



Capacity Utilization Of Listed Manufacturing Companies and Government Expenditure on Infrastructures In Nigeria (1990 -2015)

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ABSTRACT

This study examined the extent to which government spending on Infrastructures impacted on Capacity Utilization (CU) of listed manufacturing companies in Nigeria. The study adopted *ex-post facto* research design. Population of the study was 83 listed manufacturing companies in Nigeria as at December 31, 2016, from which a sample size of 20 was purposively selected based on availability of data covering the period from 1990 to 2015. Secondary data were obtained from published financial statements of listed manufacturing companies in Nigeria, publications of government and the World Bank. Validity and Reliability of the data were based on the reports of external auditors and other regulatory agencies. The data were analyzed using descriptive and inferential statistical methods.

Results of the study showed that governments spending on power, roads, security and human capital development have joint significant effect on **Capacity Utilization**. $CU(F(4, 21)= 13.969, \text{Adj } R^2 = 0.675, p<0.05)$. However, coefficients of the independent variables show that government spending on Power had positive but insignificant effect on CU ($t(26) = 0.938, p>0.05$). Roads had positive but insignificant effect on CU ($t(26) = 1.124, p>0.05$) Security had positive and significant effect on CU ($t(26) = 3.888, p<0.05$) and finally Human Capital Development (HCD) had negative but insignificant effect on CU ($t(26) = -0.846, p>0.05$). The study concluded that government spending on infrastructures did not

have significant effect on Capacity Utilization of listed manufacturing companies in Nigeria for the period covered.

Keywords: Capacity utilization, Government spending, Infrastructures

I. INTRODUCTION

Capacity utilization is the output that is produced by a manufacturing industry with the installed equipment in relation to the potential output which could be produced with it if capacity was fully used (Rimo and Tin, 2017). The level of infrastructural development in a country provides a very strong base for capacity utilization by the manufacturing industry. Because capacity utilization has become an important key performance indicator (KPI) for assessing the operating efficiency of a manufacturing industry all over the world, this study examined government spending on infrastructures covering power roads security human capital development and how this has affected the level CU of manufacturing industry in Nigeria.

Objective of the study: To examine the effect of government spending on infrastructures covering power, roads, security and human capital development On the Capacity Utilization of listed manufacturing companies in Nigeria.

Research question: To what extent has government spending on power, roads, security and human capital development impacted on the



Capacity Utilization of listed manufacturing companies in Nigeria?

Hypothesis: Government spending on power, roads, security and human capital has no significant effect on Capacity Utilization of listed manufacturing companies in Nigeria.

Method of data analysis The study adopted *ex-post facto* research design. Secondary data obtained from published financial statements of listed manufacturing companies in Nigeria, publications of government and the World Bank were analyzed using descriptive and inferential statistical methods

II. LITERATURE REVIEW

Theoretical Framework This study adopted Normative Accounting theory, this is because it is one of the accounting theories applicable to the public sector which seeks to explain reasons for the adoption of a particular method in the appropriation and distribution of public funds by the managers of public finance. Normative theory of accounting developed by MacNeal in 1939 is based on a priori concepts and deductive reasoning that prescribe the income to the industrial sector and stimulation of investment expenditure. Ukoha (2000), attributed the low rate of procedures and policies that should be followed rather than describing those that are followed in practice. Normative theory of accounting in the public sector therefore, attempts to prescribe the best practices for accounting for government spending in the public sector (Schick, 1998). The theory requires both budgeting and spending process to be transparent in such a way that information about the government spending and the budget, and what they set out to achieve flows to all stakeholders including the bureaucrats, the investors and the public (Meyers, 1996). According to this theory, if government financial resources are properly deployed, government expenditure will have positive and significant effect on the activities of individual and corporate economic agents; hence its adoption for this study.

Government Spending and Capacity utilization Capacity utilization is the extent to which a manufacturing industry utilizes its installed productive capacity (Rimo & Tin, 2013). It is the relationship between outputs that is produced with the installed equipment, and the potential output which could be produced with it, if capacity was fully used (Rimo & Tin, 2017). Capacity utilization is measured as a ratio of the actual output to the total output which the plant is able to produce (Shaikh & Moudud, 2004). It is a good performance indicator of business and market conditions because it helps to determine the variance between the total output that can be produced in a plant and the actual output achieved (Rimo & Tin, 2017). When the business environment is good, most plants operate between 70% and 80% of the installed capacity and sometimes close to 100%.

Most businesses will not invest if the existing capacity is not fully utilized (Rimo & Tin, 2017). In other words, investment is stimulated by the level of capacity utilization of firms. The relevance of increase in manufacturing capacity utilization is in the generation of employment and increase in output which eventually results in the low income earners having access to a number of affordable goods (Shaikh & Moudud, 2004). It also means more income to the industrial sector and

effect on Capacity Utilization of listed manufacturing companies in Nigeria.

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Empirical Review

stimulation of investment expenditure. Ukoha (2000), attributed the low rate of capacity utilization in the Nigerian manufacturing industry between 1970 and 1998 to poor infrastructural facilities. He however obtained a result showing positive relationship between capital expenditure and manufacturing capacity utilization. Simon-Oke & Awoyemi, (2010) confirmed from their study that there exist a long run positive relationship between Manufacturing capacity utilization and infrastructural facilities in Nigeria. According to them the low capacity utilization in the manufacturing sector in Nigeria is attributable to infrastructural inadequacies and that this could be rectified through increase in government capital expenditure on these infrastructures. Eze (2013) expressed concern over government expenditure and output of the manufacturing sector in Nigeria even with different fiscal policies of the government focusing on improving the increasing economic growth in the country through the contribution of manufacturing industry and capacity utilization of the sector. He said further that government spending, if well managed; in both developed and developing economies have the capacity to increase national output through the increase in capacity utilization of the manufacturing sector. Eze (2013), obtained a result showing a significant relationship between increase



in government expenditure and output of the manufacturing industry. By implication, as government expenditure increases the capacity utilization of the manufacturing industry increases with it. However, according to Eze (2013), the manufacturing sector capacity utilization rate in Nigeria has not produced a consistent increase in relation to increase in government spending. The rate dropped from 40% in 1990 to 38% in 1992. From 1992 to 2012 the rate was not consistent except for 2010 when it increased to 58.9%. However, government spending has consistently been on the increase. This fluctuation in the relationship between capacity utilization of the manufacturing sector and government expenditure have been attributed to a number of factors including access to long term fund and inability to access raw materials (Enebong, 2003). Dipak and Ata (2003) attributed the challenges of growth in the manufacturing sector to a number of factors including insecurity and weak infrastructures. Enebong (2003) obtained results of the study showing that level of the Nigerian manufacturing industry performance particularly the capacity utilization will continue to fall due to inability to access raw materials arising from competition from foreign firms. This he attributed to inconsistency in government fiscal policy. World Bank Enterprise Survey of Business (2017), conducted on electricity infrastructure with data from manufacturing firms shows that on the average for all countries in the world 58.8 percent of the manufacturing companies experienced power outage, the number of times power outage occurred was 6.3 a month, duration of the period of power outage was 4.4 hours while losses was only 4.6% of total sales. Average number of manufacturing firms that own or share generators to total firms was 34.1% while average proportion of electricity from generator was 20.9%. In 2014, 77.6% of the manufacturing companies in Nigeria experienced power outage with 32.8 times of power outage in a month, the duration of power outage was 11.6 hours a day, loss of income to total sales was 15.6%. On the average 70.7% of all the manufacturing companies in Nigeria have their generators and the proportion of electricity coming from generator was 58.8%. These indicators are far

higher than average for all countries according to Ogwo and Agu (2016), the deplorable condition of roads in the country has continued to cause a decline in capacity utilization of the manufacturing sector. The capacity utilization declined from 73.3% in 1984 to 53.3% in 2009 and 52.12% in 2010. Otto and Ukpere (2015), attributed high cost of production and the low level of output of manufacturing companies in Nigeria to insecurity. These challenges have caused a number of these companies to relocate to other West African countries (Otto et al, 2015). Very crucial to operational performance of manufacturing companies is the development of Human Capital. Human capital includes the stock of knowledge, habits, social and personality attributes, skills, abilities; experience, intelligence, training, judgment, with creativity, possess by individuals or a people which are instrumental to the production of economic value. These attributes are the resources which constitute the human assets used in the creation of wealth needed to transform the production capacity of any nation (O'Sullivan, 2003). The human capital is required for capacity building in the manufacturing sector and success of any organization (Crook, Todd, Combs, Woehr and Kethchen, 2011); human capital increases through education and experience (Crook et al., 2011). For these reasons, the emphasis across the globe is now on knowledge economy; knowledge acquired through high quality education produces human skills that support high level of productivity (Rahmah, 2009). Anumudu (2000) examined the influence of human capital development and productivity of labour force in the manufacturing industries in Nigeria. He obtained results showing a significant relationship between the labour productivity and human capital development. Based on the results of his study concluded that literacy rate or human capital formation affects positively the Total Factor Productivity. In other words, human capital development increases output level of firms in the manufacturing sector. This study therefore examined government spending on power, roads, security and human capital development and Capacity Utilization of Manufacturing Companies in Nigeria.



Manufacturing Capacity Utilization and Government Spending

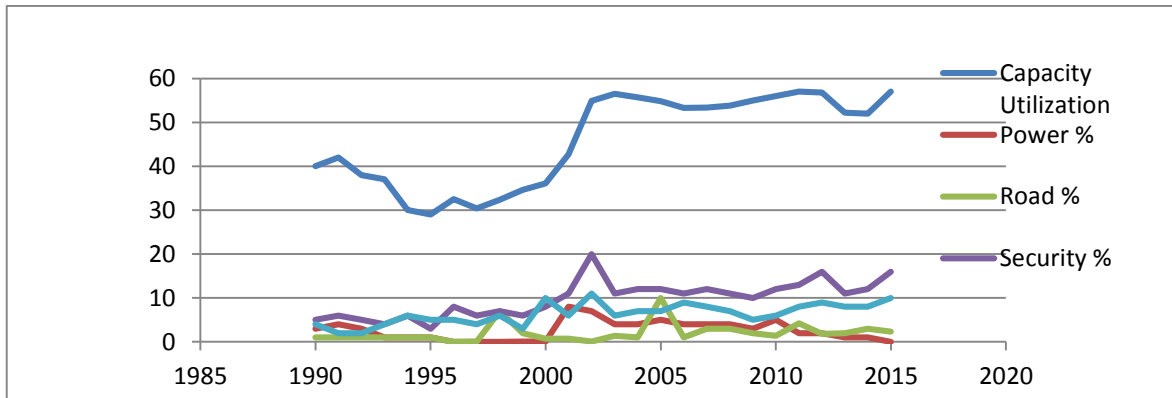
Years	Manufacturing sector Capacity Utilization %	Power Spending % of total expenditure	Roads Spending % of total expenditure	Security Spending % of total expenditure	Human Capital Development Spending % of total expenditure
1990	40	3	1	5	4
1991	42	4	1	6	2
1992	38	3	1	5	2
1993	37	1	1	4	4
1994	30	1	1	6	6
1995	29	1	1	3	5
1996	32.5	0.03	0.03	8	5
1997	30.4	0.02	0.04	6	4
1998	32.4	0-06	7	7	6
1999	34.6	0.07	2	6	3
2000	36.1	0.05	0.7	8	10
2001	42.7	8	0.7	11	6
2002	54.9	7	0.07	20	11
2003	56.5	4	1.38	11	6
2004	55.7	4	1.04	12	7
2005	54.8	5	10	12	7
2006	53.3	4	1.04	11	9
2007	53.38	4	3	12	8
2008	53.84	4	3	11	7
2009	55	3	2	10	5
2010	56	5	1.4	12	6
2011	57	2	4.2	13	8
2012	56.8	2	1.8	16	9
2013	52.17	1	2	11	8
2014	52	1	3	12	8
2015	57	0.02	2.3	16	10

Source: Researcher’s Field survey

The table shows the range of Capacity Utilization of the manufacturing sector in Nigeria between 1990 and 2015. With initial value of about 40%, it attained a height of about 56.5% in 2003 and began to fall. There was a downward trend in the fluctuation until 2011 when a peak of 57% was attained. From 2011 to 2015 the fluctuation was between 52% and 57%.

The table also revealed that the percentage of government spending on Power to total expenditure fell from 3% in 1990 to 2% in 2011 and ultimately to 0.02% in 2015. Although a

height of 8% was attained in 2001, it however decline gradually from that year to only 0.02% in 2015. The percentage of government spending on Roads fluctuated between 1% and 4%. It was 1% in 1990, attained the peak in 2011 when it was 4% and fell to only 2% in 2015. Expenditure on security recorded better performance with 5% in 1990 and consistently rose to 16% in 2015. Human Capital Development (HCD) recorded 4% in 1990, rose to 9% in 2006 and then fluctuated between 5% and 10%. The peak of 10% was achieved in 2015. This is further illustrated with the Chart Below.



Combination of all the curves in the Chart shows a wide gap between Manufacturing Capacity Utilization and government spending on Power, Roads, Security and Human Capital Development. The blue curve which represents Capacity Utilization at the top level range is between 40 and

57. The maximum of the percentages of government expenditure on the four independent variables are far less than the minimum of the Capacity Utilization, thus establishing the insignificant combine effect of government expenditure on the Capacity Utilization.

Descriptive Statistics Table

	Manufacturing Capacity Utilization	Power	Road	Security	Education
Mean	45.90	2.69	2.03	9.77	6.39
Median	52.09	3	1.21	11	6
Mode	57	4	1	11	6
Std. Deviation	10.46	2.22	2.19	4.10	2.42
Skewness	-0.38	0.62	2.49	0.43	-0.03
Kurtosis	-1.63	-0.11	7	0.08	-0.58
Range	28.00	0.02	0.03	3	2
Minimum	29.00	8.0	10	20	11
Maximum	57.00	5.0	4.2	16.0	10.0
JarqueBera	29.3913	0.3076	31.7442	9.1846	0.4609
Probability	0.0000	0.8575	0.0000	0.0101	0.7942

Source: Researcher's Field Survey

In the Descriptive Statistics table, Capacity Utilization has the mean value of 45.9 while the median is 52.0, the two figures are not significantly different and therefore are symmetrical indicating that the data set are normally distributed with the midpoint of it close to the same value of the mean. The data distribution has a maximum value of 57 and minimum value of 29. The Standard deviation which measures the degree of dispersion of the data from the mean is just 10.49 implying that only 10.49% of the data set fell outside the mean. Skewness which is the extent

to which the data are not symmetrical in the table has a negative value of -0.38 slightly different from zero indicating that the tail of the distribution is to the left. Similarly JarqueBera was 29.391 with Probability value of 0.000, Kurtosis value of -1.63 shows that the data set was normally distributed.

The significance of government spending on Capacity Utilization of manufacturing companies in Nigeria was tested with regression analysis based on our Hypothesis. Results of the regression are as stated in the co-efficient table below.



Model Specification: $Y = f(X)$

$Y =$ Capacity Utilization

$X =$ Government Expenditure on Infrastructures

$X = x_1, x_2, x_3, x_4$

$x_1 =$ Government Expenditure On Power

$x_2 =$ Government Expenditure On Roads

$x_3 =$ Government Expenditure On Security

$x_4 =$ Government Expenditure On Human

Capital Development

$$CAPUTL = \beta_0 + \beta_1 POWEXP_{it} + \beta_2 RODEXP_{it} + \beta_3 SECEXP_{it} + \beta_4 HCDEXP_{it} + \varepsilon$$

Model Summary Table

Model	R	R ² Square	Adjusted R ²	Standard Error of the estimate	Sig.F-Change	df1	Durbin-Watson
1	0.853 ^a	0.727	0.675	5.96458	0.000	4	1.263

Source: Researcher's Field Survey

a. Dependent Variable: Capacity Utilization.

b. Predictors: (Constant), HCD, Power, Road, Security

Correlations

		Capacity Utilization	Power	Roads	Security	HCD
Pearson Correlation	Capacity Utilization	1.000	0.493	0.239	0.823	0.564
	Power	0.493	1.000	0.010	0.431	0.119
	Road	0.239	0.010	1.000	0.149	0.135
	Security	0.823	0.431	0.149	1.000	0.796
	HCD	0.564	0.119	0.135	0.796	1.000

Source: Researcher's Field Survey

a. Dependent Variable: Capacity Utilization.

b. Predictors: (Constant), HCD, Power, Road, Security



Coefficient Table

Model 1	Unstandardized Coefficients		Standardized Coefficient	t-statistics	Sig.
	B	Std. Error	Beta		
Constant	25.792	3.577		7.211	0.000
Power	0.609	0.649	0.130	0.938	0.359
Road	0.619	0.551	0.130	1.124	0.274
Security	2.261	0.582	0.887	3.888	0.001
HCD	-0.756	0.893	-0.175	-0.846	0.407

Researcher’s Field Survey

- a. **Dependent Variable: Capacity Utilization.**
- b. **Predictors: (Constant), HCD, Power, Road, Security**

ANOVA Table

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1987.923	4	496.981	13.969	0.000 ^b
	Residual	747.100	21	35.576		
	Total	2735.023	25			

Source: Researcher’s Field Survey

- a. **Dependent Variable: Capacity Utilization**
- b. **Predictors: (Constant), HCD, Power, Road, Security**

$$CAPUTL = 25.79 + 0.609POWEXP_{it} + 0.619RODEXP_{it} + 2.26SECEXP_{it} - 0.76HCDEXP_{it} + \varepsilon$$

III. Findings

In the model summary table, R which is the correlation between Government expenditure and Manufacturing Capacity Utilization is 0.853. This result shows that there is high positive correlation between the independent (Government expenditure) and dependent (CU) variables. R², which measures the strength of the relationship between Government Expenditure and Capacity Utilization is 0.727 that is a 72.7% of a change in Capacity Utilization is explained by Government Expenditure on Power, Roads, Security and Human Capital Development. Durbin-Watson statistic of 1.263, less than 2.0 shows that there is no multi co-linearity among the independent variables. The correlation of Power Expenditure to Capacity Utilization is 0.493, Road has a correlation of 0.239, Security is 0.823 while Human Capital

Others are Security with t-statistics of 3.888 and 0.001 significant level and finally HCD with t-value of -0.846 and a significant level of 0.407. These results show that it is only the

Development is 0.564. The significance of this is that both the dependent and independent variables move in the same direction. As the government spending on each of these independent variables increases Capacity Utilization also increases.

In the co-efficient table, the value of constant is 25.792 representing the value of Manufacturing Capacity Utilization when Government Expenditure is zero. Coefficient of the independent variables; Power is 0.609, Road is 0.619, Security is 2.261 and Human Capacity Development is -0.756. The t-statistics associated with these coefficients as shown in the table are; 7.211 for constant with 0.000 significant level, 0.938 for Power with 0.359 significant level, 1.124 for Road at 0.274 significant level.

Security Expenditure that has a significant relationship with Capacity Utilization.

In the ANOVA table, F-value which is the Mean Square Regression divided by the Mean Square



Residual is 13.969, the P-value associated with the F-value as shown in the significance column is

Results of our study show that government expenditure on Power, Roads and Human Capital Development did not have significant effect on Capacity Utilization of manufacturing companies in Nigeria. According to the normative theory of accounting in the public sector, if government financial resources are properly deployed, government expenditure will have positive and significant effect on the activities of individual and

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