



Human Capital Development, Productivity and Output Growth in the Nigerian Economy.

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ABSTRACT

This paper examined the relationship among human capital development, productivity and output growth in the Nigerian economy between 1981 and 2020, using secondary data. The specific objectives were to examine the inter-relationships and direction of causality among gross domestic product (GDP), human capital development (HCD), human capital productivity (HCP), foreign direct investment (FDI), life expectancy (LEXP), openness of trade (OPT) and infrastructural development (INFD). The techniques used to achieve the objectives of the study were Autoregressive Distributed Lag (ARDL) model and Pairwise Granger causality test. Based on the analysis of the model, there is long-run relationship among the variables employed. From the ARDL short-run estimation, human capital development (HCD), human capital productivity (HCP), life expectancy (LEXP) and openness of trade (OPT) have positive significant impacts on output growth (GDP), while infrastructural development (INFD) has negative significant impact on GDP and foreign direct investment (FDI) has positive insignificant impact on GDP. From ARDL long-run estimation, human capital development, foreign direct investment and life expectancy have long-run positive impacts on output growth. Human capital productivity, and openness of trade have positive insignificant impact on output growth while infrastructural development has negative insignificant impact on output growth. Unidirectional causality is established between human capital development and output growth which made HCD to granger caused GDP only while no causality is established between human

capital productivity and output growth. It is therefore recommended that appropriate policy should be made by the government to increase expenditure on infrastructure to boost output, and improve life expectancy of Nigerians especially the labour force to upgrade human capital productivity in order to enhance Nigerian economy.

KEYWORDS: Human capital development, Productivity, Output Growth, Autoregressive Distributed Lag (ARDL) model, Granger Causality.

I. INTRODUCTION

Human capital is a vital economic concept for driving growth and development, being observed to increase productivity and its profitability. The more a company invests in its employees in terms of education, training and retraining, the more effective and productive it could be (Kenton, 2019). Human capital is useful, enhancing the economic growth of any emerging nation since it represents the manpower who accumulates capital, exploits natural resources, builds social, economic and political organization and improves national growth. A country which cannot develop the skills and knowledge of its people and to utilize them effectively in the national economy will lag behind in term of development (Awe and Olufemi, 2019). Human capital being crucial represents the abilities and skills of human resources in a country while human capital development is the process of acquiring and increasing the number of manpower, having the skills, education, experience and ability critical for



economic growth (Egibiremolen and Anaduaka, 2014).

Human capital development, being the process of acquiring mandatory knowledge, skills and experiences for improving employees' performances, capabilities and resources which cannot be underestimated in growing the economy for driving sustainable national developments. The prize of human capital development in economic growth cannot be underestimated as human capital development is a key prerequisite for a country's socio-economic and political transformation (Adedeji and Bamidele, 2003). Human capital development is seen as a basis for helping employees to develop their personal and organizational skills, knowledge and ability. The essence of human capital development is to train workers to be relevant in their places of work for personal and organizational relevance, and this can be influenced in one way or another (Healthfield, 2011; Mamuli, 2020).

1.2 Statement of the Problem

Many researches have been carried out by some outstanding researchers across the world especially in Nigeria with majority who focused on the relationship between human capital and economic growth without considering the impact of productivity as a variable in the relationship. Anyway, it is important to investigate the relationship between human capital development and economic growth which must include productivity. In emerging economy especially in Nigeria, can we say vividly that human productivity relating with the performances of labour commensurate with the human capital development and its investment? But according to Teixeira and Fortuna (2003), is labour work reasonably important to enable a country reap the benefits of its innovation indigenous efforts?

According to the OECD, individual human capital and human capital on the economy can be the yardsticks for assessing economy growth. Can Nigeria educational standards have enough weight to enhance the skills of individual workers and the aggregate human capital of her economy?

Ali, Egbetokun and Memon (2016) in Awe and Olufemi (2019) indicated that the results of human capital and growth regressions depend on the specification and that the additional channels related to human capital should be included in the empirical analysis. Therefore, this study went ahead to examine the significant of productivity as a variable in the relationship between human capital and economic growth.

1.3 Objectives of the Study

The main objective of the study is to examine the impacts of human capital development and productivity on output growth in Nigeria. The specific objectives are to; examine the relationship among the variables and to verify the direction of causality among the variables within the span of 40 years (1981-2020).

II. EMPIRICAL AND THEORETICAL REVIEW

2.1 Empirical Literature

Alade, MBA, Aduku and Ameh (2021) examined the impact of terrorism on economic growth and human capital development in Nigeria from 1981 to 2019, using the generalized method of moment (GMM) estimation. The findings showed that there was a negative and insignificant impact of terrorism on economic growth and human capital development. And that internal and external conflict had a negative and insignificant impact on economic growth and human capital development. Government expenditure had a negative and insignificant impact on economic growth and human capital development. Domestic investment had a positive and significant impact on economic growth, while its impact on human capital development was positive and insignificant.

Dudjo-Yen (2020) examined the contribution of human capital on economic growth in Cameroon, using a multi-equation model on time series data spanning over a period of 36 years (1980 – 2015). The findings showed that the results are quite diverse as the literacy shows a negative and significant impact at a point of 5% while health shows a positive and non-significant impact. The GDP per head remains ambiguous and contradictory when going from one equation to another. Therefore, the impact of social factors (literacy and health) is conditioned by political, economic and social stability.

Popoola, Alege, Gershon and Asaley (2019) examined the short and long-run causality as well as long-run behavior of human capital channels on productivity within the period of 1980 and 2017 in Nigeria. The findings showed that the joint short and long-run causality resulted in no long-run while there was short-run causality in the short-run. For the long-run equation, primary school enrolment and secondary school enrolment have insignificant effect on education and have a positive effect on productivity growth. Thus, human capital formation through education and investment in research and development have not promoted productivity in Nigeria.



Akinsokeji and Akinlo (2019) investigated the relationship that exists between human capital and economic growth in Nigeria for the period of 1986 and 2015, using the error correction model for the analysis. The study found a long-run relationship between economic growth and human capital though the cointegration test. Trade openness and physical capital have a negative impact on economic growth. Manufacturing and interest rate have positive significant impacts on economic growth. The study also found that human capital does not significantly enhance economic growth, and this calls for the total restructuring of the educational system and provision of complementary resources to enable the workforce to contribute positively to economic growth.

Akaakohol and Ijirshar (2018) in their paper examined the impact of human capital development on economic growth in Nigeria between 1981 and 2015, using Augmented Dickey-fuller test, Johansen cointegration test, Error Correction test and impulse response as well as variance decomposition for the analysis. The study showed that there was a bidirectional relationship between economic growth and government expenditure on health and between economic growth and government expenditure on education at 5% level of significance. The study also found that there is long-run positive relationship between human capital development and economic growth in Nigeria.

Odonkor, Asiedu-Nketiah, Brown and Miah (2018) in their study investigated the impact of human capital development on economic growth in West Africa, especially Ghana over a period of 40 years. The researchers applied Ordinary Least Square (OLS) regression analysis for the study and found out that human capital whether it is developed or under-developed has a tremendous impact on the growth of an economy both in the short and long-run.

Kanayo (2017) employed Error Correction Model (ECM) to examine the impact of human capital formation on economic growth in Nigeria and his findings showed that investment in human capital in the form of education and capacity building at the Primary, Secondary levels has significant impact on economic growth, while capital expenditure on education showed insignificant impact on the growth. Then, it was recommended that the educational institutions in Nigeria should be restructured for quality education at the primary, secondary and tertiary levels.

Yilmazer and Cinar (2015) carried out a research on Human capabilities and economic

growth. A comparative human capability index was used to analyze the relationship between human capital and economic growth. The work examined the determinants of human capabilities (new human capital index), using a panel cointegration technique which supported a long-run positive significant relationship between human capital and economic growth in both developed and developing countries. However, the results revealed that human capital is more effective in developed countries than in developing countries. Then, they concluded that both physical and human capital accumulation have been the overriding concerns in the development of advanced technologies and sustainable growth in developed countries.

Egbiremelo and Anaduaka (2014) investigated the impact of human capital development on national output. They employed Augmented Solow Human-capital Growth model and the results showed that human capital development exhibited significant positive impact on output level in Nigeria and that there is inelastic relationship between human capital development and output level.

2.2 Theoretical Literature

Becker and Schultz theory of human capital believed that human capital was like any other form of capital which is meant to improve the quality and level of production. This would require an investment in the education, training and to enhance the benefits of an organization's employees. Schultz (1961) emphasized that investment in human capital was the first proponent of theory, where he stated that people could acquire useful skills and knowledge, but it is not obvious that these skills and knowledge are a form of capital. However, this capital is in substantial part, that is, a product of deliberate investment. Becker (1964) believed that human capital could be determined by education, training, medical treatment and is effectively a means of production. And, an increase in human capital could explain the discrepancy of income for graduates. From these philosophers, human capital is so important for influencing rates of economic growth.

In the Romer model, it is discovered that new knowledge is needed in the production process in three ways. A new design is used in the intermediate goods sector for the production of new intermediate input. Labour, human capital and available producer are necessary for producing the final product in the final sector. And that a new design increases the total stock of knowledge which



increases the productivity of human capital employed in the research sector (Romer, 1990).

Lucas model was based on endogenous growth model on investment in human capital. He assumes that investment on education can lead to the production of human capital which is an important determinant in the growth process. He distinguished between the internal effects of human capital where the individual worker, undergoing training becomes more productive, and external effects which spillover and increase the productivity of capital and of other workers in the economy. He believed that investment in human capital rather than physical capital have spillover effects for increasing the level of technology (Lucas, 1988). The model is specified as follows:

$$Y = AK^\alpha (\mu H)^{1-\alpha} H_A^Y$$

Where; Y = Level of output

A = Level of technology

K = Stock of physical capital

μ = Fraction of labour time allocated to production

H = Stock of human capital

H_A = Average human capital of all individuals

γ = Parameter representing magnitude of the external effect of human capital.

α = Capital elasticity of output

III. METHODOLOGY

3.1 Model Specification

The model for this study is a modified versions of Lucas (1988), Awe and Olufemi (2019) where productivity as a variable is inclusive. $GDP=f(HCD, HCP, FDI, LEXP, OPT, INF D)$ equ 1

Where;

GDP= Output growth proxied by Gross domestic product

HCD= Human capital development proxied by total school enrolments.

HCP= Human capital productivity proxied by Manufacturing value added (% of GDP)

FDI= Foreign direct investment

LEXP= Life expectancy

OPT= Openness of trade

INF D= Infrastructure development

IV. RESULTS AND INTERPRETATION

Table 1: Descriptive Statistic for the Variables

	FDI	GDP	HCD	HCP	INF D	LEXP	OPT
Mean	2.51E+09	1.98E+11	117.5905	14.35260	122.0103	48.30625	32.08125
Median	1.61E+09	1.01E+11	123.3550	13.92900	91.28000	46.47000	33.87000
Maximum	8.84E+09	5.68E+11	150.3300	21.09800	287.1600	54.81000	53.28000
Minimum	1.89E+08	2.78E+10	46.78000	6.553000	58.55000	44.92000	9.140000
Std. Dev.	2.57E+09	1.73E+11	23.74678	5.088111	66.54877	3.107886	12.35245
Skewness	1.168304	0.711487	-0.912103	-0.045300	0.824930	0.844376	-0.332510
Kurtosis	3.154613	1.940971	3.357754	1.386866	2.275383	2.195874	2.236099
Jarque-Bera	9.139409	5.243999	5.759528	4.350683	5.411850	5.830840	1.709659
Probability	0.010361	0.072657	0.056148	0.113569	0.066809	0.054181	0.425356
Sum	1.00E+11	7.93E+12	4703.620	574.1040	4880.410	1932.250	1283.250
Sum Sq. Dev.	2.57E+20	1.16E+24	21992.47	1009.666	172720.8	376.6993	5950.739
Observations	40	40	40	40	40	40	40

Source: Authors' computation, 2020.

The Table 1 shows the summary of descriptive statistics for the study where the mean ranged from 14.35260 (HCP) to 1.98E+11 (GDP). The standard deviation of all the variables is of positive variability. The skewness indicated negative values for HCD (-0.912103), HCP (-0.045300) and OPT (-0.332510) while FDI, GDP, INF D and LEXP have positive values of 1.168304, 0.711487, 0.824930, and 0.844376 respectively.

From the skewness, only GDP, INF D, and LEXP mirrored normal distribution. The kurtosis statistics showed that it is only FDI (3.154613) and HCP (3.357754) that have normal distribution. The Jarque-Bera statistics probability showed that only GDP (0.072657), HCP (0.113569), INF D (0.066809) and OPT (0.425356) are normally distributed as their p-values are greater than 5% significance level.



Table 2: Lag order selection criteria

Lag Order Selection Criteria						
Endogenous variables: GDP HCD HCP FDI LEXP TOP INFD						
Exogenous variables: C						
Sample: 1981 2020						
Included observations: 39						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-2584.215	NA	1.21e+49	132.8828	133.1814	132.9899
1	-2374.956	332.6676*	3.40e+45*	124.6644*	127.0531*	125.5215*

Source: Authors' computation, 2020.

Table 2 shows the lag order selection to determine the best lag to be used for the distribution. All the lag criteria such as Akaike information criterion (AIC), Schwarz information criterion (SC)

and Hannan-Quinn information criterion (HQ) have the same level of lag which is one (1) but the researchers preferred to make use of Akaike information criterion (AIC) in the study.

Table 3: Augmented Dickey-fuller (ADF) Unit Root Test (Trend and intercept)

VARIABLE	At level [I(0)]		At 1 st difference [I(1)]		I(d)
	Stat	5% C.V	Stat	5% C.V	
GDP	-2.435668	-3.533083	-4.083614	-3.533083	I(1)
HCD	-3.494773	-3.529758	-6.212876	-3.536601	I(1)
HCP	-0.920241	-3.529758	-7.365249	-3.533083	I(1)
FDI	-1.570634	-3.529758	-7.303588	-3.533083	I(1)
LEXP	-0.547878	-3.529758	-7.030781	-3.533083	I(1)
TOP	-2.219071	-3.529758	-7.547619	-3.533083	I(1)
INFD	-2.315759	-3.533083	-9.858498	-3.533083	I(1)

Source: Authors' Computation.

Table 3 shows Augmented Dickey-fuller (ADF) unit root test and from the table, all the variables such as output growth (GDP), human capital development (HCD), human capital productivity (HCP), foreign direct investment (FDI), life expectancy (LEXP), openness of trade (OPT),

and infrastructural development (INFD) are stationary at 1st difference. As a result, Augmented Distributed Lag (ARDL) cointegration model was used to examine the relationship between the dependent variable and independent variables.

Table 4: Philip-Peron (PP) Unit Root Test (Trend and intercept)

VARIABLE	At level [I(0)]		At 1 st difference [I(1)]		I(d)
	Stat	5% C.V	Stat	5% C.V	
GDP	-2.326034	-3.529758	-4.106519	-3.533083	I(1)
HCD	-3.438922	-3.529758	-8.512049	-3.533083	I(1)
HCP	-0.660136	-3.529758	-7.375964	-3.533083	I(1)
FDI	-1.458472	-3.529758	-7.303728	-3.533083	I(1)
LEXP	-0.492799	-3.529758	-7.062353	-3.533083	I(1)
TOP	-2.107016	-3.529758	-7.592198	-3.533083	I(1)
INFD	-3.378794	-3.529758	-9.787044	-3.533083	I(1)

Source: Authors' computation, 2020.

The Table 4 exhibits the Philip-peron (PP) Unit root test with trend and intercept. From this unit root test, all the variables such as economic growth (GDP), human capital development (HCD), human capital

productivity (HCP), foreign direct investment (FDI), life expectancy (LEXP), openness of trade (OPT), and infrastructural development (INFD) are stationary at 1st difference. As a result, Augmented



Distributed Lag (ARDL) cointegration model would be used to examine the relationship between the dependent variable and independent variables.

Based on the information on Tables 3 and 4, both ADF and PP showed the same level of stationarity.

Table 5: ARDL cointegration

Ho: No long-run relationship exists

T-STAT	VALUE	K
F-STAT	7.645249	6
CRITICAL VALUE BOUNDS		
LEVEL OF SIGNIFICANCE	I(0) BOUND	I(1) BOUND
10%	1.99	2.94
5%	2.27	3.28
2.5%	2.55	3.61
1%	2.88	3.99

Source: Authors' computation, 2020.

Table 5 displays the results arrived at from Autoregressive Distributed Lag (ARDL) cointegration. From the table, the value of f-statistic is 7.645249 and the value of K is 6. The critical values for upper bound are 2.94, 3.28, 3.61, and 3.99 for 10%, 5%, 2.5% and 1% levels of significance respectively. Based on the information,

f-statistic value (7.645249) is greater than any of the values of upper bound at all levels of significance. Therefore, the null hypothesis (H_0) for the study is rejected and accept H_1 which means there is long-run relationship among the variables employed in the study.

Table 6: ARDL short-run and long-run estimation results

VARIABLE	SHORT-RUN			
	COEF	STD.ERROR	t-STAT	P-VALUE
GDP	5.64E+08	2.46E+08	0.000000	0.0000
D(HCD)	3.33E+09	2.26E+09	0.000000	0.0000
D(HCP)	1.015581	4.455118	0.227958	0.8213
D(LEXP)	1.98E+10	6.32E+09	0.000000	0.0000
D(OPT)	1.67E+09	5.17E+08	0.000000	0.0000
D(INFD)	-2.32E+08	1.60E+08	0.000000	0.0000
CointEq(-1)	-0.259043	0.029626	-8.743712	0.0000
VARIABLE	LONG-RUN			
	COEF	STD-ERROR	t-STAT	P-VALUE
GDP	3.72E+09	1.78E+09	2.087117	0.0461
HCD	1.29E+10	9.66E+09	1.331065	0.1939
HCP	46.37234	17.24636	2.688819	0.0119
LEXP	7.64E+10	1.89E+10	4.049550	0.0004
OPT	6.44E+09	3.66E+09	1.760634	0.0892
INFD	-1.90E+09	1.05E+09	-1.797334	0.0831
R-squared = 0.986479 Prob(F-stat) = 0.000000				

Source: Authors' computation, 2020.

Table 6 showed the ARDL short-run and long-run estimated results. With regards to the short-run relationship, the results indicated that human capital development (HCD), human capital productivity (HCP), life expectancy (LEXP), and openness of trade (OPT) exhibited positive significant short-run impact on the economic growth

(GDP), while infrastructural development (INFD) shows negative significant impact on GDP and foreign direct investment (FDI) had insignificant impact on economic growth in Nigeria within the time series used.

In the long-run, human capital development (HCD), foreign direct investment



(FDI) and life expectancy (LEXP) are statistically significant, having positive significant impacts on economic growth (GDP), while human capital productivity (HCP), openness of trade (OPT) and infrastructural development (INFD) are statistically insignificant and have insignificant long-run impacts on economic growth (GDP). Then, the error correction term showed negative coefficient (-

0.259043) and p-value (0.0000), meaning there is long-run causality between the dependent variable and independent variables. The cointegration equation, having coefficient of -0.259043 indicates that as the independent variables are reducing, the dependent variable tends to decrease and that the previous year error will be corrected at the current year with an adjustment speed of 25.9%.

Table 7: Breusch-Godfrey Serial Correlation LM Test

H0: No serial correlation

F-statistic	2.246672	Prob F(3,29)	0.1040
Obs*R-squared	7.354798	Prob. Chi-sqaure (3)	0.0614

Source: Authors' computation, 2020.

Table 7 shows that the value of the f-statistic is 2.246672, the probability f-value is 0.1040 the probability chi-square value is 0.0614. The focus is the value of probability Chi-square which is greater than 5% level of significance. As a

result, the null hypothesis of serial correlation is accepted. Thus, the model can be trusted for making conclusions and valid for policy recommendations.

Table 8: Heteroskedasticity Breusch-Godfrey Test:

H0: There is no heteroskedasticity in the model.

F-statistic	1.469366	Prob F(10, 28)	0.2028
Obs*R-squared	13.42243	Prob. Chi-sqaure (10)	0.2010
Scaled explained SS	7.342630	Prob. Chi-sqaure (10)	0.6928

Source: Authors' computation, 2020.

Table 8 shows that the value of f-statistic is 1.469366, the observed R-squared value is 13.42243, the probability f-value is 0.2028 and the probability Chi-square value is 0.2010. Thus, the value of probability Chi-square is greater than 5% level of significance. Based on this fact, the null

hypothesis of no existence of heteroskedasticity is accepted and reject H1, meaning that the model is homoskedastic. Therefore, the result is valid and the model can be accepted for making valid policy for recommendations.

Table 9: Granger causality

Pairwise Granger Causality Test				
Sample: 1981 – 2020				
Lags: 1				
Null Hypothesis	Obs.	F-stat	P-value	Remarks
GDP does not Granger Cause FDI	39	0.07297	0.7886	Unicausality
FDI does not Granger Cause GDP		13.3475	0.0008	
HCD does not Granger Cause FDI	39	0.05014	0.8241	No causality
HCD does not Granger Cause HCD		0.89544	0.3503	
HCP does not Granger Cause FDI	39	4.30591	0.0452	Unicausality
FDI does not Granger Cause HCD		1.09914	0.3014	
INFD does not Granger Cause FDI	39	0.18778	0.6674	No causality
FDI does not Granger Cause INFD		2.26808	0.1408	
LEXP does not Granger Cause FDI	39	0.03785	0.8468	No causality
FDI does not Granger Cause LEXP		2.36605	0.1327	
OPT does not Granger Cause FDI	39	0.94517	0.3374	No causality
FDI does not Granger Cause OPT		0.02486	0.8756	
HCD does not Granger Cause GDP	39	7.05139	0.0117	Unicausality



GDP does not Granger Cause HCD		0.29668	0.5893	
HCP does not Granger Cause GDP	39	21.6150	4.E-05	No causality
GDP does not Granger Cause HCD		1.12611	0.2957	
INFD does not Granger Cause GDP	39	7.03763	0.0118	Bicausality
GDP does not Granger Cause INFD		10.1046	0.0030	
LEXP does not Granger Cause GDP	39	1.86501	0.1805	Unicausality
GDP does not Granger Cause LEXP		4.02086	0.0525	
OPT does not Granger Cause GDP	39	7.95975	0.0077	Unicausality
GDP does not Granger Cause OPT		1.15397	0.2899	
HCP does not Granger Cause HCD	39	1.87725	0.1791	No causality
HCD does not Granger Cause HCP		0.68977	0.4117	
INFD does not Granger Cause HCD	39	2.97232	0.0933	No causality
HCD does not Granger Cause INFD		0.00035	0.9851	
LEXP does not Granger Cause HCD	39	0.46343	0.5004	No causality
HCD does not Granger Cause LEXP		1.31047	0.2599	
OPT does not Granger Cause HCD	39	0.01659	0.8982	No causality
HCD does not Granger Cause OPT		0.19485	0.6615	
INFD does not Granger Cause HCP	39	0.02435	0.8769	Unicausality
HCP does not Granger Cause INFD		15.8496	0.0003	
LEXP does not Granger Cause HCP	39	1.86707	0.1803	Unicausality
HCP does not Granger Cause LEXP		11.3915	0.0018	
OPT does not Granger Cause HCP	39	1.00171	0.3236	No causality
HCP does not Granger Cause OPT		0.02608	0.8726	
LEXP does not Granger Cause INFD	39	8.82705	0.0053	Unicausality
INFD does not Granger Cause LEXP		1.47205	0.2329	
OPT does not Granger Cause INFD	39	0.46351	0.5003	No causality
INFD does not Granger Cause OPT		0.00092	0.9760	
OPT does not Granger Cause LEXP	39	3.44104	0.0718	No causality
LEXP does not Granger Cause OPT		0.23095	0.6337	

Source: Authors' computation, 2020.

Table 9 shows the Pairwise Granger Causality test which established bidirectional causality between infrastructural development (INFD) and output growth (GDP). Unidirectional causality was established between foreign direct investment (FDI) and economic growth (GDP), between human capital productivity (HCP) and FDI, between human capital development (HCD) and GDP, between gross domestic product (GDP) and life expectancy (LEXP), between openness of trade (OPT) and GDP, between human capital productivity (HCP) and INFD, between human capital productivity and LEXP, between life expectancy (LEXP) and infrastructural development (INFD). From the unidirectional causality deduced, it is observed that only the former variables granger caused the latter variables. But infrastructural development and economic growth granger caused each other. In conclusion, it is obvious that only human capital development, foreign direct investment, openness of trade and infrastructural development granger caused output growth in Nigeria within the study period (1981 and 2020).

V. CONCLUSION AND POLICY RECOMMENDATIONS

From the results of this study, it is concluded that there is long-run significant relationship among the variables (GDP, HCD, HCP, FDI, LEXP, OPT and INFD) as aligned with Uilmazer and Cinar (2015); Akaakohol and Ijirshar (2018). Secondly, human capital development (HCD) and human capital productivity (HCP) have significant short-run impacts on output growth (GDP) in Nigeria between the specified periods of 1981-2020 as aligned with Egbiremelo and Anaduaka (2014). In the long-run, human capital development (HCD), foreign direct investment (FDI) and life expectancy (LEXP) have significant impacts on economic growth (GDP) while HCP, OPT and INFD have insignificant impacts on GDP. However, it is established from the uni-causality results that human capital development (HCD), foreign direct investment (FDI), and openness of trade (OPT) granger caused output growth (GDP). After all, bidirectional causality is



established between infrastructural development and economic growth. It is therefore recommended that appropriate policy measures should be made by the government to improve and enhance life expectancy of Nigerians especially the labour force in education sector and by so doing, this will guarantee improvement in human capital development, productivity in order to enhance Nigerian economy. Also, government should encourage foreign direct investment, improve on infrastructural development, and ensure that favourable balance of payment is achieved to enhance openness of trade.

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Human capital development, productivity and economic growth

YEAR	GDP	HCD	HCP(manufacturing value added)% of GDP.	FDI net inflows (BOP, current US\$)	LEXP (Life expectancy)	OPT	INFD
1981	164,475,000,000	122.51	20.264	542,000,000	45.33	16.17	69.43
1982	142,769,000,000	136.47	20.332	430,600,000	45.67	13.78	71.15
1983	97,094,910,000	141.13	21.098	364,000,000	46.02	10.04	77.32
1984	73,484,360,000	143.7	17.736	189,000,000	46.01	9.38	70.46
1985	73,745,820,000	139.02	21.055	485,600,000	45.99	10.39	70.00
1986	54,805,850,000	124.28	21.01	193,000,000	45.98	9.14	66.50
1987	52,676,040,000	120.46	18.784	610,600,000	45.96	19.50	71.39
1988	49,648,470,000	89.27	21.02	378,700,000	45.95	16.94	66.52
1989	44,003,060,000	111.43	18.354	1,884,000,000	45.93	34.18	68.49
1990	54,035,800,000	111.21	17.783	587,900,000	45.92	30.92	67.95
1991	49,118,430,000	85.65	19.495	712,000,000	45.90	37.02	58.55
1992	47,794,930,000	89.70	17.654	896,600,000	45.89	38.23	60.21
1993	27,752,200,000	93.82	18.376	1,345,000,000	45.87	33.72	65.43
1994	33,833,040,000	93.61	20.927	1,959,000,000	45.90	23.06	65.83
1995	44,062,470,000	89.30	19.994	335,800,000	44.92	39.53	67.89
1996	51,075,810,000	78.66	19.101	499,000,000	45.95	40.26	69.76
1997	54,457,840,000	78.66	19.199	469,600,000	45.97	51.46	68.94
1998	54,604,050,000	78.66	17.451	299,000,000	46.00	39.28	66.61
1999	59,372,610,000	123.78	16.257	1,005,000,000	46.19	34.46	132.24
2000	69,448,750,000	123.3	13.933	1,140,000,000	46.38	49.00	69.82
2001	74,030,370,000	123.41	13.925	1,191,000,000	46.56	49.68	102.93
2002	95,385,820,000	127.62	11.812	1,874,000,000	46.75	40.04	98.64
2003	104,912,000,000	109.18	12.651	2,005,000,000	46.94	49.33	102.73
2004	136,386,000,000	145.61	10.862	1,874,000,000	47.50	31.90	89.57
2005	176,134,000,000	146.82	10.061	4,983,000,000	48.07	33.06	92.99
2006	235,104,000,000	136.57	8.853	4,854,000,000	48.63	42.57	102.73
2007	275,626,000,000	125.18	8.401	6,036,000,000	49.20	39.34	176.42
2008	337,036,000,000	119.53	8.169	8,194,000,000	49.76	40.80	234.75
2009	291,880,000,000	124.62	7.838	8,556,000,000	50.20	36.06	247.76
2010	363,360,000,000	138.91	6.553	6,026,000,000	50.64	43.32	175.91
2011	410,335,000,000	146.40	7.178	8,841,000,000	51.07	53.28	287.16
2012	459,376,000,000	139.27	7.725	7,070,000,000	51.51	44.53	186.8
2013	514,966,000,000	150.33	8.929	5,563,000,000	51.95	31.05	192.3
2014	568,499,000,000	135.31	9.636	4,694,000,000	52.40	30.89	130.95
2015	494,583,000,000	46.78	9.428	3,064,000,000	52.84	21.45	203.72
2016	404,650,000,000	126.73	8.68	3,453,000,000	53.29	20.72	209.01
2017	375,745,000,000	123.85	8.742	2,413,000,000	53.73	26.35	215.85
2018	431,740,000,000	120.96	9.649	775,000,000	54.18	33.00	214.03
2019	448,120,000,000	120.96	11.522	2,305,000,000	54.49	34.02	201.90
2020	432,293,000,000	120.96	13.667	2,385,000,000	54.81	25.40	189.77

World Development Indicators (2020).