Tripathy, 2006) companies, which stated that it was difficult to shift employees from an 'employee mind-set' to an 'intrapreneur mind-set' as a driver for company growth. Company support for intrapreneurship showed potential to improve company growth by 8.2% (Adjusted R square = 0.082). The low level of contribution of company support for intrapreneurship to risk-taking based company growth (Adjusted R square = 0.082) indicated that other factors, not included in the model contributed more to company growth than the chosen variable.

Individual's intrapreneurial disposition (Beta = -0.023) was excluded from the model because its contribution to company growth was negative and far lower than contribution of company support for intrapreneurship (Beta = 0.304). Further regression analysis showed that allowing employees to take risks in their jobs contributed to the risk-taking based company growth. However, the surveyed companies did not fully support intrapreneurship as a key driver of company growth. Respondents revealed that their employing companies did not freely allow them to introduce new ideas and to use company resources to try new business ideas. This contradicted Alipour, Idris & Karimi (2011) who posited that management support is at the core of facilitating intrapreneurship by availing adequate resources and ensuring that there is buy-in into intrapreneurial initiatives throughout the company.

Qualitative Data Presentation and Analysis: Qualitative data was translated from its raw state into findings by cyclically: (1) transcribing raw data; (2) organising and preparing data for analysis; (3) thoroughly reading the data; (4) computer coding the data; (5) deducing themes; and interpreting themes. Qualitative data was coded and analysed using the QSR NVIVO 10 package. The focus was on "what is said" more than "how it is said" and hence thematic analysis was used to uncover patterns from the collected data (Ragab & Arisha, 2018). Thematic analysis of the qualitative data yielded results in maps, charts, and figures. Similar to Creswell's (2014) approach, qualitative data analysis was done parallel to data collection to focus only on valuable data and disregard unwanted data. For example, in the castables and foundry stratum, the second respondent was chosen to put more perspectives on what the researcher had inferred from the first interviewee's answers. Figure 2 shows a tree map of the key themes derived from the participants' answers.

Figure 2: Key Themes Derived from Participant Answers



Source: Thematic analysis of primary data

Company growth, hindrances to intrapreneurship, and intrapreneurship were emphasised by participants in receding order. This trend showed that company growth was well understood while intrapreneurship as a concept had not yet fully permeated the iron and steel manufacturing companies in Bulawayo, Zimbabwe.

Secondary Objective 1: To Identify Key Dimensions of Intrapreneurship: Intrapreneurship was mainly interrogated in the interviews by checking on company support for innovation and permission to take risks by company's employees. All the participants emphasised the need to identify, assess, control, manage, eliminate, and minimise risks. Specifically, a number of participants highlighted a need to "avoid creating risks," "insure against risks," "mitigate the risks," "adhere to procedures and standards," "train employees," and "forbid risk taking." Company support for new ideas was mentioned by all participants with the exception of participant ISK07. However, generation of ideas was largely outsourced as noted by all participants, except ISK03 and ISK07. At individual level, it was interesting to note that no participant volunteered any record of breakthrough ideas that they contributed to their companies. Employee involvement in idea generation was promoted in the iron and steel manufacturing companies in Bulawayo through allowing for (1) brainstorming, [2] putting suggestion boxes, (3) promoting research, and (4) employee debates.

However, companies favoured input from non-employee sources like magazines, management meetings, and exhibitions. Management's exclusion of employee involvement under the guise of managing risk was exposed by participant ISK06 who said, "Management go for strategic retreats…"and also: "The company does not tolerate deliberate exposure to risky activities caused by employees as it believes that not everyone is empowered to take risks on behalf of the company. Choosing risky activities to pursue is a strategic level matter for which employees have no direct role to play. Instead, company employees are continually trained on how to prevent risks or minimise them if they are to occur." On the flip side, participant ISK03 said, "I think as an organisation, to succeed, we should take risks. Most of the times we have managed to be successful through risk taking and this has enabled us to grow. It is through risk taking for us to generate new ideas which are essential to the organisation."

Azami (2013) highlighted that the focus of intrapreneurship is on innovation and risky activities. Furthermore, Birkemalm & Jansson (2018) noted that intrapreneurship is motivated by challenges and accomplishment for which risk is shared with the employing company. This study showed that innovation and risk taking were not popular in the iron and steel companies in Bulawayo. All the focus was directed at research and development department and meetings to take the companies forward.

Secondary Objective 2: To Identify Key Measures of Company Growth: Company growth, as picked from participants' answers, was determined primarily by financial measures like sales revenues, profits, and market share. Company growth was also measured by products number or range, and assets held by the company. With the exception of three participants, namely; ISK01, ISK04, and ISK06, all the other five participants mentioned products as a measure of company growth. Similarly, six participants mentioned number of employees as a measure of company growth. Measurement of company growth has no universally acceptable formula with business practitioners and academics separately advocating for qualitative and quantitative measures respectively (Gruenwald, 2015). This study disagreed with the assertion by Gruenwald (2015) as the measures of company growth were all inclined towards quantitative measures such as financial measures, number of employees, productivity, assets held, and product range.

Secondary Objective 3: To find out if there is a significant relationship between intrapreneurship and the growth of iron and steel manufacturing companies in Bulawayo, Zimbabwe. The significance of the relationship between intrapreneurship and company growth was gauged by the prominence given to each variable or its subsidiary elements. Figure 3 shows the words mentioned most by the participants.

Figure 3: Word Tree Map on Role of Intrapreneurship on Company Growth

Source: Primary data

All participants built their answers around "employees" or "person," making employees the most prominent word. "Risks" and "changing" followed as the next most popular words. Prominence was also given to "products," "work," and "ideas." From the word tree map, employees formed the core of the link between intrapreneurship and company growth. Garcia-Manjon & Romero-Marino (2012) linked innovation to

company growth. We have no room for trial and error. We also tap a lot into agricultural research institutions and in-house we rely mostly on our research and development department to lead the search for new improvement initiatives. This explains why the word "employees" was the most mentioned word by the participants. Employees link novel ideas to the growth of the company through taking risk at times.

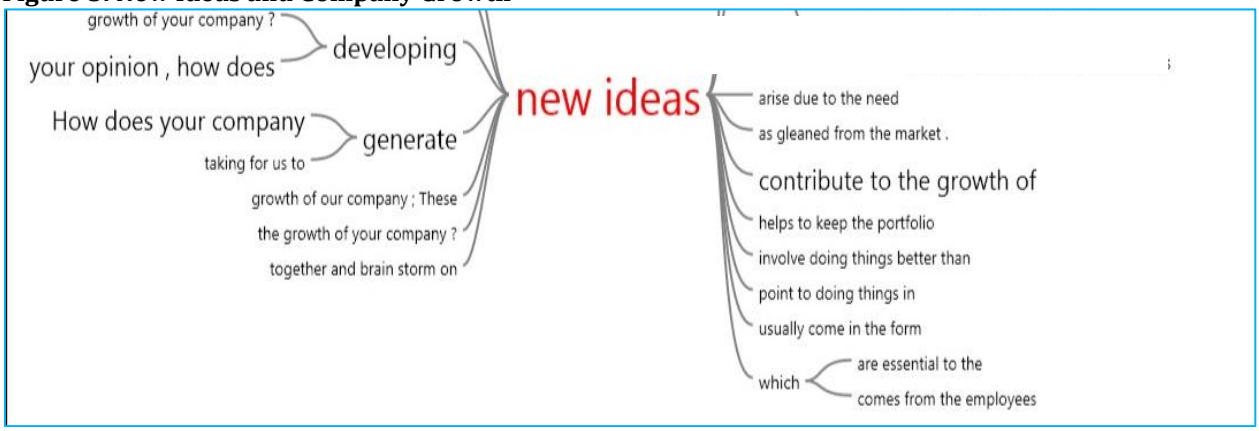
Secondary Objective 4: To find out the extent to which intrapreneurship contributes to the growth of iron and steel manufacturing companies in Bulawayo, Zimbabwe: The extent to which intrapreneurship affects the growth of iron and steel manufacturing companies in Bulawayo was best assessed by checking if participant answers tied up the dimensions of intrapreneurship to the measures of company growth. Figure 4 shows the cluster analysis chart for the participant answers.

Figure 4: Nodes Clustered by Coding Similarity

Source: Primary data

Financial measures of company growth and risk averseness were mentioned by all participants. The more companies thought about financial growth of the company, the more they were likely not to allow their employees to take risks. New ideas and taking risks were observed to lead to growth of companies. The relationship between intrapreneurship and company growth can be decomposed to show the relationship between: (1) new ideas and company growth, and (2) risk taking and company growth as shown in Figures 5 and 6 respectively.

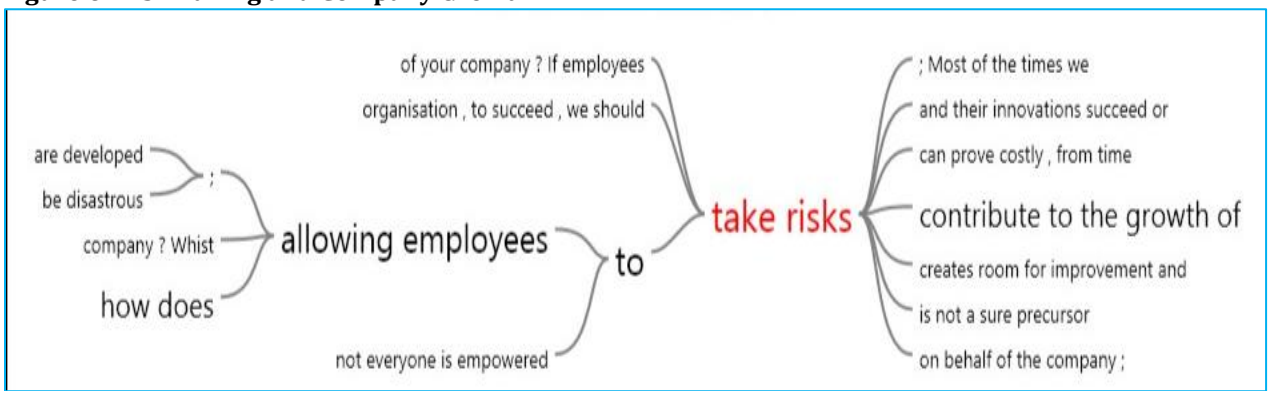
Figure 5: New Ideas and Company Growth



Source: Primary data

A strong relationship was deemed to exist between new ideas and company growth. Company growth was ascribed to doing things better.

Figure 6: Risk Taking and Company Growth



Source: Primary data

Although risk taking was not favoured by the interviewed participants, all the participants concurred that risk taking, if successful, contributed to company growth. However, there were attempts by the participants to blame the operating environment for the general risk aversion in the iron and steel manufacturing companies. Participant ISK08 mentioned the environment three times in responding to various questions. The approach taken by participant ISK08 was a deliberate move to put the answers in the context of existing economic environment and in the process justify the lack of risk taking in employing company. Firstly, participant ISK08 said: "The environment we are operating in does not allow the company to give employees freedom to experiment with scarce resources. Only if there is a compelling reason, do we allow experimentation, but only with tried, tested, and proven ideas. Of course once in a while we get brilliant ideas from our employees, which we adopt." Secondly, participant ISK08 said: "The environment we are operating in is inflationary..." Thirdly, participant ISK08 said: "However, in the current environment we do not have the luxury to risk company resources. What we have noted is that employees need incentives to excite them to innovate within the allowed limits."

5. Conclusion and Policy Recommendations

The study drew the following conclusions. Overall, intrapreneurship was not a preferred strategy for driving growth in the iron and steel manufacturing companies in Bulawayo. Financial and product range were identified as the key measures of company growth. Company support for intrapreneurship and individual's intrapreneurial disposition were statistically linked to company growth. Quantitatively and qualitatively, identification of opportunities by individuals and allowing employees to take risks in their jobs were credited for marginally driving company growth by 5.7% and 8.2% respectively. However, the free flow of ideas and risk taking by employees were inhibited in the iron and steel manufacturing companies in Bulawayo, Zimbabwe.

Based on the findings and conclusions discussed in the previous section, recommendations for this study are summarised as follows:

- If intrapreneurship is to be pursued as a long term strategy for company growth, serious promotion of innovativeness, proactiveness, and risk taking is needed.
- In addition to quantitative measurement of growth in the studied companies, qualitative measurement should also be utilised to get a full picture of company growth.
- Employees should be motivated and supported to intrapreneurially drive the growth of iron and steel manufacturing companies in Bulawayo through ideas, actions, and work.
- To increase the role of intrapreneurship on the growth of iron and steel manufacturing companies in Bulawayo, free generation and implementation of ideas, complemented by increased tolerance for risk taking by employees, should be encouraged.

Contribution of the Study to the Body of knowledge: The role of intrapreneurship on the growth of companies was widely studied in developed and emerging countries. However, little was published in developing countries in general, and more specifically in Zimbabwe. Confederation of Zimbabwe Industries (2009 - 2018) repeatedly presented drastic policy shifts, high costs of production, foreign currency shortages, lack of concessionary funding, aged equipment, unstable macroeconomic environment, competition from cheap imports, and corruption as the causative factors for the poor performance of the manufacturing sector in Zimbabwe. However, this study established that intrapreneurship was a missing element that could, in a way, buttress various ongoing efforts to grow the iron and steel manufacturing companies in Bulawayo, Zimbabwe.

Areas for Further Research: Further studies could be conducted on why iron and steel employees lacked intrapreneurial enthusiasm to act on their ideas and the reasons for low company support for risk taking employees.

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Journal of Economics and Behavioral Studies (JEBS)
Vol. 12, No. 1, February 2020 (ISSN 2220-6140)

Political Interference in the Administration of Service Delivery in UMLALAZI Local Municipality of KwaZulu-Natal, South Africa

Sengiwakhile Mngomezulu
Department of Public Administration, University of Zululand, South Africa
mngomezulu26@gmail.com

Abstract: South African political interference in the administration of service delivery is a serious problem in many municipalities, where municipalities are experiencing serious challenges on how to deal with the interface between politicians and officials. Inappropriate political interference in administrative matters as well as strained relations between key political and administrative officials in the municipalities appears to be the order of the day. To understand the impact or consequences of political interference in the administration of service delivery, a case approach was adopted to evaluate the political interference in the administration of service delivery in uMlalazi Local Municipality of Kwazulu-Natal, South Africa. Participants comprises of Municipal Officials in the administrative side of the municipality, members of Ward Committee as well as other political parties expect the political party in power. The literature seeks to review the political-administrative interface, South African local government service delivery, conflation of legislative and executive roles of local government, reflection on local government performance and the critical issue of poor service delivery in South Africa.

Keywords: *Political interference, Administration, Service delivery, Political party, Local government.*

1. Introduction

The South African Constitution of 1996, section 40 (1) and (2) provides for a national system of local government. It charges local government with a developmental mandate and equips each municipality with a set of constitutionally protected powers. Provincial governments are tasked with the supervising and supporting municipalities but play a minor role with regards to regulating the local government systems. Municipal councils are democratically elected according to electoral system that combines constituency (ward) representation with proportional representation, a political system where the party with the highest number of votes forms the government. Politically, the local government scene is dominated by the African National Congress (ANC) which controls the lion's share of municipalities, though with some notable exceptions, particularly in the Western Cape Province where the City of Cape Town is controlled by the Democratic Alliance, the national opposition party (Visser, 2010). In terms of section 40 (1) of the Constitution of the Republic of South Africa (1996), government is constituted at national, provincial and local spheres, which are distinctive, interdependent and interrelated.

This establishes local authorities as a distinctive sphere, with a mandate to govern, to provide services (such as water, electricity, houses, roads and sanitation), and to promote social and economic development. In the 26 years of democracy South Africa has made some giant strides in certain key sectors of the economy like education and health, however, at local government level the equality and efficient delivery of basic services to people like water, sanitation, housing and electricity remains a huge challenge. In recent years there has been an escalation in the number of violent service delivery protests across the country with people frustrated at the slow pace of delivery and also at corrupt practices that have become endemic in some municipalities (Mdlongwa, 2014). Against this backdrop this work looks at some of the challenges within local government in order to understand how they hamper service delivery. This study seeks to evaluate the political interference in the administration of service delivery in uMlalazi Local Municipality of KwaZulu-Natal, South Africa.

2. Literature Review

In research, Literature review is all about studying scholarly work or available body of knowledge that assist the researcher to see how other scholars have investigated the research problem. Dey (2005) stated that a literature review is a search for the published studies that are relevant to your topic to ensure that you have a grasp of what has been done in your area of intended study. This study reviews scholarly works based on

Service Delivery in South Africa's local Municipalities, the effects of politics in service delivery of Local Municipality and legislation on Local Government Service Delivery. According to Swanson and Chermack (2013) the need to evaluate the effects of service delivery in general in South Africa cannot be overemphasized.

It is true that South Africa as a country is coming from a state of inequality and disparity in service delivery and will find it very difficult to address these disparities. It is, however, very important that various studies that have been done in terms of service delivery should in turn be evaluated so as to effect improvement on service delivery in general. Visser (2010) urges that it is, however, worth nothing that quality applied to managing service delivery in local government, while they seem appropriate to service organisations generally, these notions of quality do not necessarily meet all the criteria for quality in the provision of public services. This is precisely so because delivery of public services is a process based on broadly accepted formative and ethical values, as well as other prescribed guidelines. Ultimately, quality in local government cannot be isolated from those values, which relate to what is perceived as worthwhile in society. These values provide an ethically justifiable platform for determining and evaluating public service processes and outcomes, which might permeate the orthodox market-oriented notion of a quality culture in service delivery. McLennan & Muslow (2009) notes that in order to redress these past imbalances, the ANC government was confronted with the challenge of transforming a racially and ethnically fragmented and unequal public service delivery system into one that would be able to meet the demands of a newly franchised citizenry for economic, social and political development.

Consequently, the legacies of the National Party (NP) government combined with widespread poor budgetary and financial management, a massive backlog in basic services and infrastructure, race and regional inequalities in provision and sometimes tense social relationships, tended to limit opportunities for social development for social development and expanded delivery. According to Masango (2002), before democratic dispensation in South Africa, apartheid deprived good public participation policy making and implementation in all three spheres of government. As a result of this, a majority of black South African were not afforded an opportunity to contribute to the process of developing and implementing policies that affected them particularly with regard to their participation. Simpson (2010) contends that the frequent, local government service delivery protests taking place in South Africa are almost a replica of what happened in most townships during the 1980's, when the disenfranchised majority of Africans took to the streets to protest against the imbalances of the NP government, in as far as the provision of services was concerned. It is generally argued that service delivery protests as experienced in South Africa under the ANC rule resembles the protest riots during the apartheid era. However, in this study the researcher argues that such analysis is more of a simplification of the political dynamics in the country (Simpson, 2010).

Under the ANC's rule, the mismatch between expectations, on the one hand, and limited skills, capacity and commitment on the other dented the dream of local democracy. Interestingly, the protests registered side-by-side dissatisfaction with the quality and reach of service delivery, as well as the mechanisms of public representation of community interests (Booysen, 2011). According to Booysen (2011) the politics of service delivery in South Africa is both a top-down and bottom-up process. From top-down perspectives, the government determines policy frameworks and mechanisms of implementation, sets budgets and interprets mandates. Bottom-up perspectives illuminate the struggles of ordinary people for service delivery. Therefore, service recipients struggle to make their voices heard in the corridors of power that meander from local municipalities upwards to provincial premiers. To Southhall (2012) political appointments to senior executive management positions in South Africa compromised services and suggested that it was unlikely that existing levels of technical expertise would be maintained. In one way or another, the appointments of people without the relevant expertise compromised service delivery. Gumede (2013) argue that one problem in South Africa is that appointments to crucial posts in the civil service are still often based on political connections. This is also why it appears that the same senior civil servants rotate from one top job to another because only they can be politically trusted.

Theoretical Framework: Visser (2010) reported that, South African municipalities experience serious challenges in dealing with the interface between politicians and officials. Inappropriate political interference in administrative matters as well as strained relations between key political and administrative officials in the

municipalities appears to be the order of the day. Oftentimes, the lack of a separation of powers between legislative and executive authority at local government level is blamed for this since legislative and executive authority are different. This means that the best people are not always recruited to manage crucial jobs. Since Gumede (2013), South hall (2012) and other scholars had pick pointed out that politicians have the effects on poor service delivery, therefore this study seeks to investigate the political interference in the administration of service delivery, on how do they affects the service delivery, why do they interfere in the administration, the impact of their interference, and what is the possible way forward with regard to the problem of undue political interference.

This contribution has attempted to draw the attention away from the conflation of legislative and executive authority in the municipal council while still recognising it as an important background. Local government, again, works in a more complex system. Since the Constitution designates the municipal council as the executive, it is essentially the employer of all municipal staff. Legislation has sought to separate council from the administration to some extent. The Municipal Systems Act mandates the municipal council to appoint senior managers (i.e. the municipal manager and managers that report to him or her, see s 82(1)(a) Municipal Structures Act and s 56 Municipal Systems Act), and further appointments are made by the administration itself. The Code of Conduct for Councillors includes a provision that prohibits councillors from interfering in the administration 9item 11 schedule 1 Systems Act). Taking a harder line of separation, the Municipal Finance Management Act (MFMA) has barred councillors from taking part in tender decisions (s 117 MFMA) and includes many provisions that seek to separate the council from the administration (RSA Constitution, 1996). Whilst the above explanation may provide a superficial explanation for many of the political interfering administration, the empirical evidence must be understood within a theoretical framework before a deeper interpretation of reality can be made.

Politics- Administration Dichotomy Theory: According to Spicer (2010), for more than a century, the politics-administration dichotomy has been one of the most disreputable issues in the field of public administration. The politics-administration dichotomy has had a strange history in public administration. It expands and contracts, rises and falls, but never to go away. Wilson (1887) stated that the field of administration is a field of business. It is removed from the hurry and strife of politics. Administration lies outside the proper sphere of politics. Administrative questions are not political questions. Although politics sets the tasks for administration, it should not be suffered to manipulate its offices. Wilson was concerned with both the corrupting and politicizing interference of party organisations in administrative affairs (King, 2001). He was critical of the way Congress handled core legislative functions. He stated that Congress policy making was haphazard and its oversight was weak. When Wilson suggested the clearer differentiation of politics and administration, he was seeking to strengthen and redirect the former while protecting the latter (Svara, 1998). Public administration is detailed and systematic execution of public law but the general laws are obviously outside of and above administration. The broad plans of governmental action are not administrative; the detained execution of such plans is administrative (Wilson, 1887).

The Classical Public Administration Theory: According to Wilson (1887) Public administration theory is divided into three branches. The three branches are, Classical Public Administration Theory, New Public Management Theory and Postmodern Public Administration Theory. Each of these three branches studies Public Administration from a different perspective. These theories explain the ways which administrators can understand and exercise their duties as a public administrator. Classical Public Administration Theory is often associated with Woodrow Wilson and Max Weber. Woodrow Wilson is known as "The Father of Public Administration", having written on "The Study of Administration" in 1887, in which he argued that a bureaucracy should be run like a business. Wilson promoted ideas like Merit-Based promotions, professionalism and a non-political system. Sympathy can lead to downfall in an administration; means there should be pragmatism in bureaucracy. The Classical Administration Theory will assist this study in explaining the relationship between politicians and administrators, and it will also help the researcher to differentiate the duties of Administrators and politicians to achieve the aims and objectives of the study under investigation. This theory will also help the researcher when analysing the data to support the arguments.

3. Research Methodology or Research Design

Research methodology is a reflection of the entire approach for the research process. It is a strategy employed by the researcher to obtain answers to the research questions (Kerlinger, 1986). Politics-Administration Dichotomy theory will encapsulate this study on the grounds that it talks about political-administration since the researcher is evaluating the political interference in the administration of service delivery, it will also help the researcher to achieve the aim and objectives of the study when analysing the data to support the arguments. It is a procedural plan adopted by the researcher to provide valid objective and accurate answers to research questions and it entails data collection techniques and analysis as well as interpretation of findings. Qualitative research will be conducted because a problem needs to be explored. Through qualitative approach, participants are able to describe their perceptions on the effects of politics in service delivery.

Research Design: The researcher will employ the qualitative method because qualitative method allows the researcher to capture the experiences, perceptions and attitudes of the interviewees and it uses methods such as participant observation or case studies which will result in a narrative, descriptive account of a setting or practice. The nature of this study sought to explore a social phenomenon from multiple meanings. Creswell (2007) asserts that qualitative research uses methods such as participant observation or case studies which result in a narrative, descriptive account of a setting or practice. DeVos (1998) defined qualitative research as a multi-perspective approach utilizing different qualitative techniques and data collection methods to analyse social interaction, aimed at the meanings that the subjects attach to it, while Straus & Corbin (1990) see qualitative research as any kind of research that produces findings not arrived at by means of statistical procedure or any means of qualification; it refers to research about a person life stories, behaviour, an organization's functioning, social movements or interactions and relationships. Since uMlalazi local municipality will be used as a case study, the researcher will make use of questionnaires so that the respondents will give the full details of their experiences about service political interference in uMlalazi local municipality.

Data Collection Instruments: Sekaran & Bougie (2009) argue that data collecting instruments or methods are integral elements of the research design. There are several methods available in the research field, each with its own advantages and disadvantages. The researcher has chosen semi-structured interview to engage the Municipal officials and members of Ward Committee of the uMlalazi Local Municipality to get their views and opinions on the topic under investigation. In semi-structured interviewing, a guide is used, with questions and topics that must be covered. Semi-structured interviews are often used when the researcher wants to delve deeply into a topic and to understand thoroughly the answers provided (Sekaran & Bougie, 2009). The researcher will focus on 7 municipal officials and 3 members of Ward Committee at uMlalazi Local Municipality because they are the key informants, they are in the administrative side of the municipality and service delivery is their daily basis job description or job specification, and they have relevant information about service delivery. Questionnaires shall be given to these people which, consist of open-ended as well as closed-ended questions that will give respondents a platform to answer freely and thus help the researcher to get more information on the topic at hand. Focus groups will be organized based on the types of positions in Municipal Officials and wards committee members. The researcher will also use tape recorders and field notes to strengthen the information from the respondents.

Target Population: A population is a group of individuals who have the same characteristics (Cresswell, 2012). According to Babbie (1992) "a population is that aggregation of elements from which the sample is actually selected. It is further explained as that group of people the researcher wants to draw conclusions". In this current study the target population is the Municipal officials and Ward Committee members of uMlalazi Local Municipality. The sample will also include 3 members of Ward Committee to represent the whole population of citizens of uMlalazi Local Municipality so that the researcher will know how does the political interference affects the service delivery. These Municipal Officials are administrative of the Municipality. These Municipal Officials are found at eShowe CBD, Gingindlovu CBD, Mtunzini CBD, and the citizens of the uMlalazi Local Municipality are found in the following locations: - Gingindlovu, Ncinyane, Salveshe, Mlalazi,

Ntumeni, Mbongolwane and Wombane. The researcher has chosen Gingindlovu CBD and eShowe CBD so that he is able to generalize his study.

Sampling Procedures: This study will employ the purposive non-probability sampling technique to select participants (Municipal Officials and Citizens of the Municipality). According to Cooper and Schindler (2003, 103), "In purposive sampling the researcher selects people or sites who can best help to understand the phenomenon''. According to Cresswell, (2012) "The inclusion of the participants will be based on the capacity of the participant to inform the research'' (Quinlan et al, 2006). A distribution demonstrates that the city is arranged on the north-west bank of the territory of KwaZulu-Natal, nearly 160 KMS north-east of Durban. The N2 thruway navigates uMlalazi Local Municipality in a north-east course towards the Swaziland outskirt and south-west towards Durban. It viably shapes a division among Gingindlovu, Mtunzini and Eshowe. The R66 Provincial Main Road goes through Eshowe towards Dokodweni Tollgate. UMlalazi works as a locale hub and prevailing business focus in the uThungulu District. It comprises of an assortment of grouped and specially appointed settlements that are connected with a very much created system of streets framework. In this regards, the researcher will interview the 7 municipal officials from uMlalazi Local Municipality. These would be the Municipal Manager, Director Corporate Services, Chief Financial Officer, Director Community Services, Director Engineering Services, Director Protection Services and Director Planning and Development Department.

Data Analysis and Interpretation: Searching and arranging the interview transcript, field notes and other material that can be accumulated to increase understanding and to enable you to present what you have discovered to others (Creswell, 2012). As they are key informants on the topic under investigation because they deal directly with issues of political interference in their daily work. The Municipal Manager and Directors of the departments are chosen because politicians they use to interfere in the decisions they make on how to run the municipality or their departments. The transcribed data will be analysed by means of content thematic analysis and aided by thematic network analyses. Content thematic analysis is a flexible tool that involves the identifying of themes or patterns within data (Braun & Clarke, 2006). Themes are defined as recurrent unifying concepts or statements about the subject of inquiry (Bladley, Curry, & Devers, 2007). According to Attride-Stirling (2001), content thematic analyses can be successfully aided by and presented as thematic networks, which refer to web-like illustrations that summarise the basic, organising and global themes constituting a piece of text. Therefore, the researcher will read through the transcripts several times in order to understand the content of the transcripts and then sort the information by themes.

4. Research Findings

The results show that most of the respondents highlighted that the municipal administration is directed by the Municipal Manager since he is an accounting officer faced with the challenges of political interference in his duties where he is being forced to favour the ruling party (ANC) even when such act is unconstitutional. These findings concur with Visser's (2008) account that too many reports of fraud and corruption in municipalities point towards inappropriate interference exercised by political office-bearers. As the consequence of these findings, it is obvious that numerous municipal officials could be experiencing job burnout and occupational stress since the municipal political office holders appoints the municipal administrator. The respondents further indicated that political interference of the ruling party in administration of service pose a challenge of poor service delivery in the wards that are led by the opposition parties. Respondents cited the fact that "municipal manager face the challenge of political interference from the ruling party where the administrators are force to favour the ruling political party in the allocation of wards projects, demanding that developmental projects be allocated in the wards that are led by their councillors".

Furthermore, the result shows that when respondents were asked about how political interference affects service delivery in uMlalazi local municipality these factors emerged. The respondent highlighted that incompetent or unqualified employee's lead to poor service delivery. Respondents cited "to a certain extent it does affect service delivery, for example where incompetent person is employed may result to failure to satisfactorily his/her duties and the deployment of unqualified officials can also impact on service delivery." The ANC policy of cadre deployment which promotes that people must be employed based on their loyalty and long service in the organization, has impact in the service delivery because they deploy incompetent and

unqualified employees who fail to perform their duties. Respondents further indicated that when the Integrated Development Plan (IDP) is compiled, projects are often allocated in favour of the ruling party members while the opposition is edged out in the process. Respondents further indicated that "basic services are used as political footballs to gain support to discredit either the ANC led municipality or the ward councillor and such incidents often leads to poor service delivery, as officials would rather point accusing fingers at each other than providing proper and quality service that will be effective and efficient to all wards."

This burning issue affects many South African citizens forcing many communities to protest while demanding for immediate or adequate service delivery or complaining about poor service delivery. When the respondents were asked about whether separation of legislative and executive roles helps in the administration of service delivery in the municipality, they clearly indicated that the local government system as a whole need to be reviewed as sometimes it does not lend itself to the meeting the needs of the people and service delivery may be skewed to favour the wards where the majority party is in control. Respondents further suggested that "separation of legislative and executive roles helps because it minimizes interference from other party. For example, section 117 of Municipal Finance Management Act prevents councillors from participating in bid committees or SCM processes. It does help as the legislative play oversight whilst the executive deals with almost day-to-day functioning of the municipality." The respondents also highlighted that it can help a lot because the municipal manager can perform his duties without any pressure or favour from a particular individual. One respondent commented "I think it can help because the municipal manager would be free to execute his duties without the fear of the political.

Parties, the skills of the employees will matter most and the political parties tend to mobilize for the employment of the people who do not have the skills and knowledge." It was also noted from the respondents that the legislative and executive roles is already separated in terms of the Municipal Structures Act and Municipal Systems Act, but interference is not written or documented as a results accounting officers find themselves in a huge dilemma of how to deal with the issue of political interference considering the fact that they are being employed by the very same politicians who are interfering in their duties. The political interference leads to poor performance of many municipalities which course the poor service delivery to the communities. The study reveals respondent's solutions through the opinions of the municipal officials, ward committee members and politicians on what they thought were possible solutions to the problem of political interference, which was the last item or question of the study. Respondents were asked what they thought needed to be done to reduce political interference in the administration of service delivery.

Respondents provided the following solutions:

- Allocation of projects must be procedurally fair.
- Municipal management must be employed in permanent contracts.
- Politicians must put people lives first before their political mandates or agenda.
- Cadre deployment systems must deploy competent and qualified people.
- Local government legislation must be reviewed and amended.
- Issues of party must not affect the state.
- Further certain positions must not be filled by political figures but rather by independents.
- Politicians must learn to differentiate between the state issues and political issues.
- Politicians must threat all wards equally irrespective of the political party governing the ward.
- Political office bearers must push the agenda of development not seeking self-interest.

5. Conclusion and Recommendations

Findings of the study, the critical challenge to the service delivery is political interference in the administration of service delivery in uMlalazi local municipality of Kwazulu-Natal, hence the poor service delivery to the citizens of this municipality, and other associated challenges that hinder the municipal administrative to perform their duties in manner that will promote effective and efficient standard of living of the communities in uMlalazi local municipality. This study has revealed the nature of the challenges of political interference in administrative duties and how these challenges have prevented the municipality

from delivering quality of service to those that seek municipal attention on a day-to-day basis. Therefore, the researcher in this paper draw the following recommendations aim at assisting in reducing political interference in the administration of service delivery in uMlalazi local municipality of KwaZulu-Natal. The researcher believe that it will also give an insight to what can be done to reduce political interference in the administration of service delivery in South Africa as a whole:

- The findings of this paper suggest that the allocation of projects in wards of uMlalazi local municipality must be procedurally done in fairness to party concerned in order to promote effective and efficient quality service delivery to the community.
- In order for uMlalazi local municipality to reduce the issue of political interference, government must review the local government system which stipulates that management of municipalities must be employed on five years contract by the politicians.
- Furthermore, the uMlalazi local municipality politicians must learn to put people first before their political mandates or agendas, in other words politicians must learn to differentiate between the state issues and political issues.
- The findings of this paper also suggest the cadre deployment systems through politically disadvantage other political party must be done in a way to ensure that competent and qualified people are hired to manage certain positions rather than been filled with political apologists.
- The uMlalazi local municipality political parties must learn to have political tolerance and groom their members to be well equipped in order for them to fit in the municipal positions. In other words, all the political parties in the municipality for developmental purpose must for their political affiliations and work as a unit to enhance good service delivery.
- Government must review or re-look at the local government system to find ways to improve on the functioning of local government in order to promote the quality of service delivery to the community of uMlalazi local municipality and South Africa as a whole.

Conclusion

The issue of political interference in the administration of service delivery in local municipalities and government institutions as a whole is a serious problem which leads to poor service delivery. The researcher found that the opposition political parties that exist within the uMlalazi local municipality are concern about the political interference in the administration of service delivery in uMlalazi local municipality particularly, on tender awards, recruitment of employees and project allocating or distribution where by the politicians of the ruling or majority party in the municipality will force the municipal administration to squeeze the process so that the tender will be given to their friends or relatives, they also interfere on the employment processes whereby they want the administration to hire the incompetence candidates and projects are being allocated more in the wards that are led by the majority party which lead to poor service delivery in other wards that are led by opposition parties. This paper evaluates the political interference in the administration of service delivery in uMlalazi local municipality of KwaZulu-Natal, South Africa. This study has revealed the nature of the challenges of political interference in administrative duties and how these challenges have prevented.

The municipality from delivering quality of service to those that seek municipal attention on a day-to-day basis. The local government of a nation is its wealth. While the state has very good policies on paper towards ensuring legislative and executive roles or duties to promote effective and efficient of service delivery, the implementation on the ground is very poor. Accordingly, a number of possible solutions have been identified and suggested to reduce or eliminate these challenges. This study suggests that local government and uMlalazi local municipality should implement the above mentioned recommendations. This research was limited in the following ways; Research was conducted in uMlalazi Local Municipality Area only. Only the perceptions and opinions of uMlalazi Local Municipality' municipal officials, ward committee members and politicians were used to recommend solutions to the problem. Participants were scared to answer the questions, with most thinking that the researcher was an investigator or a member of the police or member of the majority party within the municipality. The researcher therefore had to go extra length to convince the people that the research was for academic purposes only.

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Journal of Economics and Behavioral Studies (JEBS)
Vol. 12, No. 1, February 2020 (ISSN 2220-6140)

The Development of Financial Markets in Africa: Trends, Challenges and Prospects

Misheck Mutize, Ejigayhu Tefera, McBride Nkhalamba
University of Cape Town, South Africa
mmutize@gmail.com, Mtzmis001@gsb.uct.ac.za

Abstract: This paper explores trends and challenges in the development of African financial markets over the past two decades. Access to capital is essential for government to finance its budget and the performance of government policies is in part evaluated through how financial asset prices respond to the policy choices. Erratic security issuance, thin trading, low turnover ratios and lack of market depth has characterised African financial markets as inefficient. Applying a descriptive research model on key data from international think tanks to observe the behaviour of financial markets data in African countries, the study finds that African financial markets still face the traditional challenge of lack of market depth relative to other regions in other continents due to their limit size and very low market capitalisation. This is a key factor holding back the ability of investors to exploit expansion opportunities. This paper recommends that, part of the solution to challenges faced by African financial markets is for governments to assist in set-up electronic trading platforms, improve trading and settlement infrastructure.

Keywords: *Development; African financial market; bonds; stock exchange; government policy.*

1. Introduction

Historically, the majority of fiscal support for African governments has been heavily dependent on Foreign Direct Investments (FDIs), international donor support and multilateral loans from Bretton Wood institutions. Recent trends in developmental funding support shows that development partners and traditional financiers are scaling down on their volume of funding assistance (Organisation for Economic Co-operation and Development (OECD), 2018). This dynamic has inevitably forced African countries to diversify, their funding sources by developing capacity in their local financial markets and integrating into global financial markets to access global capital through sovereign bond issuance. According to OECD (2015), neither African governments nor their private sector have sufficient capacity to fully fund their infrastructure projects and other balance sheet activities. Therefore, this has driven the strong appetite for the development of financial markets in Africa to support the various infrastructural projects that needs funding. The Africa Capital Markets Report (2017) present data showing that the African continent requires more than US$ 25 billion per annum for infrastructure projects, while it can only mobilise a maximum of US$ 10 billion from local resources. Furthermore, the low yields of near zero in developed economies have pushed international investors to shift their focus to developing markets for high yields averaging 6 per cent driven by high economic growth prospects.

Thus placing African financial markets on the spotlight. This paper makes a scientific analysis of the challenges faced by financial markets in Africa, examining their developmental trend and their future prospects. Some to the key challenges identified and analysed are; thin trading, low turnover ratios and lack of market depth, which has characterised African financial markets as inefficient. The challenges have a direct impact on bond yields and interest rates, which literature debates on whether they are overpriced or depressed. Data presented in the Africa Capital Markets Watch 2018 Report shows a strong investor appetite for African financial assets due to high yields. On the contrary, other literature argue that political administrations are borrowing irresponsibly without evaluating the real cost of financial market borrowings. However, other literature asserts that the level of local financial markets development is a key indicator of the capacity of political administrations to mobilize local resources. Thus, this paper makes recommendations for African countries to address the challenges faced by their financial markets. The study proceeds as follows. Section 2 analysis the literature on financial markets importance and characteristics, followed by the methodology and data description in Section 3. The results and discussion is presented in Section 4. Then after, the study then concludes with recommendations on enhancing financial markets in Africa in Section 5.

2. Literature Review

The relationship between financial markets development and the policies adopted by political administrations are closely correlated (Ferrara and Sattler, 2018). Ferrara and Sattler (2018) provide evidence that, performance of a political administration as a policymaker is evaluated through how financial asset prices respond to their policy choices and government activities. In Fundamental Analysis, political events, social events, economic announcements, government policy change and company earnings are important in the determination of prices of financial assets on daily basis (Bernhard and Leblang, 2006). Business confidence and market sentiments are products of the optimism created by the policies of political administration about future macroeconomic prospects, a key component of Fundamental Analysis. Newell (2019) highlights that, it is the expectations for a future positive economic growth that drives investors to commit their capital for future returns, creating demand which in turn push the value of financial assets up. Bad policy choices typically drives financial asset prices down, whilst inconsistent policies increase the volatility of asset prices causing uncertainties around the realization of the expected return.

In such an environment, investors prefer to commit their capital for short term periods for fear of losses and demand high interest rates in return. These policy choices have a direct implication on government's ability to raise capital through financial markets as well as debt servicing costs. On the other hand, the scepticism of investors in committing their funds on long-term capital expenditures to create jobs, supports household expenditure and generate economic profits, also have negative implications on unemployment, inflation and GDP (Ivashina and Lerner, 2019). Hence, it is political choices that have an ultimate influence on the behaviour of investors and performance of policies through policy. These studies show that, for political administrations, access to capital is essential for government to finance its budget and support its policy implementation plans. Thus, financial markets present an open opportunity for governments to widen their funding options available to finance infrastructure, fund budget deficit and support the private sector away from the traditional funding models such as multilateral borrowing. It is easy for the government and other reputable organisations to raise funds through financial markets at little cost (Hrnjic et al., 2019).

On the other hand, financial markets penalise governments and other institutions with track records of corruption scandals, lack of accountability and unstable strategic plans (Evans, 2019). For example, in 2017, South Africa's logistics government-owned enterprise, Transnet raised only R55 million far below its targeted R600 million during its failed bond auctions because investors were sceptical of the maladministration in state-owned enterprises under the country's former President Jacob Zuma (Mutize and Gossel, 2017). The success of any government policies is evaluated by the performance of the economy, a high economic growth signify a successful policy implementation (Karlsson and Tavassoli, 2019). The World Economic Forum (2018) report shows that the development of financial markets is significantly correlated to economic growth. A moderately liquid and efficient financial market is a key component in supporting a healthy economy. According to Fama (1976), without efficient financial markets, it is impossible to connect surplus capital to deficit units that needs investment capital. They are essential in the intermediation between borrowers and lenders as well as supporting institutions in the provision of goods and services.

3. Methodology and Data Description

This study applies a descriptive analysis, observing and describing the behavior of African financial markets data to reflect on their challenges and prospects. Some of the key data utilized was obtained from the Official Monetary and Financial Institutions Forum (OMFIF) report of 2017 and 2018, an independent think tank for central banking, economic policy and public investment. Another data source was International Centre for Tax and Development (ICTD) report (2019), United Nations Conference on Trade and Development (UNCTAD) report (2018), Bank for International Settlements (BIS) annual report (2017), Africa Financial Markets Initiative (AFMI) annual conference report (2018), The Africa Capital Market Watch reports (2017 & 2018), African Securities Exchange Association (ASEA) annual report (2017, 2018 & 2019) and Centre for Affordable Housing Finance in Africa (CAHFA) (2017). Stock exchange data was obtained from respective African stock exchanges websites to verify some of the data in think tanks' annual reports.

4. Results and Discussion

The study find that one of the key traditional challenge faced by African financial markets is lack of market depth, compared to other Latin America and Asian markets, due to their limited size and very low market capitalisation. It is found that, this is a key factor holding back the ability of investors to exploit expansion opportunities. Despite the positive developments registered in recent years, Africa's financial markets are still illiquid with thin turnover ratios of less than 1 per cent in approximately a quarter of the financial markets. Africa's financial markets share of the global equity turnover is less than 0.05 per cent (Official Monetary and Financial Institutions Forum (OMFIF), 2017). The major causes of liquidity challenges are; fewer number listed companies, thin secondary market trading and long settlement periods. Besides South Africa, the majority of African financial markets have less than 10 listed securities and trade for less than 3 days out of the normal 5 trading days per week. The Algiers Stock Exchange trades for only 1 day in a week, Uganda Securities Exchange trades for 2 days in a week, whilst the Dar es Salaam Stock Exchange and the Bourse Régionale des Valeurs Mobilières trades for 3 days in a week. Another finding is that, it is lack of liquidity that is discouraging companies and securities to list on African exchanges as the markets have no capacity to raise the capital they need.

Especially African mining companies that constantly need huge capital market liquidity support and often end up list on global exchanges. Of the 1 318 mining companies listed on Toronto Stock Exchange, 118 of them are African mining companies. In addition to the low liquidity, the high exchange listing fees, legal fees and other costs of making company trading information accessible to shareholders, together makes the listing exercise unviable. The structure of investors participating in financial markets also impedes trading activity as many of the financial instruments tend to be held by large institutions such as pension funds that buy-and-hold to maturity. Therefore, there are difficulties in supporting Africa's financial markets trading systems, perform market analysis and brokerage services as liquidity and trade volume is very low. This has created huge gaps between buy and sell orders, ultimately eroding public self-assurance within the integrity of African financial markets. Consequences also show that the gradual facts production has hampered efficiency, trading activity and turnover, rendering economic integration with worldwide markets hard as the majority of African monetary markets do not have relevant depository systems. Such bottlenecks have induced inactivity in secondary markets of credit rated securities. The following Table 1 shows the turnover data for active financial markets in Africa.

Table 1: African Financial Market Indicators

Country	Market capitalisation, % of GDP	Total turnover of equities, % of Market capitalisation	Total turnover in bond market, % Bonds outstanding	Total sovereign and corporate bonds outstanding, listed on exchanges, $Billion
South Africa	358	41	970	195
Egypt	11	54	23	39
Kenya	28	8	48	9
Tanzania	18	2	4	2
Morocco	57	9	1	55
Mozambique	9	0	4	0
Nigeria	13	4	0	16
Ivory Coast	35	4	4	5
Mauritius	80	4	0	6
Seychelles	10	2	-	0
Zambia	32	0	15	2
Botswana	269	1	5	1

Uganda	25	1	-	2
Ghana	32	1	7	12
Namibia	24	1	0	12
Rwanda	40	1	2	0
Ethiopia	-	-	-	-

Source: African Securities Exchanges Association, OMFIF analysis (2018)

This research observes that investment in infrastructure that support financial market development has not been prioritised in the majority of African countries. Evidence from government expenditure in other service sectors such as information communication technology infrastructure constitute more than 5% of national budgets, whilst the expenditure in financial development infrastructure in virtually non-existent. In an average financial market in Africa, trading, clearing and settlement systems takes more than 30 days to complete a single transaction. According to the findings in this study, approximately 25 percent of the exchanges still operate manual systems compared to real-time transactions in developed markets. For instance, Malawi Stock Exchange and the Zimbabwe Stock Exchange takes 7 days to settle transaction accounts and more than 30 days to deliver share certificates. Cameroon's Douala Stock Exchange and Bolsa de Valores de Mozambique do not have central depository systems to hold proof of security ownership in the form of certificates or any uncertificated form in order that ownership can be easily transferred through a book access instead of the transfer of bodily certificates. The study further observed another key challenge in African financial markets, poor regulatory controls on foreign investments.

Except South Africa, African countries score below standard on the Official Monetary and Financial Institutions Forum (2017)'s foreign exchange index, reflecting its excessive capital controls, low respectable change price reporting standards, loss of harmonised domestic exchange price, and non-liquid interbank forex marketplace. Besides, South Africa, Egypt Stock Exchange and Namibian Stock Exchange, regulations in the majority of African exchanges require that private traders be both residents or at the least citizens to satisfy the documentation required to purchase financial assets on an exchange. The restrictive legislation prohibiting private investors was put in place to prevent illicit capital flows, curb tax evasions and money laundering. This effectively means private investors are generally prohibited from investing in a securities exchange unless they are physically residing inside the country. Moreover, the offerings of a traditional brokerage is in about 20 exchanges which have not yet been digitised. Within suited dates and in suitable capitalization, constitute a key criterion for well-functioning financial markets. African governments fail to provide for such situations because of strict forex controls, restricting unfastened waft of capital in and out of their jurisdictions, making it difficult for investor to move their capital out after divesting.

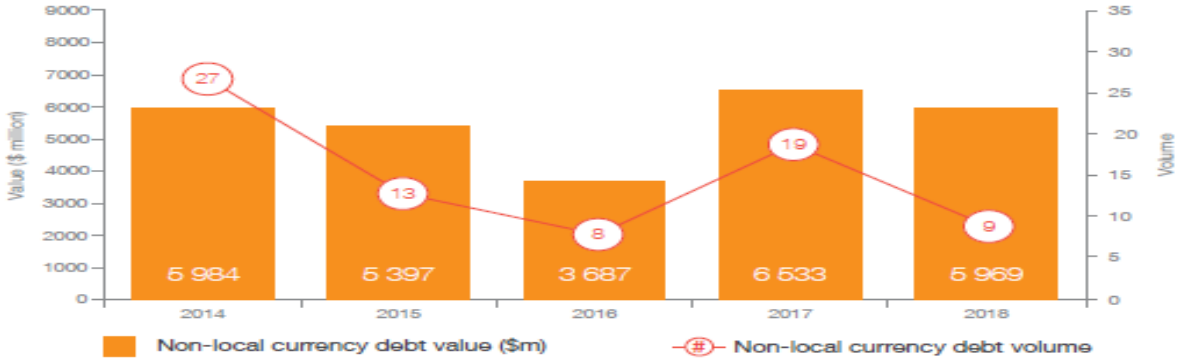
In line with the Global financial Fund (2018) economic Outlook report on Sub-Saharan Africa, the study find that a predicted 60 percent of the countries have controlled exchange rate policies. These policies do not allow their currencies to trade without much interference, rationing and blocking foreign currency repatriation of capital, causing great losses to foreign investors. There may be sluggish tempo within the adoption of global financial guidelines and reporting requirements which include worldwide financial reporting requirements and the Basel worldwide regulatory framework in African economic markets, has in addition stifling growth. International financial reporting requirements are supposed to enhance transparency and uniformity of financial statements among businesses across international locations. Another challenge to African financial markets is lack of transparency and availability of information published regularly and timely for the investment public to scrutinise. Relevant asset information is key to reducing screening costs and preventing adverse selection. Public availability of information on companies' audited financial statements, daily historical security prices, cautionary statements, in-depth analyst commentaries, company's business model, management and governance on exchanges' websites, public media and analyst statements is a desirable characteristic for efficient markets.

Besides the Egyptian, Johannesburg and Nigerian Exchanges, no African exchange neither operate an electronic security exchange system that convey real time security prices (Official Monetary and Financial Institutions Forum, 2017). With information asymmetries, brokers usually fail to execute orders and settle

transactions as it takes too long before an investor makes a buy or sell decision, exacerbating the lack of active market participants and illiquid market. A single financial market transaction in Africa incur the following costs; commissions, brokerage fees, state settlement costs, investor protection levy, Value Added Tax (VAT), Securities Transfer Tax, administration fees and Capital Gains Tax. Brokerages charges are often five times lower in London compared to African markets where brokerage fees are above 2.5% (Standard Bank Stockbrokers, 2019). In addition, the tax charges represent about 3 % of the transaction compared to less than 0.02% in other developed countries, a cost which buyers interpret as penalty for doing business in Africa. Rwanda, Mozambique, Seychelles and Egypt have the longest rebate intervals of more than 12 months, withholding tax of 15% on overseas buyers (which average 11% in 17 African countries). In addition, African countries have the highest market transaction-related taxes, because of a combination of low tax treaties and market incentives, excessive withholding, capital gains, other taxes. African markets are nevertheless in early levels of development and wishes a supportive tax environment which does no longer penalise economic marketplace transactions, alternatively ambitions to encourage them thru incentives and different fiscal measures. The size of bond market in each country is less than 10 per cent of country's GDP on average. The Africa Financial Markets Initiative (AFMI) annual coference report (2018) exhibit that the total outstanding amount of African bonds and bills rose to US$ 413 billion in 2017, 13 per cent higher the 2016, with bonds made up 70 per cent of the amount. The report further shows that a total of US$ 245 billion of treasury bonds and bills were issued in 2017, up 12 per cent compared to 2016. Of this, a total of US$ 196 billion (80 per cent) were financial instruments with term to maturity of less than 1 year.

On the bond markets, US$19 billion of financial instruments with terms of 1 to 5 years, US$ 12 billion of bonds with term 5 to10 years and US$ 18 billion of bonds longer than 10 years. This data proves that introducing new financial instruments is on an upward trend. However, the tenure of the instruments is too short to allow meaningful capital investments from the proceeds of issuances. In line with the Africa Capital Market Watch report (2018), results show that only 8 countries have financial markets with debt capitalization of above US$ 10 billion, whilst 19 countries have financial markets with debt capitalisation of below US$ 1 billion. This shows that the volume of trades and the size of African markets is very small but there is however a huge appetite for African, financial instruments. Figure 1 below show the volume and value of corporate debt sold by African companies in foreign currency.

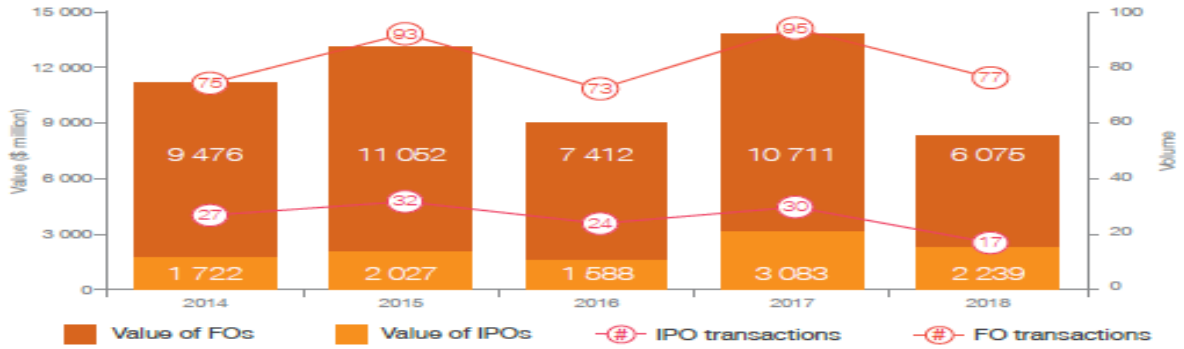
Figure 1: African Foreign Currency Corporate Debt Volume and Value



Source: Africa Capital Markets Report 2018

With significant positive stock market performance, Egyptian stock market has maintained its position as a best performer compared to other world markets since June 2013, according to Morgan Stanley, its cumulative stock index rising by 79 per cent in four years. Indicators of stock market development such as, number of listings, turnover ratio, total market capitalisation, capitalisation-to-GDP, volume of trading and value of trading. In 2018, Africa's largest stock exchanges, the JSE and NSE had some landmark transactions such as the US$ 819.3 million in May 2018 from the dual listing on local and international exchanges. Figure below shows the trend of stock market activity in new stock issues – Initial Public Offers (IPO) – as well as further offers (FO). The following Figure 2 shows the trend of stock market activity.

Figure 2: Trend of Stock Market Activity



Source: Africa Capital Markets Report 2018

5. Conclusion and Recommendations

Enhancing African capital markets is one of the goals of the African Union Agenda 2063 for as the continent seeks to take full responsibility for financing its development. This paper explores trends and challenges in the development of African financial markets over the past two decades using a descriptive research model on key data from international think tanks to observe the behaviour of financial markets data in African countries. The study finds that African financial markets still face the traditional challenge of lack of market depth relative to other regions in other continents due to their limit size and very low market capitalisation to exploit expansion opportunities. This study makes the following recommendations as part of the solution to challenges faced by African financial markets. There are a number of initiatives that continental bodies like the African Union, its governance and development monitoring organs such as the African Peer Review Mechanism (APRM) can play to enhancing the development of financial markets on the continent. Efficient financial markets is also one of the indicators in the four thematic areas of APRM's assessment of good economic governance and financial management transparency for promoting economic growth and reducing poverty. As part of supporting the implementation of Agenda 2063, the APRM should support African countries to enhance their financial markets development through the following ways.

Improve Liquidity: There is a fundamental immediate need for African countries to improve liquidity of financial markets to attract more companies and securities to list on exchanges. Companies and securities are not listing on African exchanges due lack of capacity in the exchanges to raise the capital they need and the high exchange listing fees, legal fees and other costs of making company trading information accessible to all shareholders makes the listing exercise unviable. To overcome this African countries should remove or lower barriers to entry for small firms to expand the pipeline of new listed companies by introducing an alternative secondary market for small and medium-sized enterprises, which can act as an 'incubator' for small companies with low capitalisation before they list on the main board. In addition to removing barriers, exchanges should lower transaction costs to become more attractive vehicles for raising capital and new investment. The focus should be on increasing small and medium-sized enterprises to access financial markets through implementing policies that encourage financial market growth as a vital means of deepening markets.

Digitization: It is one of the elemental factors underpinning the future global economic growth as the world prepares for the 4th Industrial Revolution (4IR). Enabling African countries to integrate into the global value chains by transforming economies through Science, Technology and Innovation (STI) is one of the goals in Agenda 2063. The use of digital technologies is changing a business models, providing new revenues and value-producing opportunities. The AU have to expand its system for supporting governments to be adopt new technology and building clear techniques that entail all of the advantages of a fourth commercial revolution. Following the trends in global financial markets, African governments should begin to invest in Block chain infrastructure (already implemented in the Australian and Canadian Exchanges) and support application of Distributed Ledger Technology (DLT) in financial markets trading (adopted by the Israel's Tel

Aviv Exchange), replacing the traditional settlement systems (Accenture Wealth Management Strategists, 2018). Digitization of African financial markets should be a matter of national priority as billions of transactions are taking place every second in the current investment world and traditional financial markets are unable to cope with the quantities and speed.

Regional Integration: To complement the continent's efforts towards economic integration by establishing Continental Financial Institutions, integration of national and regional financial markets is key to accelerate continental economic convergence and integration through in the mobilisation of resources and management of the African financial sector. Economic convergence begins with integration of financial markets with other national and regional exchanges. For small, illiquid and inefficient national exchanges dominated by either sovereign bonds or a few listings such as the Douala Stock Exchange with 2 active counters, the Bolsa de Valores de Cabo Verde with 4 counters and the Algiers Stock Exchange with 5 active counters, these financial markets need to integrate with one another to improve capitalisation and liquidity.

Improve Legislative Environment: There is need to improve the regulatory environment and do away with excessive capital controls. Governments should also support financial markets by providing enabling environment and tax incentives to encourage more listing. African financial markets need to attract more foreign capital, hence legislation should support foreign investors to invest in African financial markets to increasing liquidity in exchanges. Well-functioning financial markets requires strong legal institutions and a sound legal framework, investor protection, legal enforcement laws and good corporate governance as an enabling business environment to support growth. Central banks should also be given the institutional independence to effectively administer monetary policy and maintain the value of a country's currency whilst managing inflation the band. The institutional strength of the central bank determines its ability to manage the demands of foreign investors, balancing the need for foreign currency and domestic currency.

Adoption and Implementation of International Standards: To counter the perception that African financial markets are non-transparent, adopting international standards and best practices will be a key step towards promoting transparency and accountability. Continental governance and monitoring organ of The African Union, the African Peer Review Mechanism (APRM) can be instrumental in supporting countries towards universal adoption and implement of key international standards for best practices such as Basel III international regulatory framework and International Financial Accounting Standards (IFRS) as a requirement for all companies. These will address most of the challenges faced by African markets such as thin trading, low turnover ratios and lack of liquidity as efficient trading and settlement infrastructure allows quick completion of transactions. This will promote coherence, consistency and quality of information provided in financial reports, its usefulness and reliance of such reports to users.

Introduce Financial Literacy and Education: The World Bank's, Global Findex database (2018), shows the percentage of adults between 24 and 60 years old that has owes a loan and required to pay it back with interest. The highest, South Africans (86 percent), Kenya (79 percent), Niger (71 percent) and Botswana (69 percent), compared to worldwide average of 40 percent. The database shows that one in every five Africans that have borrowed are in arrears as they lack financial literacy to quantify the real cost of credit compared to their capacity to repay the principal plus interest, which is usually very expensive. Financial markets present opportunities for venture capitalists to access relatively cheaper capital than they would from both banks and informal moneylender. With well-implemented financial education initiatives, Africa has the capacity to address financial disintermediation and illegal capital flow, which could double the current financial markets capitalisation. The APRM as it have the mandate from the African Union to track progress and implementation of Agenda 2063 and UN Sustainable Development Goals, can also report on the status of financial education programmes developed in Africa and make recommendations for policy makers.

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Appendix

Table 1: Africa's Stock Markets Capitalisation

Economy	Exchange	Code	Founded	No. of Listings	2017 Capitalisation (US$ Billions)	2018 Capitalisation (US$ Billions)
Algeria	Algiers Stock Exchange	SGBV	1997	5	0.147	-
Botswana	Botswana Stock Exchange	BSE	1989	44	4.78	4.4
Cameroon	Douala Stock Exchange	DSX	2001	2	0.28	0.3
Cape Verde	Bolsa de Valores de Cabo Verde	BVC	2005	4	0.089	0.081
Benin						
Burkina Faso						
Côte d'Ivoire						
Guinea Bissau	Bourse Régionale des Valeurs Mobilières	BRVM	1998	44	10.5	11.7
Mali						
Niger						
Senegal						
Togo						
Egypt	Egyptian Exchange	EGX	1883	247	61.5	70.03
Ghana	Ghana Stock Exchange	GSE	1990	43	29.4	20.11
Kenya	Nairobi Securities Exchange	NSE	1954	65	20.6	25.57
Libya	Libyan Stock Market	LSM	2007	7	3.04	-
Malawi	Malawi Stock Exchange	MSE	1995	14	13	15.74
Mauritius	Stock Exchange of Mauritius	SEM	1988	95	8.5	8.66
Morocco	Casablanca Stock Exchange	Casa SE	1929	81	54.8	53.44
Mozambique	Bolsa de Valores de Mozambique	BVM	1999	3	1	-
Namibia	Namibia Stock Exchange	NSX	1992	40	136.9	148.48
Nigeria	Nigerian Stock Exchange	NSE	1960	223	114.2	116.4
Rwanda	Rwanda Stock Exchange	RSE	2008	8	1.9	1.93
Seychelles	Seychelles Securities Exchange (Trop-X)	SSE	2012	4	0.011	0.033
Sierra Leone	Sierra Leone Stock Exchange		2009	3		
Somalia	Somalia Stock Exchange		2012	-	-	-
South Africa	Johannesburg Stock Exchange	JSE	1887	402	970.5	1150.5
Sudan	Khartoum Stock Exchange	KSE	1994	54	1.8	2.1
Swaziland	Swaziland Stock Exchange	SSX	1990	10	-	-
Tanzania	Dar es Salaam Stock Exchange	DSE	1998	17	10.46	12.8
Tunisia	Bourse de Tunis	BVMT	1969	56	8.6	9.32
Uganda	Uganda Securities Exchange	USE	1997	17	8.3	9.49
Zambia	Lusaka Stock Exchange	LuSE	1994	23	10.2	-
Zimbabwe	Zimbabwe Stock Exchange	ZSE	1948	64	5.4	4.33

Source: ASEA Annual report (2017)

Journal of Economics and Behavioral Studies (JEBS)
Vol. 12, No. 1, February 2020 (ISSN 2220-6140)

Economic Growth and Unemployment Nexus: Okun's Two-Version Case for Nigeria, South Africa and United States of America

ONAKOYA, Adegbemi Babatunde[1], SEYINGBO, Adedotun Victor[2]
[1]Department of Economics, Babcock University Ilishan-Remo, Nigeria
[2]Department of Economics, Tai Solarin University of Education, Ijagun, Nigeria
onakoyaa@babcock.edu.ng, seyingboadedotun@yahoo.com

Abstract: Okun's law in its original form was predicated on the experience in the United States of America. Some methodological refinements have been added based on studies conducted in other climes with varied results. This research investigated the applicability of this law in Nigeria, South Africa and the United States of America. The study conducted a comparative analysis of three of the versions of the law. The research employed Ordinary Least Squares method having validated it's appropriateness with Dickey-Fuller and Philips-Perron tests. The result also showed that the dynamic version of the law was applicable in the three nations while the difference version was applicable only in Nigeria. This study also found that the dynamic version was superior to the difference version. Deployment of employment creative employment schemes, labour market reform and economic restructuring are recommended in the Nigerian case. The policy makers on South Africa and USA are enjoined to pursue both labour and growth-inducing policies.

Keywords: *Okun's Law, GDP growth, Unemployment rate, Difference version, Dynamic version*.

1. Introduction

The postulation of Arthur Melvin Okun (1939-1980) is part of the supply-side economics school of macroeconomic thought which contends that economic growth can be effectively engendered by lowering of production barriers. Okun's Law in effect refers to the inverse nexus between output and unemployment. The law in its original form states that a 2 per cent increase in output matches up to a 1per cent fall in the cyclical unemployment rate, 0.5 per cent increase in labour force involvement, 0.5 per cent rise in the number of hours worked per employee and 1 per cent increase in labour productivity that is, output per hours worked (Okun, 1962). For the economy to grow at a pace above its potential and therefore reduce the rate of unemployment, there must be a continuous rise in the both the size of the labour force and labour productivity. Critics of Okun's law points out that it is not based on any strong economic reasoning but only shows a statistical relationship based on the regression of unemployment and the growth of the economy. The coefficient adduced in the Okun's law is a rule of thumb, useful at best in forecasting for the purpose of policy formulation (Harris, 2001). In particular, the variations in the unemployment rates cannot be ascribed solely to the changes in the economic growth (Kwami, 2005). This is because there are other intermediary factors linking both variables. The degree of the applicability Okun's Law differs across countries. It also differs over the stages of a business cycle and over different time periods (Ball, 2017). Several versions of the law have been developed and deployed with varying results.

Indeed, the link between the growth of the economy and the level of unemployment have been modelled in a non-linear manner, contrary to the original linear postulation The Okun relationship has in addition to being different during the course of the business cycle, mutated over time and across nations. This makes it imperative for policymakers to have clear grasp of the direction and magnitude of these variations (Ball, 2017). The relationship between the two variables is reported stable, strong and constant (IMF, 2010), (Crespo-Cuaresma, 2003) and (Silvapulle, 2004). Some studies have also been carried out on the applicability of this study to the Nigerian case with conflicting results. Some indeed reported a stagflation situation (Jumah, 2007), (Njoku, 2011), (Sanusi, 2012) and (Amassoma, 2013). The lack of understanding of these nonlinearities and asymmetries in Okun's law can lead to forecasting errors and policy misdirection. The novelty of the study study therefore is the comparative investigation of the applicability of the law in three countries. Nigeria and South Africa are developing economies, and the USA, a developed country. In addition, two of the versions of the law (dynamic and difference versions) were conducted because the dynamic has been reported to be the more robust estimator (Knotek, 2007). The secondary question to be answered by this study is whether this is so in its countries of interest. The choice of the study period (1980-2010) provides an opportunity for a comprehensive assessment of the connection between employment and GDP.

2. Literature and Empirical Reviews

This section is in two parts: trend analysis of unemployment and economic growth of the countries of interest to this study and the review of related works across the globe. The law of demand for labour states that the number of employers required in the economy will vary with the level of productivity, demand for labour and variations in the price of the product. Across economic cycles of boom and depression, economic buoyancy and recession for almost 75 per cent of the life of Nigeria since attaining political independence in 1960. The next section is devoted to the review of relevant literature. The research methodology is discussed in section three followed by the analysis of results and discussions in the section four. In the concluding section, a brief summary of the study is presented together with some proffered recommendations. The supply law attributes employment factors such as the education, technology, the economic cycles, productivity level, profits desire and the intension of potential and actual workers to be gainfully employed (Dritsaki, 2009).

Trend Analysis of Unemployment and Economic Growth: An estimated 210 million unemployed people globally which is an increase of over 30 million since the start of the great recession of 2007 was recorded (Loungani, 2017). Unemployment as defined by the International Labour Organization (ILO) relates to the employable individuals actively by unsuccessfully seeking for jobs. They also include people who have voluntarily left work or have lost their jobs (Dwivedi, 2001). The insightful explanation for the causes of unemployment is predicated on the law of demand and supply for internal resources in the production process. Insight into the linkages between output and unemployment provided that unemployment could be decomposed into frictional, structural and cyclical elements for better understanding of Okun's Law (Geldenhuys, 2007). Whereas cyclical unemployment arises from deficiency in aggregate demand, imperfections in the microeconomic labour market and information asymmetry give rise to frictional and structural unemployment. Structural unemployment occurs as a result of advanced technology which replaces worker tasks with machines unless the workers are retrained. The unemployment trends for Nigeria, South Africa and USA depicted in Figure 1 showed that the patterns of the countries in the case study are different.

Figure 1: Unemployment Trends in Nigeria, South Africa and USA 1980 -2018

Source: Authors' compilation (2020)

The illustration in the rough shows that for Nigeria, the unemployment and real GDP are largely trended in the up with some significant drops in 1994 / 1995. The growth of the population can be held to be largely responsible for this. The country has experienced fundamental economic and indeed socio-political structural changes since its political independence in 1960. The relative growth of the economy due to crude oil boon in the greater parts of the 1970s had scant impact on the employment levels because the oil economy has been dominated by foreign oil corporations and interests. The level of integration of the oil sector and the rest of the economy is low. The results of wasteful expenditure in the public sector, in line with Dutch disease syndrome, caused employment dislocations and distorted policy planning (Fasanya, 2013).

The Structural Adjustment Programme (SAP) of 1986 and other reforms have yielded limited results. Unemployment which stood at 5.3 per cent in 1986 has risen to 23.1 per cent in the 2018 (National Bureau of Statistics, 2018). The average economic growth rate of 2.2 per cent during the study period lagged behind the average unemployment rate of 23 per cent. The report by the South African National Treasury (2018) is that unemployment rose from 9.2 per cent in 1980 to a peak of 29.4 per cent in 1984. It stood at 26.5 per cent in 2018 (Figure 1). Unemployment in South Africa, suffers from unmanaged structural unemployment as opposed to the cyclical unemployment in the USA due to reduced consumer demand country especially during the recession phase of the business cycle (Kamgnia, 2009). The post-apartheid years have not delivered the promised benefits of economic freedom for the majority of the population who had suffered from antiquated education during the apartheid years (Mosikari, 2013).

The average United States of America economic growth rate of 2.7 per cent during the study period lagged behind the average unemployment rate of 6.4 per cent. In the USA, the misery index which is the sum of the inflation and unemployment rates is used as an indicator of tough times. Figure 1 depicts a trend with the narrowest band of variation of unemployment amongst the three countries over the period under review. The problem is considered very severe in the United States being the epicentre of the economic recession. Indeed, Americans **living in poverty** rose by 30 per cent from 37.3 million in 2007 to 48.5 million in 2011 Indeed, the 2.9 per cent rate of growth was less than the 3.9 per cent rate of unemployment as of 2018 (World Development Indicators, 2018). Several studies have been conducted on the association between unemployment rate and the growth of GDP. The empirical evidence from across the world is presented in the next section.

Empirical Literature: Some of the earlier studies on this topic found little correlation between reduction in aggregate national outputs and the rise in unemployment during the countries' recessions suggesting that Okun's Law may indeed be exaggerated across countries ((Gordon, 1984), (Knoester, 1986), (Prachowny, 1993), (IMF, 2010) and (McKinsey, 2011)). An inverse linkage was recorded in a bi-variate component modelling of the law for United Kingdom and France (Stephan, 2012). The study which utilised quarterly data OECD data (1969:1 to 2011:2) is supportive of the real business cycle theory. The Middle Eastern economies came to similar conclusions (Soylu, 2018). Furthermore, a Scottish study shows that the strength of association between the growth of the economy and employment was due to the disparity in the rural and urban areas of the two economies (Revoredo-Giha, 2012). The worldwide economic recession between 2008 and 2009 provides ample opportunity for researchers to test the relevance of Okun's Law. Some other deviation from Okun's Law as reported by in the study of Germany was that the fall in the unemployment rate occurred more during recession (Burda, 2011).This marvel was explained by the reduction in the hours per worker as a result of government - sanctioned work sharing arrangement. The tradition of lifetime provision of employment in Japan was the explanation given for the weak link between unemployment and output growth. The study contended that the Okun Coefficient for the country may have risen but for the reluctance of firms to disengage workers.

Using the Generalised Method of Moments, the examination of the dynamic relationships subsisting between output growth and unemployment in Nigeria between 1970 and 2010 confirmed a non-linear and hump-shaped dynamic link (Sanusi, 2012). The connection was being positive at unemployment rates below the threshold of 5.5 per cent and become negative at higher unemployment rates (Adeyeye, 2017). The dynamic research which applied the same generalized method of moment's estimation reports an adverse impact of present and past GDP on the rate of employment in Nigeria between 1985 and 2015. The relationship estimate in the USA was about a 3 per cent output reduction for every 1 per cent rise in the unemployment rate (Prachowny, 1993). He contended that most of the change in a country's output apart from unemployment, was due to variables including the number of hours worked and the level of capacity utilization. When these other factors are held constant, variations in GDP plummets to about 0.7 per cent for every 1 per cent change in the unemployment rate. The study of the fitness of Okun's Law into short-run unemployment movements in twenty one advanced economies since 1980 recorded stable but strong connection in most countries, notwithstanding the various economic recessions (Kooros, 2006). This was contrary to the findings of the examination the linkage between variations in the output growth and unemployment rates based on USA labour market flows and utilising the difference version of the Okun's law. The net flows between unemployment rate and indeed rate of employment were reported.

To be sensitive to variations in output growth which responds differently to negative and positive shocks (Lim, 2019). In effect, the relationship espoused by Okun's law was stable but asymmetric. The impact of the variations was larger during periods of economic contraction than when it was expansionary. This position validated the findings of (Owyang, 2012) and (Cazes, 2013) where unemployment appeared to react less to economic growth before rather than after the onset of economic depression. The limitation of Okun's rule of the thumb especially during global financial crisis manifested in the puzzling paradoxical coexistence of relatively modest national output growth and the significant decline in the US unemployment rate between 2010 and 2011 (Bernanke, 2012). One possible explanation for the incongruence situation is statistical white noise arising from the use of GDP. An alternative measure of economic activity (gross domestic income) constructed from the same data source report different results. Another explanation is the likelihood that the unemployed has given up looking for work in which case the dip in the rate of unemployment would be exaggerating the improvement in the job market.

The modification of the Okun's Law, set within a vector autoregressive (VAR) framework and evaluated by means of impulse response analysis data from some African countries found that that 14 out of 29 countries show zero causal interaction (Jumah, 2007). Similar finding in Nigeria showed that unemployment rate between 1986 and 2010 has an insignificant influence on productivity in the short and long run (Amassoma, 2013). Contrary findings were reported on the affiliation between economic growth and the level of unemployment in Nigeria between 1985 and 2009 (Njoku, 2011). The result demonstrated that whereas the economy grew by about 56 per cent between 1991 and 2006, the unemployment level rose by about 75 per cent. Similar finding was reported reports the phenomena of 'jobless growth' in the Nigerian study spanning 1970 to 2009 (Adawo, 2012). Whereas the country's labour force grew at an average rate of 0.3% every year, the GDP growth rate at 1984 factor cost grew at 3.5% over a period of 33 years. In the same vein, the Okun's coefficient was studied in order to validate the law in some Asian countries using the annual time series data between 1980 and 2006 (Lal, 2010). In addition, the research employed the Error Correction Mechanism (ECM) evaluate the dynamics in the short run.

The Granger co integration technique to identify the long-run connection. The investigation concluded that Okun's law interpretation of the output-growth nexus may not be applicable in some Asian developing countries. However, given the myriads of factors shaping economic growth, relying on Okun's Law to make specific predictions about the level of unemployment given the growth trends of the economy appears difficult (Lal, 2010). Over time, the growth-unemployment nexus as observed by Okun changed but there was no consensus on the extent of co-trending among the unemployment rate and output (Huang, 2005). The relationship has also been reported to differ during a business cycle (Crespo-Cuaresma, 2003), over time (Sögner, 2002), and across countries (Silvapulle, 2004). Three main versions of the Okun's Law identified in the literature are the gap, the difference and the dynamic versions (Mielcová, 2011). This rule of thumb in the empirical study of the law by Okun has, together with the Phillips curve, been of interest to many economists not only because of their robustness, but also because both laws help to model the aggregate supply curves (Friedman, 1974). The key versions are presented in the next section in addition to other methodological matters of interest to this study.

3. Methodology

Versions of Okun's Law: The original empirical observation of Okun on the nexus between unemployment and economic growth, have attracted the formulation of several other versions. This was in a bid to apply the law in different times and climes. The application of regression analysis between unemployment and economic growth has resulted in contradictory coefficient values and indeed, causality due to the historical nature of the data inputs and the time periods used. The gap version also known as the level version asserts that when output is below full employment, the unemployment will exceed the natural rate. The stipulation of the gap version is that the potential GDP will fall by an additional 2% for every 1% rise in the rate of employment. This version is useful for illustrating the material costs of unemployment. The 'gap version' of the (Okun, 1962) examines the differences in actual and potential output. This is written as:

$$(\overline{Y} - Y)/\overline{Y} = c(u - \overline{u}), \quad (1)$$

Where: $\overline{Y}$ is potential GDP, Y is actual output, $\overline{u}$ is the natural rate of unemployment, u is actual unemployment rate and C is the factor relating change in unemployment to changes in output. The Difference version of the Okun's Law was formulated to address the problem of trending associated with the estimation of time series data (Prachowny, 1993). In clear terms, the difference version (equation 2) is the difference between output and potential output expressed as a percentage of potential output for a given economy. This is inversely proportional to the variance between the actual unemployment rate and the natural rate of unemployment. This version is a purely statistical and simple calculations method which can be directly calculated from the available empirical data without making any assumptions. The approach is to simply regress GDP growth over changes in unemployment rate. In clear terms, the difference version stipulates that the difference between output and potential output as a percentage of potential output for a given economy is negatively proportional to the difference between the rate of unemployment and the natural rate of unemployment (Prachowny, 1993). This version is depicted by equation (2):

$$(UM_t - UM_{t-1}) = \alpha + \beta(Y_t - Y_{t-1}) + \mu_t \quad (2)$$

This can also be rewritten as:

$$\Delta UM_t = \alpha + \beta \Delta Y_t + \mu_t \quad (3)$$

Where: ΔUM_t is the first difference of Unemployment (denoting changes in unemployment), ΔY_t is the first difference of GDP growth rate (denoting changes in economic growth) and μ_t is the error term. The dynamic version of Okun's Law ignores the temporal effects of output fluctuations. It relates the current change of the rate of unemployment to the current real output growth and past real output growth on the one hand, and past changes in the unemployment rate on the other (Knotek, 2007). The Dynamic version also addresses the problem of endogeneity bias because the inherent distributed lag specification reduces the simultaneous equation bias for the total effect of output on unemployment when output growth is positively auto-correlated (Sögner, 2002). This model is specified as equation (4).

$$\Delta UM_t = \beta_0 + \beta_1 Y_t + \beta_2 Y_{t-1} + \beta_3 Y_{t-2} + \beta_4 \Delta UM_{t-1} + \beta_5 \Delta UM_{t-2} + \mu_t \quad (4)$$

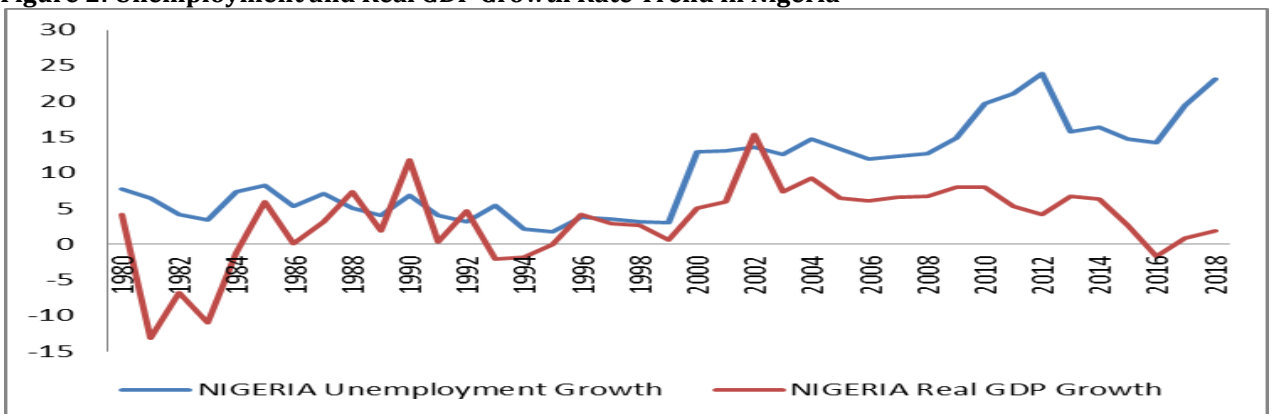
Where: Y and C are as defined in equation (1) and (2), ΔY and Δu is the change in actual output and actual unemployment respectively from one year to the next, k is the average annual growth rate of full-employment output and β is the coefficient. The dynamic version as deployed to developed nations like the USA is considered more robust than the other versions (Knotek, 2007). The salient question for this study is whether this position is true for Nigeria, South Africa and indeed, USA. The study therefore estimated the nexus between economic growth and unemployment rate using the difference and dynamic versions given their advancement over the basic gap version. The models to be estimated are as depicted in equations (3) and (4) in order to better assess the applicability of each of the methods. A comparative analysis of the results for the three countries is then conducted before inferences are drawn for policy advice.

Data Collection and Estimation Techniques: This research utilised time series data obtained from the (World Development Indicators, 2018) and the Central Bank of Nigeria Statistical Bulletin (various years). The study period spanned thirty – eight (38) years (1980-2018). The data on unemployment rate and GDP were also validated from the International Financial Statistics (International Monetary Fund). A two-step estimation procedure was deployed. The first stage is to check for the stationarity of the variables by utilising the Augmented Dickey-fuller (1979) and Phillips Perron unit root tests. The need for testing stationarity conditions of variables arose in order to avoid spurious regression results. Since all the variables were stationary at level, the Ordinary Least Squares (OLS) was deployed as the appropriate regression technique. The statistical software package, EViews 9 was used for the computations. The choice of the study period spanning thirty-eight year ended 2018 is borne out of the fact that the Nigerian government embarked on an economic structural adjustment programme (SAP) in 1986 which involved massive disinvestment of government ownership from some key economic sectors. This International Monetary Fund (IMF) inspired programme also involved the deregulation and liberalization which impacted the macroeconomic variables including employment. Sufficient time has elapsed since then for a comprehensive evaluation of this programme with respect to unemployment and economic growth.

4. Results and Discussion

Findings: The test for stationarity in the variables shows that the tendency of the regression being spurious is non-existent. Also, the result of the Johansen cointegration showed significant cointegrating relationship among the variables. The graphical depictions of the findings on comparison of unemployment and economic growth between 1980 and 2010 for Nigeria, South Africa and USA are presented in Figures 2, 3 and 4 respectively. The illustration in the rough shows that for Nigeria, the unemployment and real GDP are largely trended in the same direction which is contrary to Okun's Law. Please refer to Appendix 1 for the Schedule of employment and real GDP growth rates for Nigeria, South Africa and USA (1980 to 2018). The graphical illustrations are given in Figures 2, 3 and 4.

Figure 2: Unemployment and Real GDP Growth Rate Trend in Nigeria



Source: Authors' compilation (2020)

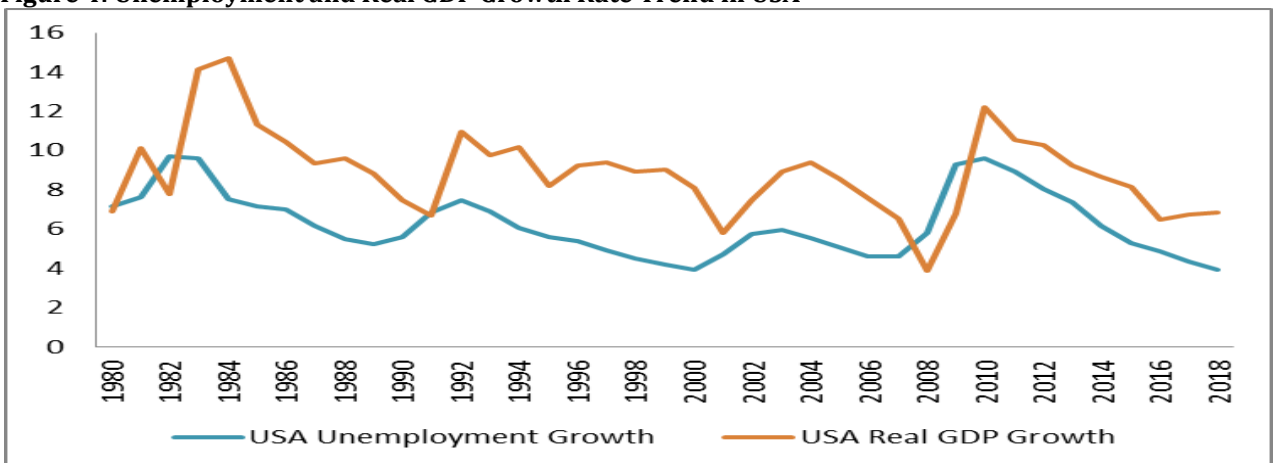
The South Africa case demonstrated conformity with the postulation of the Okun's Law as illustrated in Figure 3. Both variables are trended in the same direction and have continued on a rising spiral.

Figure 3: Unemployment and Real GDP Growth Rate Trend in South Africa

Source: Authors' compilation (2020)

Although the GDP growth rates exceeded those of unemployment, the trend in the United States of America also generally conforms to the Okun's law as shown in Figure 4.

Figure 4: Unemployment and Real GDP Growth Rate Trend in USA



Source: Authors' compilation (2020)

As shown in Table 1, all the series (both at Difference and levels) are stationary at 5% level of significance. This is expected, since differencing time series helps in addressing unit root. Unit root test was conducted on the Difference version of unemployment and growth rate as they take the form of variables (Equation 1). The implication of this result is that the tendency of the regression being spurious is non-existent.

Table 1: Unit Root Test Result

	ADF Test			Philips-Perron Test		
	ΔY	ΔUM	Y	ΔY	ΔUM	Y
Nigeria	I(0)	I(0)	I(0)	I(0)	I(0)	I(0)
South Africa	I(0)	I(0)	I(0)	I(0)	I(0)	I(0)
United States of America	I(0)	I(0)	I(0)	I(0)	I(0)	I(0)

Source: Author's computation

Applying the Difference version of the Okun's Law, Table 2 below reveals that the Okun law of Output-unemployment relationship does not hold weight in Nigeria. This is because the coefficient explaining the rate of change in unemployment as caused by a change in growth rate shows a positive sign as against the expected negative sign. The hypothesis however holds for the United States of America and South Africa as the coefficient in the Okun's Difference equation shows a positive sign (Table 2).

Table 2: Estimated Result using Difference Version of Okun's Law

Country	Okun's Coefficient (Difference Version)			
	Sign	Magnitude	t-statistic	P-value
Nigeria	Positive	0.0161	1.8125	0.0756
South Africa	Negative	0.0055	1.9255	0.0642
United States of America	Negative	0.0348	3.5291	0.0025

Source: Author's computation (2014)

With respect to the t-statistic, output growth rate is significant in determining unemployment as in the case of the United States. However, it is insignificant in the case of South Africa and Nigeria at 5% level of significance. A major concern in the dynamic model is the nexus between the current change in unemployment (ΔUM) and the current rate output growth (Y) (Knotek, 2007). To satisfy this submission in the analysis, the coefficient of Y (current rate of output growth) is solely used in discussing the dynamic

model version of the Okun's law. The result of the dynamic version shown in Table 3 shows consistency in the Okun's coefficient for Nigeria as this is a positive sign. However, the relationship between changes in unemployment and growth shows an expected negative sign for South Africa and the United States of America as earlier shown in the Difference version result.

Table 3: Estimated Result using Dynamic Version of Okun's Law

Country	Sign	Magnitude	T-Statistic	P-Value
Nigeria	Positive	0.0268	2.1003	0.0332
South Africa	Negative	0.0151	-2.2542	0.0346
United States of America	Negative	0.0632	-4.4422	0.0003

Source: Author's computation (2014)

The use of the dynamic version of the Okun's Law improved the result given the presence of consistency in the directional relationships between unemployment and growth as shown in (Table 4). In addition, to the consistency in sign, the problem of simultaneity bias (autocorrelation), which would have dampened the BLUE properties of the estimates, was well taken care of.

Table 4: Result of Breusch-Godfrey Serial Correlation Test

Country	Difference Model	Dynamic model
Nigeria	0.9451	0.2125
South Africa	0.0815	0.9643
United States of America	0.0254	0.2141

Note: LM test static p-value reported above
Source: Author's computation (2014)

To further buttress the efficiency and unbiasedness of the estimates, the regression was run in such a way that the stand errors and co-variances are white, i.e. heteroskedasticity is consistent, which implies that the assumption of equal variance of disturbances is fully accounted for in the two models used. The dynamic version further helps justify the significance of growth in determining changes in unemployment as shown for the three countries.

5. Discussion of Findings and Conclusion

The Output-Unemployment relationship of Law Okun was not applicable in the Nigerian case. This can be adduced to the dependency on crude oil for most of the foreign revenue. The sector has been responsible for about 10% of Gross Domestic Product and about 88% its foreign exchange earnings (Organization of the Petroleum Exporting Countries - OPEC, 2019). The oil prices and volumes are exogenously determined by OPEC and other international oil interests. The Nigerian result was however, contrary to the report of (Huang G. H., 2019) which confirmed the validity of the proposition of Okun by utilising the variations in oil prices and net crude export as exogenous instrumental variable for economic growth. The results of the Dynamic and Difference versions for Nigeria clearly showed that economic growth did not influence the unemployment levels during the research period. Indeed, whereas the rate of economic growth was 3.29 per cent on the average, the average unemployment rate during the study period was 23.1 per cent. These results have also support the similar findings of ((Arewa, 2012), (Bankole, 2013) and (Lal, 2010)) on Nigeria. The result of the Difference version for United States of America is negative. This connection in the case of USA is stable, strong and reliable of (Ball, 2017). The asymmetric weakening of the Okun relationship over the years since the 1980s has been reported over the years (Valadkhani, 2015). The results of the Dynamic versions for USA were also negative.

The investigated linkage between changes in the rate of unemployment and growth of USA output USA from the perspective of the labour market flows also manifested negative nexus (Lim, 2019). Specifically, the net flows between unemployment and employment were recorded to be sensitive to changes in output growth and reacted inversely to negative and positive changes in growth. The importance of market driven labour policies was also identified as being decisive in explaining the cross-country cyclical variances in the

aggregate Okun's coefficient obtained in USA, Japan, The United Kingdom and Switzerland (Goto, 2019). The results of the Difference and Dynamic versions conducted by this research with respect to South Africa were negative. Okun's law holds in this country. However, the findings in the literature are mixed. The study up held the findings of the relationship to be negative (Geldenhuys, 2007). The finding ran contrary to the findings that Okun's law is not applicable in South Africa (Moroke, 2014). This study found evidence of the superiority of the Dynamic version over the Difference version. Drawing lessons from the country's experience during the Structural Adjustment Programme era, there are no one-size-fits-all economic policies as we have always been made to believe. It therefore implies that most developing countries, especially in the African continent need home-grown economic policies, which can be adapted from successful development models in the developed countries.

Conclusion

This study investigates the relationship between unemployment rate and GDP for Nigeria, South Africa and the United States of America. The idea is to test the relationship for Nigeria but bench marked by the results for South Africa, an emerging country and the U.S.A., a developed country. Using the more robust dynamic version, the Okun hypothesis, shows that the negative nexus between unemployment and economic growth holds for Nigeria as well as for the other two benchmark countries. The difference version of the law, which expectedly holds for United States of America and surprisingly for South Africa did not apply to Nigeria. The parody in the Nigerian case is therefore manifest. The study found no evidence that the dynamic version of Okun's law is the more robust estimator than the difference version as posited by (Javeid, 2012). Stemming from these findings, on the whole, the world is indeed much more complicated for a simple causal interpretation of equations. Therefore, policy rules based on such simplistic model should possibly be viewed carefully. The base line recommendation however is that the government should take concrete steps to diversify the economy. The Nigeria's over-reliance on crude oil export for about 10% of GDP, 65% of government revenue and about 88% its foreign exchange earnings is undesirable. This exogenously controlled sector cannot engender sustainable economic growth and domestic employment. The Nigerian government is enjoined to introduce macro-economic stabilization policies, which aim at providing job creation opportunities. The policy makers of South Africa should continue the deployment of growth inducing policies. The United States of America should continue to device both growth and labour enhancing policies.

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