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Original Research Article

Human Capital Development and Manufacturing Sector Performance in Nigeria

Johnson I. Okoh

Department of Financial Studies, National Open University of Nigeria, Abuja

Akinloye O. Oyeranmi

Department of Economics, Lautech Teaching Hospital Ogbomosho Nigeria,

Mijinyawa Afebuamhe Adamu

Department of Business Administration, National Open University of Nigeria, Abuja

Oyakhromhe Bamidele Agbadua

Department of Banking and Finance, Auchu Polytechnic, Edo State

For correspondence, email: jokoh@noun.edu.ng

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Abstract

The study examined the effect of human capital development on the manufacturing sector in Nigeria for the period 1981-2021. After various pre-estimation test such as unit root and co-integration were carried out. The study utilized Ordinary Least Square (OLS), Augmented Dickey-Fuller Test and Auto Regression Distributed Lag Bound Test. Secondary data were collected from the Central Bank of Nigeria Statistical Bulletin. Human capital development and Manufacturing value added have a significant inverse relationship. More so, Exchange rate and Manufacturing value added have insignificant inverse relationship. Consumer price index and Interest rate showed an insignificant positive relationship with Manufacturing value added. Population growth rate and Manufacturing value added possess a positive and significant relationship. From these important findings that emerged from this study, it is important to conclude, that the overall model or variable are significant relationship with manufacturing sector growth in Nigeria. In view of the above, the study made recommendations for training and retraining of staff in the manufacturing sector to enable them to acquire requisite skills and knowledge to enhance productivity and also make provision of new technological equipment and training of workers on new technologies. This will lead to better performance of the manufacturing sector in Nigeria.

Keywords: Human Capital Development, Manufacturing Sector, Nigeria

JEL Classification Code: J24, M53, M54

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Introduction

Nigeria is endowed with abundant natural resources, and it is believed that it should be classified as an affluent country. The focus of the study was the effect of Human Capital development on the manufacturing sector. The government of Nigeria established policies to support the manufacturing sector because it contributes to human capital growth in Nigeria. Effect of human Capital Development could be an escape route for manufacturing sector in Nigeria strategically planning and positioning their internal productivity resources so they can thrive successfully in the global knowledge economy, manufacturing sector that are able to master the production of knowledge and its conversion to tradable goods and services are topping the chart of economic growth and success (Okoye *et al*,2020).A group of related activities completed in a given time span to deliver a conduct change. Human capital development can be characterized as the most common way of creating or potentially releasing human aptitude through organization advancement, faculty preparing and improvement for motivation behind further enhancing performance (CBN,2020). Human capital is the focus of scholarly capital that energies manufacturing

performance(Akinlo,2012).The present study set out to examine the effect of human capital development on manufacturing sector in Nigeria from 1981 to 2021.

2. Literature Review

Conceptual Review

The concept of human capital is identifies the avenue through which human capitalis developed such as provision of formal education the on- job training, adult education, health service, labour market information and support for internal migration among others (Smauel *et al*,2019). Human capital development defined as the process of acquiring and increasing number of people who have on-the-job -training, leadership quality, education and experience that are critical for economic growth and development of a country (Bontis,1999).In economic theory, there are two basic approach to human capital which are macro-economic and micro economic approach. Effect of human capital development on manufacturing sector are, improve labour productivity, facilitates technological innovation, increase returns to capital and make growth more sustainable which in turn support poverty reduction(Okoye *et al*,2020.).Also lack of concensus among scholar provide

motivation for further studies on this subject.

Concept of manufacturing sector is the production of good through the use of labour, machinery tool and biological or chemical formulation (Favour *et al*,2020).However Manufacturing term is refer to the processing of raw material or part into finished goods through the use of tools, human, labour, machinery and chemical processing (Alika,2014), The word was derived from the Latin words **manus** (meaning 'hand') and factus (meaning to make). In late Latin, these were combined to form the word manufacture meaning "made by hand" or handmade".

According to business Dictionary 2009, manufacturing sector is the agglomeration of industries engaged in chemical, mechanical or physical transformation of material, substances or component into economic or industrial good. The development of manufacturing sector to this day still relies heavily on research into manufacturing processes and material and the development of new product.

Theoretical Review

In explaining the subject matter Human capital development and behaviour of Human capital several theories have been propounded in the literature. Some of the theories are summarized as follow.

Human capital theory: Human capital was elaborated by economist, representative of the Chicago school in the 60s of the 20th century. "Attention of Chicago economist also focused on building human capital theory, which was a major contribution to theoretical research in education. Their theory of human capital has become a

"decoration" Chicago school (Schultz,1961). The leader of this school was Schultz who in 1981 wrote. Take into account the innate and acquired skill. Those are important and may invest to expand and will form the human capital" The most important author and promoter of human capital in 1964 developed a theoretical basis for deciding on investment in human capital (Backer,1993)

Endogenous Growth theory: This theory associated with Paul Romer in the mid – 1980s. It is also called the Ak-model. They place greater importance on the need for government to actively encourage technological innovation. They argue in the free market classical view firms may have no incentive to invest in new technologies because they will struggle to benefit in competitive markets. Place emphasis on increasing both capital and labour productivity. They argue that increasing labour productivity does not have diminishing return, but may have increasing return "According to Romer (1986) human capital has a great role to play in stimulating growth, he believed that technology result from innovation which is due to the development of human capital.

Lewis theory of unlimited supplies of labour; Propounded by Prof. Kwon, in 2009,the theory posit that undeveloped countries are characterized by over populated labour is withdrawn from the agriculture dominant sector to the industrial sector while maintaining a zero-marginal labour as no output would be lost in transfer (Jhingan,2013).This can lead to creation of new industries or expansion of existing one. The theory assumes that the economy run as a dual economy characterized by traditional and industrial sector, and the unlimited supply of labour in the underdeveloped

countries arise due to high population, unemployment, high birth rate etc. Lewis posited that the wages in industrial sector remain constant. This process of modern self-sustaining growth and employment expansion will continue till all the surplus rural labour is absorbed in the new industrial sector.

Kaldor's model of economic growth; Kaldor postulated a growth model in which he tried to provide a framework for relating the genesis of technical progress to capital accumulation. Kaldor analysed and posited that development hinges on four fundamental concepts; increasing returns in the manufacturing sector, effective demand constrained growth, the agriculture-industry relationship and internal external market relation (Thirlwall, 2013). He posited that technical progress depends on the rate of capital accumulated (Jhingan, 2013). Kaldor postulated that investment at any period depends partly on change in output and partly on the change in profit on capital in the previous period. The model introduced the technical progress function in place of the usual production function.

Sustainable resources theory; Sustainable resources theory is much like scarce resources theory except for one major point, the concern for the long-term, versus short term agenda (Thurrow, 1993; Odion & Omolo 2015). Sustainable advantage will depend on new process technologies and less on new product technologies and less on new product technology. New industries of the future depend on brain power, the implication of this theory to this paper being that human capital investment must add value to creating sustainable long term economic performance (Swanson & Holton, 2001).

Empirical Review

In the recent times, studies on human capital development and its effect on manufacturing variables have received a global attention. In view of the above, this section provides the contributions of the past studies as follows.

Favour *et al* (2020) investigated the effect of human capital on manufacturing output in the Nigerian industrial firms. The study adopts human capital theory as a basis for the theoretical framework. Micro-data from the World Bank enterprise survey is utilized to perform Spearman correlation in investigating the specific effect of human capital on manufacturing value added for Nigeria industries. High school education, formal training and research were found to have a weak positive but significant impact on level of manufacturing output. Therefore, the study in the end improved human capital quality via public-private partnership. Fostering training, research activities and conducive business environment in terms of bias.

Afrah, (2016) did an examination on the part of human capital development on organizational performance; case study Benard University, Mogadishu, Somalia. The discoveries found that the part of human capital on organization performance is an essential for advancing the organization's benefit, furthermore, organization brag for the human capital they have over the long haul, HR rehearsal assumes a huge part in building the limit of the employees in this way, this examination gives commitment of the part of human capital development on organizational performance. The examination reason that the investigation found that there is a positive connection between human capital and Benard University. The examination

prescribes a positive connection between human capital and Benard University. The examination prescribes that use of a solitary organization configuration restricts its generalizability to different organization.

Halidu,(2015) carried out an empirically review on the impact of training and development on workers. Productivity in some selected Nigerian Universities. The findings revealed that training and development programmes improve employee's skill and performance at work place enhance their technical knowhow/wherewithal to withstand the challenges of contemporary times, thus, an effective tool for sustaining and the academia. The study recommended that tertiary education trust fund should be improve on its training policy in its entire ramification because in recent times academic are being faced with new innovations and techno-scientific developments so as to meet up with the changing trend and circumstances.

Okoye *et al* (2021) examined the impact of financial intermediation of economic growth in Nigeria. Quarterly time series data generated from the World Bank Development indicator and the Nigerian Bureau of statistic for the period 1994 QT to 2018as were used for the anlaysis and ordinary Least Square (OLS) regression technique was adopted for the estimation of the hypotheses per capital GDP was used as a measure of economic growth while bank deposit, bank credit and bank reserves are measure of financial intermediation. Further investigation also show that bank deposit is positive and significantly relate to GDPs suggesting that increase in bank deposit bring about 0.244193 increase in economic growth. We further observed that bank credit impacted positively on

economic growth. Though the impact was found to be insignificant. Hence, we also found bank reserves to assert significant and positive impacted on economic growth from the findings, we suggest for good policy reform that they may promote the efficiency and the development of bank which serves as a critical factor for economic growth in Nigeria.

Ofuoma (2021) conducted a work on the relationship between human capital development and organizational performance in the Nigeria Aluminum sector. The types of research design used in this work is survey research and sampling, the hypotheses of this study were tested using multiple regression statistical tool with the aid of SPSS version 23 as the basis of testing hypotheses and also revealed that human capital development had significant impact on the organization performance of the manufacturing firms thereby investment profit of the studies organizational being tied to human capital development element like training.

Chigozie (2018) investigated the effect of human capital development in an organizational performance in manufacturing industries in south east Nigeria. Population consist of 6230 staff of selected manufacturing firm from south east Nigeria. The study used the survey approach. The primary sources used were the administration of questionnaire to staff and distributions. The sample size of 358 was determined using Ferund and William formular. 306 copies of the questionnaire were returned and accurately filled. The validity of the instrument as tested using content analysis and the result was good. The reliability was tested using Pearson correlation coefficient ®. It given a reliability coefficient of 0.88 which was also

good. The hypothesis were analyze using for statistics (ANOVA) tools. The finding undirected that knowledge has positive significant effect on product quality, $F_{95, n=358} = 2181, P < 0.05$, skills have positive significant relationship on promoting of innovations $F_{95, n=358} = 381.631, P < 0.05$; the study concluded that any organization that does not learn continuously and is not able to continuously list, develop, share, distribute, mobilize, cultivate put to practice review and spread knowledge will not be able to compete effectively in the global market. The study recommended that to it is important that should training their staff to enable them acquire knowledge to enhance productively and market share of firm and provision of new technology.

Asghar and Rehman (2017) appraised human capital and labour productivity. This study was designed to investigated the role of human capital in labour productivity in district Lahore for analyzing this relationship, cross sectional study was conducted and data was collected from 243 firms which include manufacturing, trading and service sector. The empirical analysis reveals that all the sector have heterogeneous effect of human capital on labour production. Education appear to be significant and positively related to labour productivity in all the sector with greater effect in manufacturing sector. Skill and training have also noticeable effect on labour productivity.

Olayemi (2015) investigated the relationship between human capital investment and industrial productivity in Nigeria using secondary data spanned through 1978 to 2008. The study found that government expenditure on education maintained a positive long run relationship with index of industrial production while government

expenditure on health and cross capital formation exhibited longrun negatively relationship with the dependent variable. Consequently, it was recommended among others that more stock of physical capital needed to be acquired to facilitates more investment in human capital and thereby enhance industrial productivity in Nigeria. This study made use of the co-integration and error correction model (ECM) techniques as part of the estimation method (Acquah & Hushak, 1978)

Okuwa, Nwuche & Anyawu (2016) conducted a work on the impact human capital development and organizational resilience in selected manufacturing firm in River State. Using simple random sampling technique and Taro Yumen's formula, 119 managers were drawn from the 31 manufacturing firm in Portharcourt. The statistical tools adopted was spearman rank order correlation coefficient. Their finding showed that performance management and training have influence on organizational agility and organizational adaptive capacity in manufacturing firm from the finding, they concluded that human capital development has significant influence on organization resilience.

Adejumo (2017) appraised the direction f causality between human capital and productivity growth in Nigeria, the study first investigated the pattern of productivity growth in Nigeria between 1970 and 2010. This study empirically determined the productivity growth in Nigeria using the eagle – Granger causality test. The results revealed that productivity growth has been very low and unstable in Nigeria. In addition, the nexus was examined. The finding reveals that while productivity growth causes human capital

development did not cause productivity growth.

variables is expanded to include, population growth rate, Human capital development (which include primary, secondary enrolments and tertiary school enrolments) exchange rate, consumer price index, and the monetary policy variable (interest rate) the model is therefore stated as follows:

3. Methodology

Model Specification

The study adopted the ex-post facto research design. In the study, the list of policy

$$MANQ = F(HUMANCAP, EXCH, CPI, POPGR, INTR) \dots\dots\dots(1)$$

where

- MANQ= Manufacturing value added (As a proxy for manufacturing sector growth)
- HUMANCAP = Human capital development (primary, secondary and tertiary school enrolments)
- EXCH = Exchange rate ;
- CPI = Consumer price index;
- POPGR = Population growth rate
- INTR = The policy variable (interest rate)

The econometric form of the model above is stated as:

$$MANQ_t = \beta_0 + \beta_1 HUMANCAP_t + \beta_2 EXCH_t + \beta_3 CPI_t + \beta_4 POPGR_t + \beta_5 INTR_t + \mu_t \dots\dots (2)$$

- μ_t = stochastic error term;
- β_0, α_0 = constant intercept;
- $\beta_1, \alpha_1 - \beta_5, \alpha_5$ = co-efficient of the associated variables

However, the dependent and some of the independent variables were not in the same unit, hence, they were logged so as to bring the data to the same level. Thus, the above equation can be re-specified as;

$$LOG(MANQ)_t = \beta_0 + \beta_1 LOG(HUMANCAP)_t + \beta_2 LOG(EXCH)_t + \beta_3 LOG(CPI)_t + \beta_4 LOG(POPGR)_t + \beta_5 INTR_t + \varepsilon_t \dots\dots (3)$$

- where $LOG(MANQ)_t$ = natural log of manufacturing output
- $LOG(HUMANCAP)$ = natural log of Human capital development
- ε_t = stochastic error term

Method of Result Evaluation

This study utilizes the Augmented Dickey Fuller (ADF) test for stationarity test. This is because, the Auto Regressive Distributed Lag (ARDL) bound test procedure is conducted based on the assumption that, the variables under consideration are either

integrated of order zero or order one. Hence an order of integration was determined using the ADF test procedures. The null hypothesis that guided the test is stated as follows: $H_0: \beta=0$ (β has a unit root); $H_1: \beta<0$ (for alternative hypothesis). According to Pesaran, Shin and Smith (2001), the

variables under consideration cannot be integrated of order two to avoid a spurious regression. In conducting an ARDL model procedure, a choice for an appropriate lag length is provided. Pesaran and Shin (1999)

were of the view that Akaike info criterion (AIC) and Schwarz criterion (SC) are appropriate in a small sample, though SC is superior to AIC: The ARDL model is written as follow:

$$\Delta LOG(MANQ)_t = \beta_0 + \sum_{i=1}^n \beta_{1i} \Delta LOG(MANQ)_{t-1} + \sum_{i=0}^n \beta_{2i} \Delta LOG(HUMANCAP)_{t-1} + \sum_{i=0}^n \beta_{3i} \Delta LOG(EXCH)_{t-1} + \sum_{i=0}^n \beta_{4i} \Delta LOG(CPI)_{t-1} + \sum_{i=0}^n \beta_{5i} \Delta LOG(POPGR)_{t-1} + \sum_{i=0}^n \beta_{6i} \Delta INTR_{t-1} + \delta_1 LOG(MANQ)_{t-1} + \delta_2 LOG(HUMANCAP)_{t-1} + \delta_3 LOG(EXCH)_{t-1} + \delta_4 LOG(CPI)_{t-1} + \delta_5 LOG(POPGR)_{t-1} + \delta_6 INTR_{t-1} + \varepsilon \tag{4}$$

where

Δ = Difference operator
 ε = Stochastic term

Conducting ARDL bound test, an Ordinary Least Square (OLS) is estimated firstly in order to establish if there exists a long-run relationship between the variable under consideration. The test is based on an F-Statistic for the joint statistically significance of the lagged variables. The null hypothesis of no cointegration stated as:

$H_0 : \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0$. The underlining assumption is therefore stated as follows: if the F-statistic is > upper critical

bound, H_0 is rejected and concludes that the variables under consideration are cointegrated, otherwise it is not accepted. However, if $F\text{-statistic} \geq \text{lower critical bound} \leq \text{upper critical bound}$, then decision becomes inclusive. If the null hypothesis of no cointegration is rejected, a vector error-correction model (VECM) is therefore estimated (Narayan & Narayan, 2006). The VECM model is therefore specified as follows: For the human capital equation:

$$\Delta LOG(MANQ)_t = \alpha_0 + \sum_{i=1}^n \alpha_{1i} LOG(MANQ)_{t-1} + \sum_{i=1}^n \alpha_{2i} \Delta LOG(HUMANCAP)_{t-1} + \sum_{i=1}^n \alpha_{3i} \Delta LOG(EXCH)_{t-1} + \sum_{i=1}^n \alpha_{4i} \Delta LOG(CPI)_{t-1} + \sum_{i=1}^n \alpha_{5i} \Delta LOG(POPGR)_{t-1} + \sum_{i=1}^n \alpha_{6i} \Delta INTR_{t-1} + \lambda ECM_{t-1} + \mu_t \tag{5}$$

where: ECM = The error correction term

4 Results and Discussion of Findings

Descriptive Statistics

The descriptive statistics for the variables under consideration are therefore presented as follows:

The descriptive statistics

	MANQ	HUMANCAP	EXCH	CPI	POPGR	INTR
Mean	3089.579	17160171	116.4773	77.73720	122.1637	12.44085
Median	989.1100	16574519	118.5700	72.87000	118.9530	12.50000
Maximum	16781.06	27096436	360.2000	216.0000	173.9380	26.90000
Minimum	26.89000	4355389.	0.610000	0.880000	68.44700	3.720000
Std. Dev.	4176.916	5459718.	113.7665	65.00965	35.95748	4.999373
Skewness	1.489545	-0.295654	0.796929	0.190243	0.110503	0.372777

Kurtosis	4.428291	2.319565	2.546977	1.734899	1.613056	3.236288
Jarque-Bera	18.64645	1.388254	4.690420	2.981469	3.369615	1.044960
Probability	0.000089	0.499510	0.095827	0.225207	0.185480	0.593048
Sum	126672.7	7.04E+08	4775.570	3187.225	5008.712	510.0750
Sum Sq. Dev.	6.98E+08	1.19E+15	517713.1	169050.2	51717.61	999.7494
Observations	41	41	41	41	41	41

Source: Author's computation from the Eviews result (2022)

From the result table, the descriptive statistics indicates that all the variables have a positive mean values with 41 observations. The standard deviation showed that the highest standard deviation is recorded by the HUMANCAP while the least standard deviation is recorded by INTR. The skewness statistics from the table revealed that five of the variables are positively skewed while one variable is skewed negatively; the kurtosis coefficients showed that two of the variables are leptokurtic, suggesting that the distributions are high relative to normal distribution, two

variables are mesokurtic, indicating not too flat topped, while two variables are platykurtic, suggesting a flat topped. The probabilities of Jarque-Bera test of normality for the variables indicates that three of the variables have values greater than 5% level of significance.

Correlation

The relationships among the studied variables depicted in the model were tested using correlation matrix and the result presented below:

Correlation matrix

	MANQ	HUMANCAP	EXCH	CPI	POPGR	INTR
MANQ	1.000000	0.727143	0.895374	0.651637	0.853636	0.206748
HUMANCAP	0.727143	1.000000	0.817691	0.878031	0.932578	0.214799
EXCH	0.895374	0.817691	1.000000	0.787501	0.929167	0.270368
CPI	0.651637	0.878031	0.787501	1.000000	0.897875	0.076820
POPGR	0.853636	0.932578	0.929167	0.897875	1.000000	0.263538
INTR	0.206748	0.214799	0.270368	0.076820	0.263538	1.000000

Source: Author's computation from the Eviews result(2022)

The correlation result shows that all of the variables have positive values ranging from 74%, 89%, 65%, 85%, 14% and 20% respectively. This result suggests that the variables under consideration have no multicollinearity.

Unit Root/ Stationarity Test

The assumption is stated as follows: If the absolute value of the Augmented Dickey Fuller (ADF) test is greater than the critical value either at 1%, 5%, or 10% level of significance at order zero, one or two, it shows that the variable under consideration is stationary otherwise it is not. The results of the Augmented Dickey Fuller (ADF) test obtained are as follow:

The Unit root test

Variable	Level difference	Probability	Order of integration	First difference	Probability	Order of integration
LOG(MANQ)	-1.475156	0.5357		-5.318468	0.0001	I(1)
HUMANCAP	-2.103187	0.2446		-8.253838	0.0000	I(1)
EXCH	0.756853	0.9919		-4.630713	0.0006	I(1)
CPI	-1.212842	0.6595		-6.789666	0.0000	I(1)
POPGR	-1.314872	0.6127		-11.23127	0.0000	I(1)
INTR	-3.098479	0.0347	I(0)			

Source: Author’s computation from the Eviews result (2022)

From the table above the results shows that one of the variables is stationary at level, while five other variables are integrated of order one at 5% level of significance in ADF test procedure. Thus there is a need to conduct a bound test cointegration procedure since there exists a mixed order of stationarity

Bound Autoregressive Distributed Lag (ARDL) Testing Approach

Conducting the ARDL bounds test procedure, it is expected that the variables are I(0) or I(1), otherwise, the variable may be considered spurious. The F-test results is therefore presented as follows:

The ARDL Bound test results

Date: 04/03/22 Time: 02:12		
Sample: 1985 2021		
Included observations: 37		
Null Hypothesis: No long-run relationships exist		
Test Statistic	Value	K
F-statistic	6.767092	5
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.26	3.35
5%	2.62	3.79
2.5%	2.96	4.18
1%	3.41	4.68

Source: Author’s computation from the E views result (2022)

The Bound test result from the tables above indicates that the underling ARDL model can be established to determine the long-run slope-estimated coefficients and the short-run dynamic-estimated coefficients for the two equations. The ARDL (1, 4) is selected

based on Akaike information criterion (AIC):

The Short Run Error Correction Coefficients

There is long-run equilibrium relationship among the variables in the regression

model; however, it is the short-run that transmit to the long-run. Thus, Error Correction Mechanism (ECM) is therefore

used to correct or eliminate the discrepancy that occurs in the short-run. The ECM result is therefore presented below:

The short run error correction results

Dependent Variable: LOG(MANQ)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLOG(HUMANCAP)	-0.570752	0.445330	-1.281639	0.2289
DLOG(HUMANCAP(-1))	3.530402	1.431365	2.466459	0.0333
DLOG(EXCH)	-0.118851	0.139724	-0.850617	0.4149
DLOG(EXCH(-3))	0.818708	0.250183	3.272435	0.0084
DLOG(CPI)	-0.553341	0.457762	-1.208797	0.2545
DLOG(CPI(-2))	0.536020	0.236171	2.269628	0.0466
DLOG(POPGR)	12.868814	4.262808	3.018858	0.0129
DLOG(POPGR(-1))	8.796254	3.865897	2.275346	0.0461
D(INTR)	-0.025824	0.014497	-1.781259	0.1052
D(INTR(-1))	-0.004428	0.008919	-0.496511	0.6303
D(INTR(-2))	-0.015416	0.009540	-1.616032	0.1372
CointEq(-1)	-1.209694	0.208943	-5.789586	0.0002
R-squared	0.875191	Mean dependent var		0.156592
Adjusted R-squared	0.550686	S.D. dependent var		0.167583
S.E. of regression	0.112332	Akaike info criterion		-1.383582
Sum squared resid	0.126186	Schwarz criterion		-0.208047
Log likelihood	52.59626	Hannan-Quinn criter.		-0.969151
F-statistic	2.697007	Durbin-Watson stat		1.728384
Prob(F-statistic)	0.051559			

Source: Authors' computation from the E-views result(2022)

The equilibrium error-correction coefficient ECM (-1) is -1.209694. The coefficient has the expected negative sign and is statistically significant at 5% significant levels. The implication is that there is a long run causality running from independent variables to dependent variable. It also confirms that all the variables are cointegrated or have long run relationship. We can therefore states that 1. 2 percent gaps between long run equilibrium values and the actual values has been corrected. Its t-ratio is -5.789586 the probability of the null hypotheses being true for zero is [0.0000], which is significant even when $\alpha = 0.05$. Thus, it can also be concluded that the

adjustments are quite meaningful in the short-run ARDL relationship.

The coefficient of determination R^2 indicates a value of 0.875191; and the adjusted R^2 with a value of 0.550686 respectively. This show that 55% of variations in the dependent variable (LOG(MANQ)) is explained by independent variables respectively. The F-statistics results indicate that the overall model is significant with a value of Prob(F-statistic) = 0.051559; while the Durbin-Watson (DW) statistics value of 1.728384 indicate absence

of serial correlation in the model under consideration.

Long Run Relationships Equation

Long Run Coefficients results

Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(HUMANCAP)	-2.034118	0.590380	-3.445441	0.0063
LOG(EXCH)	-0.298868	0.201914	-1.480176	0.1696
LOG(CPI)	0.265093	0.245155	1.081330	0.3049
LOG(POPGR)	8.526179	0.916781	9.300128	0.0000
INTR	0.019127	0.017148	1.115372	0.2908
C	-0.009938	6.283129	-0.001582	0.9988

Source: Authors’ computation from the E-views result(2022)

From the equation, the intercept is -0.009938. This indicates that if the independent variables are held constant, the value of the manufacturing sector growth will be -0.009938. The long-run elasticity of the independent variables contributing to industrial output growth shows that the coefficient of LOG(HUMANCAP) indicates a negative sign and significant statistically. It show that the variable impacted negatively on the manufacturing output growth in the long run. This also implies that a unit change in the human capital growth will decrease the manufacturing

sector growth by -2.034118. The coefficients of POPGR showed positive signs and are statistically significant. Other variables which include, EXCH indicate negative coefficient, while CPI and INTR are positive and insignificant statistically.

Diagnostic Test

To ensure the goodness of fit of the model, diagnostic test are conducted. Diagnostic tests examine the model for serial correlation, functional form, non-normality and heteroscedasticity.

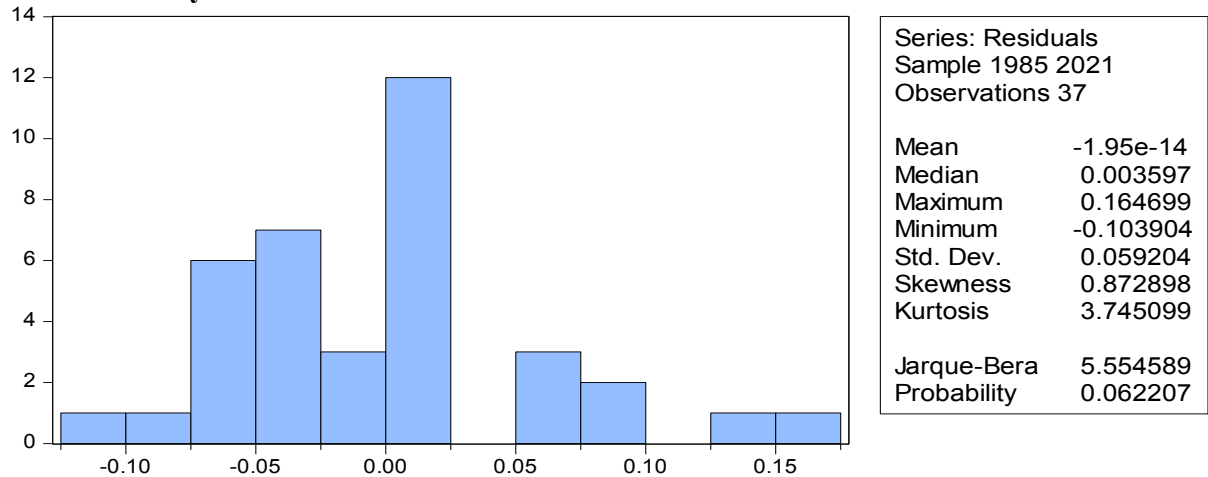
Serial correlation tests

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.704474	Prob. F(2,8)	0.5226
Obs*R-squared	5.540582	Prob. Chi-Square(2)	0.0626

The serial correlation test result obtained shows that the null hypotheses of a serial correlation cannot be rejected and the corresponding probability values of the F-statistics are statistically insignificant at 5%

level. Thus we conclude that there is no serial correlation among the variables under consideration.

The normality test



Ho: The sample data are not significantly different than a normal population

H1: The sample data are significantly different than a normal population.

Probabilities > 0.05 accept the null hypothesis

Probabilities < 0.05 reject the null hypothesis

From the result, the probability is 0.062207 and this is less than 0.05 at 5% significant level and therefore, the null hypothesis is rejected. This implies that the residuals are not normally distributed.

The Heteroskedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	0.363650	Prob. F(26,10)	0.9814
Obs*R-squared	17.98164	Prob. Chi-Square(26)	0.8764
Scaled explained SS	1.802827	Prob. Chi-Square(26)	1.0000

Ho: homoscedasticity

H1: heteroscedasticity

Probabilities > 0.05 accept the null hypothesis

Probabilities < 0.05 reject the null hypothesis

From the result, the probability of Chi-Square (8) is 0.8764 and this is greater than 0.05 at 5% significant level and therefore, the null hypothesis is accepted. This implies and therefore confirm the absence of heteroscedasticity in the model. That is the error terms are homoscedastic i.e., they have constant variance in repeated sampling.

5. Summary of Findings, Conclusion and Recommendations

Summary of Findings

The following are the summary of the result

- (i) Human cap was negative and significant to manufacturing sector in Nigeria because it show that variable

impacted negatively on the manufacturing output growth and this also implies that a unit change in the human capital growth will decrease the manufacturing growth by -2.034118 And corresponding probability value of the 0.0063 is statistically significant at 5% level.

- (ii) Exchange rate was negative and insignificant to manufacturing sector in Nigeria because it show that variable impacted negatively on the manufacturing output growth and this also implies that a unit change in the exchange rate will reduce the manufacturing growth by -0.298868 And corresponding probability value of the 0.1696 is statistically insignificant at 5% level.
- (iii) Consumer price index was positive and insignificant to manufacturing sector in Nigeria because it show that variable impacted positively on the manufacturing output growth and this also implies that a unit change in the consumer price index will increase the manufacturing growth by 0.265093 And corresponding probability value of the 0.3049 is statistically insignificant at 5% level.
- (iv) Population growth rate was positive and significant to manufacturing sector in Nigeria because it show that variable impacted positively on manufacturing output growth and this also implies that a unit change in the population growth rate will increase the manufacturing growth by 8.526179 And corresponding probability value of the 0.0000 is statistically significant at 5% level.
- (v) Interest rate was positive and insignificant to manufacturing sector in Nigeria because it show that variable impacted positively on

manufacturing output growth and this also implies that a unit change in the interest rate will increase the manufacturing growth by 0.019127 And corresponding probability value of the 0.2908 is statistically insignificant at 5% level.

Conclusion

This study was carried out with a core objective to examined the effect of human capital development on manufacturing sector in Nigeria. Based on the research objective. The result show that Human cap indicate negative sign and significant while Exchange rate show negative sign and insignificant Moreso Consumer price index has positive sign and insignificant. Meanwhile Population growth rate indicate positive sign and significant and also Interest rate contribute negative relationship and insignificant. From the above finding, the study concludes that over all model or variable are significant relationship with manufacturing sector in Nigeria.

Recommendations

The recommendation made flow from the finding of the study and constitute the research's advice to manufacturing sector for improving their operational performance. They are.

- i. Training of their staff to enable them acquire knowledge to enhance productivity and the market share of the firm.
- ii. Policies making should make the price of our country money be revalued in relation to another country money to reduce the cost of training both locally and internationally.
- iii. Collaborative partnership between public and private enterprises should be encourage and educational scheme re-

structured to be much more practical than theoretical.

- iv. To encourage new and existing firm to produce more of their intermediate input used in the country.
- v. Provision of new technological equipment and training of worker on the machine should be advice and encourage for more profitability of the manufacturing sector in Nigeria

References

- Adejumo, O. O. & Adejumo, V. A. (2017). An analysis of human capital development and productivity, *Review of International and Competitiveness* 3(3), 61-84
- Afrah,, N. A. (2016). The role of human capital development on organizational performance: Case study Benador university, Mogadishu, Somalia, *European Journal of Business and Management* 8(4), 120 -124
- Akinnlo, A. E. (2012). How important is oil in Nigeria's economic growth *Journal of Sustainable Development* 5(4), 165-179
- Alika, J. I & Aibieyi, S. (2014). Human capital definition approaches and management dynamic. *Journal of Business Administration and Education* 5(1).55-78
- Asghar, N; Danish, M. H. & Rehman, H. (2017). Human capital & labour productivity & case study of district lahore. *JP UHS* 30(1)
- Becker, G. A. (1993). Human capital and poverty. *Religion and Liberty* 8(1), 5 -7
- Bontis,N; Dragonetti,N.C.:Jacobsen,K & Roos,G. (1999).The knowledge toolbox:A review of tools available to measure and manage intangible resources. *European Management Journal* 17(14),391-402.
- Business Dictionary (2009). *Oxford Dictionary of Business Management*. Fifth edition 2009 ... Oxford online premium website.
- CBN (2020) Weblet importer Retrieved February 19, 2018 from htl-11 Statistical cbnorg.org.ng
- Chigozie, M.P: Aga, C.C. & Onyia, E. (2018). Effect of human capital development in organizational performance in manufacturing industries in South East. Nigeria. *International Journal of Academic Research in Economics and Management Science* 7 (3), 60-78
- Favour, O; Adeyemi, O. M; Paul, A.& Ngosi, A..(2020). Human capital and manufacturing output in Nigeria : A micro – data survey,
- Halidu, S. G. (2015). The impact of training and development on workers' productivity in some selected Nigerian Universities, *International Journal of Public Administration and Management Research*, 3(1) 10 – 16
- Jhingan, M. L. (2013) “*The economic of development and planning*” 4th Edition Vrinla Publication (P) hd. Delhi India
- Kwon,D.B. (2009).Human capital and it's measurement. In the 3rd OECD world forum on “Statistics knowledge and policy”charting progress,building visions,improving life Busan,Korea 27-30
- Odhon'g, E.A. & Omolo J (2015) Effect of human capital management drive organizational performance of pharmaceutical company Kenya. *Global journal of Human Resources Management*. 3(6)1–29

- Ofuoma, I.; Aniekwe, K.V.I; Edeme, N.C.& Okotie, E,(2021). Relationship between human capital development and organizational performance in the Nigeria aluminum manufacturing sector *Journal of Research Business and Management e 9*.(9), 39 – 52
- Okoye,L.U; Olokoyo,F; Okoh,J.I; Ezeji, F.&Uzohue,R.E. (2020). Effect of corporate government on the financial performance of commercial bank in Nigeria *Bank and Banking System 15*(3).55-69
- Okoye,L.U; Omankhanlen,A.E; Okoh, J.I; Adeleye, N.B. & Ezenji, F.N. (2021). Analyzing the energy consumption and economic growth nexus in Nigeria. *International Journal of Energy Economics and Policy, 11*(1), 378-387
- Okuwa, J. A. ; Nwuche, C. A.& Anyanwu, S. A. (2016). Human capital development and organizational resilience in selected manufacturing firm in River State. *International Journal of Novel Research in Humanity and Social Science 3*(2)
- Olayemi, S. O. (2015). Human capital investment and economic growth in Nigeria *International Journal of Humanities and Social Science 2*(16) 298 – 307
- Persaram M. & Persaram B. (1997). *Miscrofit 4.0 (Windows Version)*. New York: Oxford University Press Inc.
- Roomer, P. M. (1986). Increasing returns and long-run growth. *Journal of Political Economy*,9(4), 1002-1037.
- Schultz, T.W. (1961) .Investment in human capital. *American Economics Review*,51(1),1-17
- Smauel,U.E.;Udoh,B.E.;Prince,A.I.;Okoh,J. I.& Ndu,O.M.(2019).Money supply and inflation rate in Nigeria, *Humanities and Social Science Letter*,7(3) 156-166.
- Swanson,R.A. & Holton,E.F. (2001).*Foundation of Human Resources Development*Carlifornia Beret-Kochler Publishers,Inc.
- Thirlwall,A.P. (2013).Commentary on Kaldor’s 1970 regional growth model.*Scottish Journal of Political Economy*,60(5),492-494
- Thurow. L. (1993). *Generating Inequality: Mechanisms of Distribution in the U. S. Economy*. New York: Basic Books. [https:// doi; org/10.1007/978 – 1 – 349 – 15723 – 5](https://doi.org/10.1007/978-1-349-15723-5)