Moderating Effects of Institutional Quality on the Human Capital Development-Service Sector Output Nexus

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Abstract: This study examines moderating effects of institutional quality on the human capital development-service sector output nexus employing autoregressive distributed lag (ARDL) estimation technique based on annual time series in Nigeria from 1971-2019. Institutional variables used are bureaucratic quality, control of corruption and democratic accountability. Findings indicate that human capital development accentuates service sector output which is consistent with prevailing literature. Although all the measures of institutional quality were positively related with service sector output, the efficacy of control of corruption in accentuating sector output is than that of bureaucratic quality and democratic accountability. The insignificant effects in both short run and long run is suggestive of weak institutions that has not efficiently contribute to service sector output in Nigeria. This offers for policy support to improve the quality of existing institutions.

1. Introduction

The service sector has been identified as the sector with great potentials to drive sustainable growth. Beyond driving the productive performance of other sectors such as manufacturing, the service sector contributes to gross domestic product (GDP) and overall investment (Isu and Okpara, 2013; Ghani and O'Connell, 2014; UNCTAD, 2015; Khanna, *et al.* 2016). Ehigiator, (2017). alludes that the service sector enhances the innovative capacity of the industrial sector and growth potential of the economy enhanced by human capital development.

Given the importance of the service sector in the attainment of sustainable development, researchers are being focused on the effects of institutional quality on

human capital development and service sector output nexus. Although scholars, including Orji, *et al.* (2020), Aluko and Aluko, (2019) have been strongly linked human capital development with output growth, the service sector seems to perform better with quality institutions (Stern and James, 2018).

Institutional quality (bureaucratic quality, control of corruption, rule of law, democratic accountability) are given less attention in the human capital development and service sector performance. Arguably, quality institutions create conducive environment for human capital to thrive. Quality institution ensures rational distribution of health and educational services as well as infrastructure. Quality of institutions, which include not only the level of political institutions but also the administrative level, is relevant not only for achieving macro-level development objectives but also the provision of infrastructure and other public services. Participation of private enterprises in service provision and the introduction of public-private partnerships depend to a high degree on the institutional quality of a country (Ghani and Connell, 2014).

Nigeria country is characterized with slow human capital development and as a result the service sector have not contributed substantially to gross domestic product (GDP). The service sector contribution to GDP declined from 59.8 percent in 2016. It further declined to 55.8 percent, 52.1 percent and 49.7 percent in 2017, 2018 and 2019 respectively. Empirically, the effect of human development on output growth have been examined in some developing countries. Nevertheless, limited studies (Yushi and Borojo, 2018; Winful *et al* 2016; Bullow (2015) have examined the effect on institutional quality on service output. These studies have ignored the moderating effects of institutional quality on human capital development and service sector relationship, eventhough institutional quality may exacerbate this association. Going further, the objective of this study was to examine moderating effects of institutional quality on the human capital development-service sector output nexus. This study employs Nigeria data from 1971-2019. Institutional variables used are bureaucratic quality, control of corruption and democratic accountability. Our finding indicates that human capital development accentuates service sector output which is consistent with the prevailing literature. Although all the measures of institutional quality had positive effect on service sector, the efficacy of control of corruption in enhancing sector is than that of bureaucratic quality and democratic accountability. The insignificant coefficients in both short run and long run is suggestive of weak institutions that cannot efficiently accentuate service sector growth in Nigeria.

The remaining part of this paper is organized as follows. Section 2 provide literature review, followed by discussion on the methodology in Section 3. Empirical findings are presented in Section 4 while Section 5 is conclusion, policy implication and suggestions for future research.

2. Review of Literature

According to Iheonu, *et al.* (2017), the desire of West Africa to enhance the performance of the economy would be futile in the absence of improved institutions, most especially government effectiveness. Acemoglu, *et al.* (2014) contend that institutions, human capital plays a robust role in long run development. Ajmair, *et al.* (2016) evaluated the factors affecting services sector output growth using annual data from 1975 to 2014 and Autoregressive Distributed Lag (ARDL) method of estimation. Findings indicate that foreign trade, government expenditures, market size and population growth are the relevant determinants of service sector output growth in the long run. In the short run, service sector growth was influenced by foreign trade and personal remittances. Ali and Chaudry (2017) carried out a study in the service sector of Punjab, Pakistan and found that human capital exerts significant effect on career, job and life satisfaction of employees which are indicators of organization's performance. Olayemi (2012), examined the relationship between human capital investment and industrial productivity in Nigeria. The study employed co-integration and error correction mechanism and also granger causality estimation methods. Findings reveal that government expenditure on education exhibited a positive and long run relationship with the index of industrial production while government health expenditure and gross capital formation had long run negative relationship with industrial production. In a study on the impact of human capital development on the service sector performance and endogenous growth. In a related study, Chakraborty, *et al.* (2015) demonstrates that the steady growth rate of human capital accumulation has contributed to the growth of other sectors of the economy. As the productivity of human capital accumulation increases, productivity of the commodity sector increases and this spurs service sector growth, In a study on the impact of human capital development on output growth in Nigeria, Orji, *et al.* (2020) employed time series data from 1985-2018 and adopted the Autoregressive Distributed Lag (ARDL) model bounds test to ascertain the existence of long-run relationship between human capital development and output growth. The findings of this

study suggest that there exists a long-run relationship between human capital development and output growth in Nigeria.

Yushi and Borojo (2018). examine the impacts of quality of institutions on overall and intra-Africa trade covering 44 African countries and their 173 trade partners for the period, 2000-2014. Using Principal Component Analysis (PCA), the findings indicate that intra-Africa and overall Africa's trade is robustly determined by quality of institutions. In another study, Kaasa (2016) sought to ascertain how institutional quality and different dimensions of social capital affect a regions' labour productivity. The data set used for this study covered 80 regions of 24 European countries. Results disclose that institutional trust and civic participation are most important to enhance productivity this region. In a study, Bullow (2015) draws inferences on the effect of better government institutions on the performance of firms in developing and transition countries. It was indicated that institutions have a positive impact on firm productivity and growth Winful *et al* (2016) examined the relationship between institutional quality and stock market performance in 41 emerging countries for the time period of 1996 to 2011. It was found that institutional quality exerts positive and significant effect on stock market performance.

Yushi and Borojo (2018) examined the impact of institutional quality and infrastructure on overall and intra-African trade. The study was based on 44 African countries and their 173 trade partners with data covering 2000 to 2014. Empirical finding suggest that intra-Africa and overall African trade is robustly determined by quality of institution.

3.   Methodology

3.1. *Theoretical Framework*

This study is guided by the augmented Solow human-capital-growth framework proposed by Mankiw, Romer, and Weil (1992). The augmented Solow human-capital-growth theory is an improvement on the Solow growth theory. Mankiw, Romer, and Weil (1992) incorporated human capital into the original Solow growth theory. The inclusion of human capital is justified on the basis of non-homogeneity of labour in the production process either within a nation or across different economies as a result of educational attainment and skills. Adopting the Cobb-Douglas production function, the augmented Solow model can be specified as:

$$Y = AK^a (hL)^\beta \tag{1}$$

where Y is Output, K is physical stock of capital, h is human capital development, L is labour, A is total factor productivity, α denotes capital input elasticity with respect to output, β is labour input elasticity with respect to the output. Total factor productivity (A) is determined by investment on physical capital as depicted in equation (2).

$$A = (DINV) = DINV^{\theta}$$

where $DINV$ is domestic investment. For the purpose of this study, domestic investment is taken to be gross fixed capital formation (GFCF). Substituting equation (2) into (1) and denoting output (Y) as service sector output with capital stock (K) as gross domestic savings (GDS), human capital development (HKD) and labour (L) yields:

$$SSP = GFCF^{\varphi}GDS^{\alpha}(HKD^{\beta}) \tag{3}$$

Taking the logarithm of the variables, the expanded model of equation (3) after taking logs of is specified as:

$$ssp = \varphi gfcf + \alpha GDS + \beta HKD \tag{4}$$

where SSP is service sector ouput, φ, α, β measure the output elasticities of domestic investment, capital, human capital development and labour respectively. To account for the impact of institutions on the service sector output, it is assumed that the elasticity of service sector with respect to human capital development is influenced by institutional quality. Specifically, institutional quality augment capital productivity and influences the contribution of human capital development on service sector output. Taking the respective ratios and defining $y = \dfrac{Y}{AL}$ and $k = \dfrac{K}{AL}$ the technical relationship represented in equation (1) is written as:

$$y = k^{aT}$$

Equation (5) with a standard capital accumulation equation yields:

$$\ddot{k} = sk^{aT} - (\delta + n + g)k \tag{6}$$

where s is the savings rate and δ is the capital depreciation rate. In a balanced-growth path $\dfrac{\ddot{k}}{K} = 0$. This criterion enables solving equation (6) for the steady state level of capita as:

$$\ddot{k} = \left[\frac{s}{(\delta + n + g)} \right]^{\frac{1}{1-aT}} \tag{7}$$

Equation (7) denotes that institutions impact on the steady state level of capital and hence the steady state level of output. Ordinarily, better institutions increase the rate of return to capital accumulation and thus higher effective and output.

3.2. *Model specification and Estimation Procedure*

In line with the theoretical framework and following literature, the model for empirical estimation is specified in linear form as:

$$SSO = \zeta_0 + \zeta_1\, GFCF + \zeta_2\, HKF + \zeta_3\, BQ + \zeta_4\, CC + \zeta_5\, DACCNT \qquad (8)$$

where *SSO* is service sector output (measured by *GDP* of telecommunication, postal services and utilities), *GFCF* is gross fixed capital, *HKD* is human capital development (measured by human development index), *BQ* is bureaucratic quality, *CC* is control of corruption, *DACCNT* is democratic accountability

The estimation procedure is based on autoregressive distributed lag (ARDL) technique. ARDL is used to investigate time series data where variables attain stationarity at their differenced level and there is presence of cointegrating relations. Pesaran, Shin & Smith, (2001) stipulates that ARDL is a dynamic model that incorporates lagged value of the dependent variable as exogenous variable in determining the effect of the dependent variable. ARDL technique is implemented by conducting cointegration test through bounds testing and then estimate the long-run relationship of the model as reflected by the co-integrating analysis. This process also generates the error correction model and in the process the short-run dynamics is estimated. Using a two-variable model (ARDL 1, 1), the ARDL modelling technique can be illustrated as:

$$q_t = \alpha_0 + \beta_t q_{t-1} + \phi_0\, x_t + \phi_0\, x_{t-1} + \varepsilon_t \qquad (9)$$

where ε_t is error term. In the case of a linear relationship with explanatory variable, ARDL model is stated more concisely as:

$$q_t = \theta_i\, q_{t-p} + \Sigma_{J=0}^{M} \beta_j\, x_{t-M} + \varepsilon_t \qquad (10)$$

Taken the log of the variables, equation (8) is presented in an ARDL form as:

$$\Delta SSO = b_0 + \Sigma_{j=1}^{p} \phi_j SOS_{t-j} + \alpha_2\, gfcf + \alpha_5 HKD + \Sigma_{j=1}^{p} \phi_j SOS_{t-j} + \Sigma_{k=0}^{q} \lambda_k\, gfcf_{t-k} +$$

$$\Sigma_{m=0}^{q} \delta_m HKD_{t-m} + \Sigma_{j=0}^{r} b_1\, \Delta BQ_{t-j} + \Sigma_{k=0}^{S} b_2\, \Delta CC_{t-k} + \Sigma_{l=0}^{v} b_3\, \Delta DACCNT_{t-l} +$$

$$\Sigma_{m=0}^{m} b_4\, \Delta GDS_{t-m} + b_6 ECM2_{t-1} + e_{22}$$

$$(11)$$

where Δ is first difference operator, $ECM2_{t-1}$ is the error correction term.

The differenced terms in equation (11) represent the short-run variables while the lag terms indicate the long run process. The lower case variables are logged variables. μ_{1t} is the error term while a_i (i = 1, 2, 3, …5) and ϕ, λ, ρ, δ, and ψ are the long and short run parameters of the respective variables. The optimal lag length was determined using Akaike information selection criteria.

The data for this study are annual time series covering 1981-2019. The data were sourced from Central Bank of Nigeria (CBN) Statistical Bulletins, the African Development Bank. Table 1 present the descriptive summary statistics of the variables used for empirical estimation.

Table 1: Descriptive Summary Statistics of the Variables for empirical estimation

Variable	Mean	Standard Deviation	Minimum	Maximum
SSO	9943.512	14321.86	64.24217	46311.83
GFCF	351238	623152.8	8799.48	2442704
HKD	.5018072	0.143798	0.158445	.6450048
DACCNT	-.8453656	0.386097	-1.979178	-.3736738
CC	-1.317343	0.153135	-1.586598	-.9631907
BQ	3.880435	0.534284	3.57	4.76

Source: Authors' Computation

As indicated, the mean value for human capital development, democratic accountability, control of corruption and bureaucratic quality center around the standard deviation. The minimum values of democratic accountability and control of corruption are less than their respective mean but the minimum values of the rest of the variables are greater than their respective mean.

4. Results and Discussions

4.1. Pre Estimation Tests

As part of ARDL estimation, it is imperative to conduct unit root test on the variables as well as the long run relationship that exist between them. *A unit root is a feature of some stochastic process that can cause problems in statistical inference involving time series. Unit root process has a permanent impact on the mean in the presence of a shock. There are different methods of testing for a unit root. This study adopts the Augmented Dickey-Fuller (ADF) and*

Philips Perron (P-P) unit root test procedures. Thereafter, a test for the long-run relationship among the variables would be carried out. *Two sets of critical values were tabulated by* Pesaran, Shin and Smith (2001) with the assumption of I(1) and I(0)variables. There is, therefore, a band covering all possible classifications of the variables into I(1) and I(0). If the calculated F-statistics lies above the upper level of the band, the null hypothesis of non-existence of long-run relationship among the variables is rejected, implying that there is co-integration, otherwise the null hypothesis is rejected, meaning there is no cointegration.

4.2. *Unit Root Test*

The variables were tested for unit root using both the Augmented Dickey-Fuller and the Philips – Perron tests. The results are presented in Table 2.

Table 2: Unit Root Test Result

Variable	ADF Test Result		P–P Test Result			
	Level	1st Difference	Level	1st Difference	Lag order	~I(d)
DANCCT	-4.525*	-	-4.216*	-	2	I(0)
CC	-2.731	-3.446*	-2.823	-4.551*	2	I(1)
BQ	-7.323*	-	-4.934*	-	2	I(0)
HKD	-1.922	-5.852*	-3.413	5.522*	2	I(1)
SOO	-1.432	-1.708 *	-1.637	-2.638*		I(1)
GFCF	-1.437	-3.440*	-1.443	-5.914*	2	I(1)

Note: * denotes significance at 5% and the rejection of the null hypothesis of the presence of unit root. The optimal lag lengths were chosen according to Akaike's Final Prediction Error (FPE), and Akaike's information criteria. The ADF 5% critical value at levels is -3.560 and the 1st difference is -3.564, while the P–P critical value at levels is -3.552 and at 1st difference, on the other hand, is -3.556.

Source: Authors' Computation

As indicated in the unit root tests result, democratic accountability and bureaucratic quality are stationary at level, while the rest of the variables were not stationary at level. Since the variables exhibit of I(0) and I(1) series, the ARDL technique is suitable is this study. We proceeded further to conduct the Pesaran, *et al* (2001) Bounds test for the existence of level form relationship (cointegration) of the variables in equation. The result is presented in Table 3.

Table 3: Bounds Test Result for Long-run Relationship in the ARDL Model

Critical Values (0.1-0.01), F-statistic, Case 3

90%		95%		97.5%		99%	
I(0)	I(1)	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
2.26	3.35	2.62	3.79	2.96	4.18	3.41	4.68

Critical Values (0.1-0.01), t-statistic, Case 3

90%		95%		97.5%		99%	
I(0)	I(1)	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
-2.57	-3.86	-2.86	-4.19	-3.13	-4.46	-3.43	-4.79
K	5						
F = 3.812							
T = -4.550							

Source: Authors' computation

At the 5 per cent level, the F-value is greater than the upper bound critical values, an indication that the null hypothesis of no long-run relationship is rejected. This implication is that that there is a long-run relationship among the variables. In this regard, we specify the error correction model and the result presented in Table 5.

Table 5: Error Correction Estimates of the ARDL model

Variables	Service Sector Output
Long-run	
HKD	1.5174
	(t = 1.15) (p = 0.261)
GFCF	0.0373
	(t = 2.85) (p = 0.004)
BQ	0.0395
	(t = 0.43) (p = 0.694)
CC	0.8739
	(t = 2.20) (p = 0.038)
DACCNT	0.0204
	(t = 0.08) (p = 0.938)
Short run	
HKD	0.5409
	(t = 1.22) (p = 0.234)

Variables	Service Sector Output
GFCF	0.0092
	(t = 2.49) (p = 0.029)
BQ	0.0186
	(t = 0.97) (p = 0.403)
CC	0.0686
	(t = 0.86) (p = 0.453)
DACCNT	0.0301
	(t = 0.39) (p = 0.721)
Constant	2.8088
	(t = 0.57) (p = 0.607)
R-Squared	0.7894
F-statistics	10.40 (p = 0.0103)
Durbin-Watson statistic	1.8719
Breusch-Godfrey Statistics 1.076 (p = 0.7015)	

Source: Authors' computation

The result presented in Table 5 shows that human capital development accentuates service sector output both in the long run and short run. This is in tandem with earlier studies like Orji, *et al* (2020), Aluko and Aluko, (2019). Bureaucratic quality exhibited positive effect on sector output. Although not stat6istically significant at the 5 per cent level. If the bureaucratic quality improves by 1 percent, service sector output will increase by of 0.03 percent in the long run and 0.02 per cent in the short run. The index of corruption control shows positive coefficients of 0.87 with t-value of 2.20 in the long run and statistically significant at the 5 per cent level. Specifically, any improvement in the corruption control implies that service sector output will grow by 0.87 per cent. The short-run result portrays that corruption control had a positive impact on service sector output. If corruption control improves by a percentage, service sector output will improve by 0.07 percent.

Democratic accountability had a positive coefficient of 0.02, an indication that an improvement in democratic accountability leads to an increase in service sector output 0.02 per cent in the long run. Similar result was found in the short-run. The coefficient for democratic accountability is 0.030 with t-value of 0.39. This means that the null hypothesis that democratic accountability has no statistically significant impact on service sector output is accepted at the 5 per cent

5. Conclusion

In this paper, we examined the moderating effects of institutional quality on the human capital development-service output. The study used annual time series from Nigeria, spanning 48 years, 1971-2019. Based on ARDL technique, it was found that human capital development is central to service sector output. All the measures of institutional quality had positive and statistically insignificant effect on service sector output. Service sector growth is positively associated with the level of institutional quality. Therefore, promoting the quality of institutions will enhance service sector growth. The insignificant coefficients in the long and short-run demonstrate weak institutions, which cannot efficiently propel service sector growth in Nigeria. We find institutional control of corruption a key factor in accentuating service sector output.

In resume, weak institutions dampen service sector output growth, whereas strong institutions accentuate service sector growth in Nigeria. In terms of policy implications, we believe efforts at attaining sustainable development can be achieved by improvement in service sector which can be achieved through strengthening of institutions. This offers for some support to improve the quality of existing institutions.

This study has several limitations. First, it a specific country study. It may be worthwhile to extend the empirical analysis to other countries in Africa so as to gain more insights into how institutional quality can accentuate service sector output, especially for those countries with higher human capital development. Second, we used three indicators of institutional quality. Future studies may include more institutions such as governance, regulatory framework and enforcement.

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