



Productivity Performance Assessment of a Firm: A Case Study of Infrastructural Construction Company in Nigeria

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ABSTRACT: Productivity measures how efficiently production inputs, such as labour and capital, are being used in an economy to produce a given level of output. Productivity growth constitutes an important element for modeling the productive capacity of economies. It also allows analysts to determine capacity utilization, which in turn allows one to gauge the position of economies in the business cycle and to forecast economic growth. The objective of the study is to analyze the impact of productivity, while using the inventory of the construction Company in Nigeria to investigate, measure, plan and control the productivity and performance of a firm. Data used for this study was generated through the firm's annual reports and financial statements. Multiple Linear regression Model developed was used to predict accurately the productivity level of the firm. In order to check the significant and the adequacy of the model developed, the coefficient of correlation(R), coefficient of determination (R^2) and adjusted R^2 were determined, with an R^2 value of 0.983 and an adjusted R^2 values of 0.932 obtained indicating that the model is adequate. The result of the study shows that the degree of association and correlation of the data is meritorious. Investigation revealed that factors in both external and internal work environment as well as the firm's policies are unfavorable to the enhancement of labour productivity.

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The term productivity has been recognized for its contribution to operational, organizational, industrial, and national competitiveness. Productivity implies how well the resources are utilized for goods and service generation (and, from the national perspective, the wealth generation). It is crucial to the welfare of the industrial firm as well as for the economic progress of the country. High productivity refers to doing the work in a shortest possible time, with least expenditure on inputs without sacrificing quality and with minimum wastage of resources (Taj and Lismar, 2006). According to (Anyanwu, 2004, Udo-Aka, 1983). There is no universal definition of the term, productivity. It has been defined by Economists as the ratio of output to input in a given period of time. In

other words, it is the amount of output produced by each unit of input Business Managers, on the other hand, see productivity not only as a measure of efficiency, but also connotes effectiveness and performance of individual organizations (Anyanwu, 2004). For them, productivity would incorporate quality of output, workmanship, adherence to standards, absence of complaints, customer satisfaction, etc (Udo-Aka, 1983). According to (Adekoya, 1987) The administrator is more concerned with organizational effectiveness, while the industrial engineer focuses more on those factors which are more operational and quantifiable, work measurement and performance standards. Productivity can be computed for a firm, industrial group, the entire industrial sector

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or the economy as a whole. It measures the level of efficiency at which scarce resources are being utilized. Higher or increasing productivity will, therefore, mean either getting more output with the same level of input or the same level of output with less input. The least controversial definition of productivity is that it is a quantitative relationship between output and input (Iyaniwura and Osoba, 1983, Antle and Capalbo, 1988). This definition enjoys general acceptability because of two related considerations. One, the definition suggests what productivity is thought of to be in the context of an enterprise, an industry or an economy as a whole. Two, regardless of the type of production, economic or political system, this definition of productivity remains the same as long as the basic concept is the relationship between the quantity and quality of goods and services produced and the quantity of resources used to produce them (Prokopenko, 1987). Eatwell and Newman (1991) defined productivity as a ratio of some measure of output to some index of input use. Put differently, productivity is nothing more than the arithmetic ratio between the amount produced and the amount of any resources used in the course of production. This conception of productivity goes to imply that it can indeed be perceived as the output per unit input or the efficiency with which resources are utilized (Samuelson and Nordhaus, 1995). Today the term productivity has acquired a wider meaning. Originally, it was used only to rate the workers according to their skills. The person who produced more either faster or harder were said to have higher productivity. Subsequently, emphasis was laid to improve the hourly output by analyzing and improving upon the techniques applied by different workers. A system of measurement was then evolved to compare the improvement made in relation to the rate of output and in order to improve productivity further, machines were introduced (Afaha, 2014). Manufacturers of machines started incorporating new features, with the help of latest technological developments. Computers have now become powerful tools towards improving productivity (Singh, 2000; Khan, 2003). Productivity measurement and analysis have gained more recognition from researchers and higher acceptance from practitioners over the past three decades (Mohamed, 1996). It has evolved from merely linking individual and accounting-related to more comprehensive information that contains both financial and non-financial information. The need to improve productivity measurement is apparent in both manufacturing and service industries (Medori, 2000).

Caves *et al.* (1982) observed that efficiency of transformation of inputs to outputs is largely dependent on the skill of the workforce. Skill is one of

the main inputs of a production process. Publications by Scott and Pisa (1998) recognize and analyze the need for a coherent, systematic methodology for productivity measurement and analysis at the factory level. There are three important measures which are defined in monetary rather than physical units: throughput, inventory and operational expenses. The first should be maximized and the last two should be minimized. Productivity measures the capability to meet the demand and not the sales. Consequently, attempts to measure the output in terms of units sold in a shop, mixes both a production measure and a demand measure in a way that makes it difficult to quantify (Abdel-wahab, 2008). Many organizations have used productivity measurement as a primary tool for communicating future directions, establishing functional and project accountability, defining the roles and responsibilities, allocating the limited resources, monitoring and evaluating the activities, establishing the targets and benchmarks, and initiating necessary changes to ensure continuous improvement. This work is geared towards studying the productivity and performance of a firm, evaluate and measure its productiveness, determine the impact of productivity on the nation's economy, and identify critical factors limiting productivity in an organization using Multiple Linear regression analysis.

MATERIALS AND METHODS

The processes of Multiple linear regression analysis was the statistical tools and techniques employed for the analysis of data. The mathematical approach for this study is enumerated in model formulation of this research work. This study was carried out using Data obtained from Infrastructural Construction Company in Nigeria. The data obtained from the company's annual reports and financial statements was converted into productivity ratios and subjected to various mathematical manipulations to measure and determine the relevance of productivity on the firm's performance, and the various factors affecting it. Consequently, the multiple linear regression analysis methods was chosen because of its ability to group data into dependent and independent variables. In the proceeding sections, we explained the mathematical platform on which the multiple linear regression model was developed, how Productivity of the firm was computed, how data was visibly manipulated and the way this translates into interpretable results.

Model Formulation: From the above data in table 1, the Total productivity ratio represents the dependent variable y , while the labour, material, capital, energy, and other expenses productivity ratios are the domain of independent variables x_1 , x_2 , x_3 , x_4 and x_5 respectively. In order to develop the multivariate

normal equations, we need to formulate tables from the derived data's in table 1.

$$y = b_0 + b_1x_1 + \dots + b_nx_n \quad (1b)$$

To develop the multivariate normal equations using the dependent variable y and the domain of independent variables x₁, x₂, x₃, x₄ and x₅. Thus:

To solve equation (1) we need to develop a set of normal equation by multiplying the model by independent variable and sum.

$$y=b_0+b_1x_1+b_2x_2+b_3x_3+b_4x_4+b_5x_5 \quad (1a)$$

Thus,

$$y = bo + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 \dots (2)$$

The above is widely used in industries the model is of the form

To solve for b₀, b₁, b₂, b₃, b₄, and b₅ we proceed as follow:

$$\sum y = nb_0 + b_1 \sum x_1 + b_2 \sum x_2 + b_3 \sum x_3 + b_4 \sum x_4 + b_5 \sum x_5 \dots \dots \dots (3)$$

$$\sum x_1y = b_0 \sum x_1 + b_1 \sum x_1^2 + b_2 \sum x_1x_2 + b_3 \sum x_1x_3 + b_4 \sum x_1x_4 + b_5 \sum x_1x_5 \dots \dots \dots (4)$$

$$\sum x_2y = b_0 \sum x_2 + b_1 \sum x_1x_2 + b_2 \sum x_2^2 + b_3 \sum x_2x_3 + b_4 \sum x_2x_4 + b_5 \sum x_2x_5 \dots \dots \dots (5)$$

$$\sum x_3y = b_0 \sum x_3 + b_1 \sum x_1x_3 + b_2 \sum x_2x_3 + b_3 \sum x_3^2 + b_4 \sum x_3x_4 + b_5 \sum x_3x_5 \dots \dots \dots (6)$$

$$\sum x_4y = b_0 \sum x_4 + b_1 \sum x_1x_4 + b_2 \sum x_2x_4 + b_3 \sum x_3x_4 + b_4 \sum x_4^2 + b_5 \sum x_4x_5 \dots \dots \dots (7)$$

$$\sum x_5y = b_0 \sum x_5 + b_1 \sum x_1x_5 + b_2 \sum x_2x_5 + b_3 \sum x_3x_5 + b_4 \sum x_4x_5 + b_5 \sum x_5^2 \dots \dots \dots (8)$$

Equations (3) to (8) are the normal equations for the model represented by equation (1). Substituting the variables being summed by the summation notation we have.

- 5b₀ + 21.63b₁ + 90.03b₂ + 15.09b₃ + 287.99b₄ + 28.85b₅ = 6.11
- 21.63b₀ + 95.20b₁ + 390.92b₂ + 65.48b₃ + 1211.59b₄ + 123.72b₅ = 26.51
- 90.03b₀ + 390.92b₁ + 1628.74b₂ + 272.23b₃ + 5112.60b₄ + 518.94b₅ = 110.19
- 15.09b₀ + 65.48b₁ + 272.23b₂ + 45.94b₃ + 881.44b₄ + 87.33b₅ = 18.54
- 287.99b₀ + 1211.59b₁ + 5112.60b₂ + 881.44b₃ + 18,890.95b₄ + 1699.26b₅ = 354.70
- 28.85b₀ + 123.72b₁ + 518.94b₂ + 87.33b₃ + 1699.26b₄ + 167.63b₅ = 35.31

We can transform the above equations to matrix form as follows;

Table 1: Matrix form

5	21.6	90.03	15.9	287.99	8.85	b ₀	6.11
21.63	95.20	390.92	65.48	1211.59	123.72	b ₁	26.51
90.03	390.92	1628.74	272.23	5112.60	518.94	b ₂	110.19
15.09	65.48	272.23	45.94	881.44	87.33	b ₃	18.54
287.99	1211.59	5112.60	881.44	18,890.95	1699.26	b ₄	354.70
28.85	123.72	518.94	87.33	1699.26	167.63	b ₅	35.31

After solving the matrix above, the following values were obtained;

To test for the adequacy of the multivariate model, we use the equation 10;

$$b_0 = 8.6067, b_1 = 1.2276, b_2 = 0.0851, b_3 = 1.6192, b_4 = 0.0102, b_5 = 1.2625$$

Model Adequacy: The above results are then tabulated to obtain the model adequacy.

Substituting the values obtained above into the model in equation (1), we have the fitted Multivariate Linear regression model for the firm is:

$$R^2 = \left\{ 1 - \frac{\sum(y-\hat{y})^2}{\sum(y-\bar{y})^2} \right\} \quad (10)$$

$$\hat{y} = 8.6067 + 1.2276x_1 + 0.0851x_2 + 1.6192x_3 + 0.0102x_4 + 1.2625x_5 \quad (9)$$

Where R² is the coefficient of determination and R is the coefficient of correlation.

Coefficient of determination is a measure of the extent to which the dependent variable is able to account for the observed variability in the independent variable, while coefficient of correlation is a measure of the degree of association between the two variables.

Where y , y_i and \bar{y} are estimated mean value, actual and predicted values of output response (y) respectively. Since it is always possible to increase the value of R^2 by adding more repressor variables, therefore the adjusted R^2 value is computed using equation (11).

$$R^2_{adj} = 1 - \frac{n-1}{n-p} (1 - R^2) \quad (11)$$

Where n is the total number of observations and p is the number of regression coefficients.

RESULT AND DISCUSSION

The obtained inventory of the Infrastructural construction company in Nigeria is shown in Table 1.

Table 2: Inventory of the Infrastructural Construction Sector in Nigeria

Particulars	2011	2012	2013	2014	2015
A. Output					
1. Construction and Maintenance					
i. Civil works	101,383,428	120,375,160	101,762,935	109,333,628	122,437,567
ii. Building works	65,889,534	76,307,591	82,165,087	70,386,981	46,633,975
iii. Services	125,761	271,962	284,163	258,098	170,999
Total Output	167,398,723	196,954,713	184,212,185	179,978,707	169,242,541
B. Inputs					
1. Labour					
i. Wages and Salaries	36,895,835	43,025,869	41,682,863	44,401,611	30,109,505
ii. Social security costs	387,061	410,629	468,087	1,211,930	-
iii. Defined benefit plans	3,707,244	1,449,205	844,939	325,215	407,270
iv. Defined contribution (pension schemes)	993,344	1,199,607	1,276,404	1,483,844	694,152
2. Materials					
i. Construction materials	3,498,050	3,226,126	3,299,342	2,850,488	2,589,532
ii. Consumables	2,269,159	2,089,625	2,272,197	2,026,787	1,481,724
iii. Spares	4,339,151	4,336,454	4,075,700	4,453,449	4,484,729
iv. Others	543,690	536,718	609,792	544,138	445,486
3. Capital					
i. Property, plant and equipment	54,650,926	56,172,990	66,542,850	66,711,736	55,470,657
4. Energy costs	1,946,713	2,708,783	2,942,892	4,593,487	6,148,772
5. Other Expenses					
i. Marketing expenses	91,479	152,155	101,537	116,276	66,355
ii. Administrative expenses	21,998,911	27,066,902	26,750,656	26,829,104	30,650,717
iii. Audit fees	36,000	70,000	70,000	56,000	56,000
iv. Income tax expense	5,461,817	3,772,925	6,242,816	3,298,407	3,397,666
TOTAL INPUT	136,819,380	146,217,988	157,180,075	158,902,472	136,002,565

Note: All the units are in Monetary terms 'Naira

Analysis of Data

Productivity Measures of the Firm: Assuming 2011 is the base year

$$\text{Deflator for the year} = \frac{\text{Current year price}}{\text{Base year price}} \quad (12)$$

A. Calculations for the year 2011

$$\text{Total Output} = 167,398,723$$

Calculations for Productivity measures

$$1. \text{ Total Productivity Measure} = \frac{\text{Total Output}}{\text{Total Input}} = \frac{167,398,723}{136,819,380} = 1.22$$

$$2. \text{ Labour Productivity} = \frac{\text{Output}}{\text{Labour Input}} = \frac{167,398,723}{41,983,484} = 3.99$$

$$3. \text{ Material Productivity} = \frac{\text{Output}}{\text{Material Input}} = \frac{167,398,723}{10,650,050} = 15.72$$

$$4. \text{ Capital Productivity} = \frac{\text{Output}}{\text{Capital Input}} = \frac{167,398,723}{54,650,926} = 3.06$$

$$5. \text{ Energy Productivity} = \frac{\text{Output}}{\text{Energy Input}} = \frac{167,398,723}{1,946,713} = 85.99$$

$$6. \text{ Other Expenses Productivity} = \frac{\text{Output}}{\text{Other expenses input}} = \frac{167,398,723}{27,588,207} = 6.07$$

B. Calculations for the year 2012

$$\text{Total Output} = 196,954,713$$

Calculations for Productivity Measures

$$1. \text{ Total Productivity Measure} = \frac{196,954,713}{146,217,988} = 1.35$$

$$2. \text{ Labour Productivity} = \frac{196,954,713}{46,085,310} = 4.27$$

- 3. Material Productivity = $\frac{196,954,713}{10,188,923} = 19.33$
- 4. Capital Productivity = $\frac{196,954,713}{56,172,990} = 3.51$
- 5. Energy Productivity = $\frac{196,954,713}{2,708,783} = 72.71$
- 6. Other Expenses Productivity = $\frac{196,954,713}{31,061,982} = 6.34$

C. Calculations for the year 2013

Total Output = 184,212,185

Calculations for Productivity Measures

- 1. Total Productivity Measure = $\frac{184,212,185}{157,180,075} = 1.17$
- 2. Labour Productivity = $\frac{184,212,185}{44,272,293} = 4.16$
- 3. Material Productivity = $\frac{184,212,185}{10,257,031} = 17.96$
- 4. Capital Productivity = $\frac{184,212,185}{66,542,850} = 2.77$
- 5. Energy Productivity = $\frac{184,212,185}{2,942,892} = 62.59$
- 6. Other Expenses Productivity = $\frac{184,212,185}{33,165,009} = 5.55$

D. Calculations for the year 2014

Total Output = 179,978,707

Calculations for Productivity Measures

- 1. Total Productivity Measure = $\frac{179,978,707}{158,902,472} = 1.13$

- 2. Labour Productivity = $\frac{179,978,707}{47,422,600} = 3.79$
- 3. Material Productivity = $\frac{179,978,707}{9,874,862} = 18.22$
- 4. Capital Productivity = $\frac{179,978,707}{66,711,736} = 2.70$
- 5. Energy Productivity = $\frac{179,978,707}{4,593,487} = 39.18$
- 6. Other Expenses Productivity = $\frac{179,978,707}{30,299,787} = 5.94$

E. Calculations for the year 2015

Total Output = 169,242,541

Calculations for Productivity Measures

- 1. Total Productivity Measure = $\frac{169,242,541}{136,002,565} = 1.24$
- 2. Labour Productivity = $\frac{169,242,541}{31,210,927} = 5.42$
- 3. Material Productivity = $\frac{169,242,541}{9,001,471} = 18.80$
- 4. Capital Productivity = $\frac{169,242,541}{55,470,657} = 3.05$
- 5. Energy Productivity = $\frac{169,242,541}{6,148,772} = 27.52$
- 6. Other Expenses Productivity = $\frac{169,242,541}{34,170,738} = 4.95$

Productivity ratios of Firm computed is presented in in Table 2.

Table 3: Productivity Ratios

Particulars	2011	2012	2013	2014	2015
Total Productivity Ratio	1.22	1.35	1.17	1.13	1.24
Labour Productivity Ratio	3.99	4.27	4.16	3.79	5.42
Material Productivity Ratio	15.72	19.33	17.96	18.22	18.80
Capital Productivity Ratio	3.06	3.51	2.77	2.70	3.05
Energy Productivity Ratio	85.99	72.71	62.59	39.18	27.52
Other Expenses Productivity Ratio	6.07	6.34	5.55	5.94	4.95

$$PI = \frac{PR_{CY}}{PR_{BY}} \quad (13)$$

$$\text{Total productivity index in 2012} = \frac{1.35}{1.22} = 1.11$$

Here PI = productivity index; PR_{CY} = productivity ratio in the current year; PR_{BY} = productivity ratio in the base year

Productivity index of the Firm computed is presented in Table3.

Table 4: Productivity Index

Particulars	2011	2012	2013	2014	2015
Total Productivity Index	1	1.11	0.96	0.93	1.02
Labour Productivity Index	1	1.07	1.04	0.95	1.36
Material Productivity Index	1	1.23	1.14	1.16	1.20
Capital Productivity Index	1	1.15	0.91	0.88	0.99
Energy Productivity Index	1	0.85	0.73	0.46	0.32
Other Expenses Productivity Index	1	1.04	0.91	0.98	0.81

From Table3, If the productivity index is greater than 1 it means there is increase in Productivity, If the Productivity index is less than 1, it means there is decrease in Productivity as presented in Table 4.
 Increase in Productivity = Productivity Index – 1 (14)
 Increase in total productivity in 2012 = 1.11 – 1 = 0.11

productivity ratio represents the dependent variable y, while the labour, material, capital, energy, and other expenses productivity ratios are the domain of independent variables x₁, x₂, x₃, x₄ and x₅ respectively. In order to develop the multivariate normal equations, we need to formulate tables from the derived data's in table 1. To obtain the values of the multivariate model, we substitute the values of the domain of independent variables x₁, x₂, x₃, x₄ and x₅ into the model in Equation 9. Results obtained is presented in Table 5.

Data Analysis using Multiple Linear regression Model Developed: From the above data in table 1, the Total

Table 5 : Total Productivity

S/N	Y	x ₁	x ₂	x ₃	x ₄	x ₅	x ₁ ²	x ₂ ²	x ₃ ²	x ₄ ²
1	1.22	3.99	15.72	3.06	85.99	6.07	15.92	247.12	9.36	7394.28
2	1.35	4.27	19.33	3.51	72.71	6.34	18.23	373.65	12.32	5286.74
3	1.17	4.16	17.96	2.77	62.59	5.55	17.31	322.56	7.67	3917.51
4	1.13	3.79	18.22	2.70	39.18	5.94	14.36	331.97	7.29	1535.07
5	1.24	5.42	18.80	3.05	27.52	4.95	29.38	353.44	9.30	757.35
Σ	6.11	21.63	90.03	15.09	287.99	28.85	95.20	1628.74	45.94	18,890.95

Table 6 : Labour Productivity

x ₅ ²	x ₁ x ₂	x ₁ x ₃	x ₁ x ₄	x ₁ x ₅	x ₂ x ₃	x ₂ x ₄	x ₂ x ₅
36.85	62.72	12.21	343.10	24.22	48.10	1351.76	95.42
40.20	82.54	14.99	310.47	27.07	67.85	1405.48	122.55
30.80	74.71	11.52	260.37	23.09	49.75	1124.12	99.68
35.28	69.05	10.23	148.49	22.51	49.19	713.86	108.23
24.50	101.90	16.53	149.16	26.83	57.34	517.38	93.06
167.63	390.92	65.48	1211.59	123.72	272.23	5112.60	518.94

Table 7 : Material Productivity

x ₃ x ₄	x ₃ x ₅	x ₄ x ₅	x ₁ y	x ₂ y	x ₃ y	x ₄ y	x ₅ y
263.13	18.57	521.96	4.87	19.18	3.73	104.91	7.41
255.21	22.25	460.98	5.77	26.10	4.74	98.16	8.56
173.37	15.37	347.37	4.87	21.01	3.24	73.23	6.49
105.79	16.04	232.73	4.28	20.59	3.05	44.27	6.71
83.94	15.10	136.22	6.72	23.31	3.78	34.13	6.14
881.44	87.33	1699.26	26.51	110.19	18.54	354.70	35.31

The above results are then tabulated to obtain the model adequacy.

Table 6 : Energy Productivity

S/N	Y	\bar{y}	\bar{Y}	(y - \bar{y})	(y - \bar{y})	(y - \bar{y}) ²	(y - \bar{y}) ²
1	1.22	1.222	1.215	0.005	-0.002	0.000025	0.000004
2	1.35	1.222	1.343	0.007	0.128	0.000049	0.0164
3	1.17	1.222	1.189	-0.019	-0.052	0.000361	0.0027
4	1.13	1.222	1.123	0.007	-0.092	0.000049	0.00846
5	1.24	1.222	1.238	0.002	0.018	0.000004	0.000324
Σ	6.11	6.11	6.108	0.002	0	0.000488	0.0279

$$\therefore R^2 = \left\{ 1 - \frac{\sum(y - \hat{y})^2}{\sum(y - \bar{y})^2} \right\} = \left\{ 1 - \frac{0.000488}{0.0279} \right\} = \{ 1 - 0.017 \} = 0.983$$

The coefficient of determination, R² shows that the dependent variable y is able to account for 98.3% of the observed variability in the independent variables.

To determine the coefficient of correlation R = $\sqrt{0.983}$ = 0.99

From the coefficient of correlation R, the model is meritorious.

The adjusted R² (R²adj) computed from equation (10) = 1 - 5-1/5-6(1 - 0.983) = 0.932

The Data used for the analysis is presented in Table 1. Which is the inventory of the section of the construction company. The productivity ratios and Productivity measures of the firm was computed and the results shows that productivity of a firm could be

measure using total productivity rather labour, partial or multifactor, Total factor productivity as presented in Table 2 and Table 3, That do not accurate measures the productivity of the firm. Productivity analysis of the company from 2011 to 2015 in order to measure the productivity level of the company using 2011 as a base year. From the analysis of results there was an increase in total productivity by 11 percent in 2012 and radial decrease in the total productivity in 2013 and 2014 by 4 percent and 7 percent respectively. From The result, radial decrease in total productivity of the company could be as a result of internal and external factors that facilitate the productivity growth. 2015 saw an increase in Productivity with a small margin of 2 percent. While the multiple linear regression model developed was able to predict accurate the productivity of the firm in future. The result shows an increase in productivity of the firm in 2011 to 2015, In order to determine the adequacy of the model developed the coefficient of correlation(R) and the coefficient of determination (R²) were computed with an R² value of 0.983 obtained and the Adjusted R² value of 0.932 was also obtained indicating that the

model developed was adequate and significant. Table 4 shows the predicted productivity measures of the firm from 2011 to 2015. The result shows an increase in productivity in 2011 and 2012 and a decrease in productivity in 2013 and 2014 while 2015 record a radial increase in productivity measure. The computed productivity by the analytical method and the predicted multivariate regression model developed compared fairly well and are in good agreement. In the light of collection of data, findings and analysis, the following inferences can be made: Hence, the productivity of the firm has to be worked upon and improved by considering the critical factors (both internal and external) that inhibits or facilitates productivity growth. The coefficient of determination, R^2 shows that the dependent variable y is able to account for 98.3% of the observed variability in the independent variables, while the coefficient of correlation shows that the result gotten from the data is meritorious because it accounts for 99%. The Multiple Linear regression model developed was able to predict accurate the productivity Level and of the Firm.

Conclusion: In conclusion, the Multiple Linear Regression analysis clarifies the relationships between the predictor variables and the response variable when the predictors are correlated with each other. And with the correlation, the degree of association between the two variables can be determined. The model developed was able to predict accurately the Productivity of the Firm. Although there has been a decrease in the company's productivity over the years. These decline is as a result of some external and internal factors that has affected the growth and productivity of the firm.

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