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## PRODUCTION PLANNING AND PROFITABILITY OF SELECTED MANUFACTURING FIRMS IN NIGERIA.

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**ABSTRACT:** This research focuses on Production Planning and Profitability. A study of Flour Mill of Nigeria Plc, Dangote Flour Mill Plc, and Honeywell Flour Mill Plc was adopted. Production Planning is important in providing better and more economic goods to customers at lower investment. Inventory shortage as a result of stock out and unexpected increase in demand, supply challenge associated with inadequate capacity installation of machines, poor technology, poor capacity utilization, inability to meet budgetary target as a result of change in demand and supply variable and poor demand forecasting are established as the problem of this study. In view of the problem identified, the objectives of this study are to examine the effect of inventory shortage on turnover, to examine the problems of value added by supply chain on profitability and to ascertain the influence of budget on investment of selected manufacturing firms in Nigeria. This work is anchored on the Economic Theory of Production and Rational Economic Man Theory. Data collected for this research were based on Secondary information. Data obtained were analyzed using Ordinary Least Square (OLS) technique by the use of time series. The finding of this study shows that the estimated coefficient of the constant term is statistically significant at better than 0.1 per cent for Dangote Flour Mill Plc and Honeywell Flour Mill Plc and statistically significant at 0.6 per cent for Flour Mill of Nigeria Plc. This implies that increase in turnover (sales) lead to subsequent increase in inventory which in turn increases level of production. The increase in turnover subsequently increases profitability in Dangote Flour Mill Plc and Honeywell Flour Mill Plc. This study concludes that increase in turnover, profitability and budget are vital sources of facilitating growth in flour milling firms in Nigeria. The study recommends that flour millers should integrate their supply chain management operations efficiently to enhances their sales and profitability and also adopt the supply chain strategy/models that were developed in this study to align with their operations and target customers

**KEYWORDS**: Production Planning, Profitability, Capacity Utilisation and Budgetary Target

## **INTRODUCTION**

The business terrain in which firms operate has witnessed tremendous change in the past in terms of material sourcing, customer satisfaction, inventory management and overall profitability. The level of globalization, which entails that many organizations find themselves operating in a highly competitive international market and the use of highly advanced strategy and technologies have challenged the very basic principles and ideologies of business management and marketing Management. To compete in a global environment, therefore, organizations have had to change in order to sustain growth and break new frontiers. As a result, most industries have transformed completely from manual processes to complicated, automated and computerized technologies and strategies (Minoli, 2005).

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Production planning is associated with planning (that is the acquisition, time of usage, quantity) of the resources required to perform these transformation steps, in order to satisfy the customers in the most efficient or economical way (Ahuja, 2004). In other words, the production decisions are typically taken by looking at the best trade-off between financial objectives and customer service or satisfaction objectives. Profitability is a state or condition of yielding financial profit or gain, in other words, profitability refers to the operating efficiency of the enterprise (Business Dictionary, 2012). It is the ability of enterprise to get sufficient return on the capital and employees used in the business operation. Revenue and profits are driven solely by market share and efficiency, therefore success is determined mainly by the ability of a company to ensure superior capacity utilisation.

# **Statement of the Problem**

In manufacturing environments, production planning is associated with decisions about the size of the production lots of the different products to be manufactured. This therefore has to do with processing the time at which those lots have to be produced, as well as the machine and/or production facility for the final production.

Flour Mills of Nigeria Plc, Dangote Flour Mills Plc and Honeywell Flour Mills Plc have jointly continued to grapple with operating environment problems ranging from high exchange rate to high production cost as well as poor infrastructure in Nigeria. Furthermore, Flour Milling Industries in Nigeria, are experiencing slow sales growth, inventory shortage, rising cost-income ratio (that is driven by rising interest expenses on the company's large borrowings), high cost of operations which result in reduction of improved profit.

## **Objectives of the Study**

The overall objective of this paper is to determine the effect of production planning on profitability of manufacturing firms in Nigeria.

This paper seeks to achieve the objectives stated below:

- i. To examine the influence of inventory shortages on turnover of Flour Milling firms in Nigeria.
- ii. To examine the value added by supply chain on profitability of flour milling firms in Nigeria.
- iii. To ascertain the influence of budget on the investment of flour milling firms in Nigeria

# **REVIEW OF RELATED LITERATURE**

Jolayemi and Oloruniwo (2010) developed a deterministic model for planning production and transportation quantities in a multi-plant and multi-warehouse environment, where opportunities to increase capacity levels were available. A mixed integer linear programming model was applied to analyse this model.

Hong-Sen, Qi-Feng, Min-Ru, and Xia-Ling (2013) addressed the closely related problems of production planning and scheduling on mixed model automobile assembly lines. They proposed an integrated solution, in which a production plan that was feasible with respect to

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aggregate capacity constraint was developed and then a sequence that was feasible with respect to this plan was sought. They proposed three tabu-search-based algorithms that explore the solution spaces for both problems to different degrees to find a combination of a production plan and schedule that were feasible and that approximately optimized the objective function ( involving the overproduction and underproduction of finished automobiles, the set up cost, the idle times of work cells on the line, the make span and the load deviations among work cells). Simulation was used to evaluate alternative schedules.

Mula, Poler, and Garcia, (2012), presented a new linear programming model for medium term production planning in a capacity constrained MRP, multi-product, multi-level and multi-period manufacturing environment. This paper provided three fuzzy models with flexibility in the objective function. The paper demonstrated the usefulness and significance of MRP modeling with flexible constraints under uncertainty in demand. Their model was tested using real data from an automobile seat manufacturer.

# METHODOLOGY

The classical linear regression models also known as Ordinary Least Square technique were employed in analyzing the data. This statistical tool seeks to establish the strength or degree of association between the dependent variables and independent variables. The software used for analysis is GrettI.

## **Model Specification**

**Turnover Equation:** these equations examine the influence of inventory shortages on turnover of Flour Milling Industries in Nigeria.

The estimation model is as stated below:

TNOR=a (INVT, PRT, BGT, TECH, EXCHR, IMPt-1, FAST, CAST) <sup>e</sup>t ..... (i)

This could be restated as follows:

TNOR=  $a_0 + a_1$  LINVT +  $a_2$ LPRT+  $a_3$ LBGT +  $a_4$ LTECH +  $a_5$ L EXCHR+  $a_6$ L IMPt-1+  $a_7$ LFAST

Where:

 ${}^{e}t =$ Stochastic term

a<sub>0</sub> - a<sub>8</sub> = Parameter Estimate or error term

TNOR = turnover LINVT = log of inventory

LPRT = log of profitability

LBG = log of budget

 $LTECH = \log of technology$ 

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 $LEXCHR = \log of exchange rate$ 

LIMP $t-1 = \log of import at particular point in time$ 

 $LFAST = \log of fixed asset$ 

LCAST = log of current asset

**Profitability Equation:** these equations examine the value added by supply chain on profitability of Flour Milling Industries in Nigeria.

PROF = f (CPROD, CAST, EXCH, TNOR, INVT, PRCUST, TECH, CAPU) <sup>e</sup>t ------ (iii)

Econometrically the model can be restated as:

 $\label{eq:pressure} \begin{array}{l} PRT = b_0 + \ b_1 \ LCPROD + \ b_2 \ LCAST + \ b_3 LEXCH + \ b_4 LTNOR + \ b_5 LINVT + \ b_6 \ LPRCUST + \ b_7 LTEC + \ b_8 LCAPU \ ^e \ \textbf{t}(\ iv) \end{array}$ 

Where:

Supply chain is proxy for procurement cost

 $b_{0-}b_8 = parameter estimates / parameter structure$ 

<sup>e</sup>t = stochastic or error term

PRT = Profitability

 $LCPROD = \log of \cos t of production$ 

 $LFAST = \log of fixed asset$ 

LCAST = log of current asset

 $LEXCH = \log of exchange rate$ 

LTNOR = log of turnover

LINVT = log inventory

LPRCUST = log of procurement cost

LTECH = log of technology

LCAPU = log of capacity utilization

**Budget Equation**: These equations ascertain the influence of budget on investment of the Flour Milling Industries in Nigeria.

The model is restated in econometric form as follows:-

BGT = $e_0+e_1LINV+e_2LPRT+e_3LTNOR+e_4CAST+e_5FAST+e_6LCAPU+e_7LEXCHR$  <sup>e</sup>t ------(X)

Where:

 $e_0 - e_7 =$ parameter estimates / parameter structure

 ${}^{e}t = \text{stochastic or error term}$ 

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BGT = budget LINV =log of investment LPRT = log of profitability LTNOR= log of turnover L CAST = log of current asset LFAST = log of fixed asset LCAPU = log of capacity utilisation LEXCHR = log of exchange rate

# Data Presentation and Analysis of Data

The data used for model estimation of equation i, ii and iii in relation to production planning and profitability of selected manufacturing firms in Nigeria is presented below. In the equations, dependent variables include turnover, profitability and budget. The explanatory variables includes: inventory, profitability, budget, technology, exchange rate, turnover, import, fixed asset, current asset, cost of production, procurement cost, investment, and capacity utilization.

Table 1.1a, 1.1b and 1.1c presents the variables used for estimating turnover equation. Column 1 of the table presents the range of years which the study covers. Column 2 of the tables presents the yearly data for turnover. Column 3 shows the yearly figures for profitability within the range of year covered by the study. Column 4 presents the yearly data for budget over the period under study. Column 5 presents yearly figures for technology within the years covered by the study. Column 6 presents the yearly data for exchange rate over the period under study. Column 7 shows the yearly figures for import within the range of year covered by the study Column 8 presents the yearly data for fixed asset over the period under study. Column 9 presents the yearly figures for current asset within the range of year covered by the study.( see appendix 1,2 &3)

Table 2.2a, 2.2b and 2.2c, presents the variables used for estimating profitability equation. Column 1 of the table presents the range of years which the study covers. Column 2 of the tables presents the yearly data for profitability. Column 3 shows the yearly figures for cost of production within the range of year covered by the study. Column 4 presents the yearly data for fixed asset over the period under study. Column 5 presents yearly figures for current asset within the years covered by the study. Column 6 presents the yearly data for exchange rate over the period under study. Column 7 shows the yearly figures for turnover within the range of year covered by the study. Column 9 presents the yearly figures for procurement cost within the range of year covered by the study. Column 10 presents the yearly data for technology within the range of years covered by the study. Column 11 presents the yearly data for capacity utilisation within the range of years covered by the study. (See appendix 4, 5 &6)

Table 3.3a, 3.3b and 3.3c, presents the variables used for estimating budget equation. Column 1 of the table presents the range of years which the study covers. Column 2 of the tables presents the yearly data for budget. Column 3 shows the yearly figures for investment within the range of year covered by the study. Column 4 presents the yearly data for profitability over the period under study. Column 5 presents yearly figures for turnover within the years covered

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by the study. Column 6 presents the yearly data for current asset over the period under study. Column 7 shows the yearly figures for fixed asset within the range of year covered by the study Column 8 presents the yearly data for capacity utilisation over the period under study. Column 9 presents the yearly figures for exchange rate within the range of year covered by the study. (See appendix 7, 8 & 9)

# **ANALYSIS OF RESULTS**

This study focused on Production planning variables such as turnover, profitability and budget and profitability of selected manufacturing firms in Nigeria. These set of regressions were run using the ordinary least square method to obtain the results.

#### **Turnover Equation**

# Table 1.1a: Regression result of inventory shortage on turnover of Flour Mill of Nigeria plc.

Method of Estimation = ordinary least squares

F (Zero slopes) = 2.54127 [.062]

R-square = 2.266345

Adjusted R-squared = .161537

Variable	Estimated coefficient	Standard Error	t-statistic	P-value
∆C	244.098	497.122	3.491022	[.627]
∆LINVT	-268.351	791.836	1-338897	[.737]
<b>△</b> LPRT	-391.948	1103.46	2.355200	[.725]
∆ LBGT	-287.030	121.193	-2.36837	[.908]
∆ LTECH	.130993E-02	.011201	2.116949	[.908]
<u> </u>	.448271	.785111	1.99871	[.611]
△LIMP	.38421	.861819	1.337181	[.781]
△ LFAST	.567382	.132399	2.254301	[.400]
△ LCAST	.691846	.674222	1.446261	[.0121]

Source: Gret L. package

 Table 1.1b: Regression result of inventory shortage on turnover of Dangote Flour Mill
 plc.

Method of Estimation = ordinary least squares

F (Zero slopes) = 7.62668 [.000]

Published by European Centre for Research Training and Development UK (www.eajournals.org) R-square = .512660

K-square = .512000

Variable	Estimated	Standard	t-statistic	P-value
	coefficient	Error		
∆C	8.89194	1.03171	5.28745	[.000]
∐LINVT	.360377	.177672	2.02833	[.053]
$\triangle$ LPRT	135004	113370	-1.19083	[.245]
$\triangle$ LBGT	325429E-04	.450373E-03	-972258	[.943]
$\wedge$ LTECH	121732	.100591	-1.21016	[.238]
$\triangle$ LEXCHR	.072258	.186345	.958745	[.347]
$\triangle$ LIMP	.085923	.034436	2.49517	[.020]
$\triangle$ LFAST	.025844	.04587	2.52164	[.000]
$\triangle$ LCAST	.078634	.06728	-1.10155	[.003]

Adjusted R-squared = .44544137

Source: Gret L. package

# Table 1.1c: Regression result of inventory shortage on turnover of Honeywell Flour Mill plc.

Method of Estimation = ordinary least squares

F (Zero slopes) = 2.30335 [.084]

R-square = .254420

Adjusted R-squared = .143963

Variable	Estimated	Standard	t-statistic	P-value
	coefficient	Error		
∑C	12.1672	1.63991	7.41946	[.000]
△LINVT	149544	.105400	-1.41882	[.167]
$\triangle$ LPRT	.067100	.219790	.305293	[.762]
$\triangle$ LBGT	.013291	.037992	.349840	[.729]
$\triangle$ LTECH	.194749	.094557	2.349840	[.049]
$\triangle$ LEXCHR	.0811148	.0216880	1.994821	[.000]
$\triangle$ LIMP	.138322	.0937991	2.212445	[0.004]
<u> </u>	195658	.0619684	0.496778	[.006]
$\triangle$ LCAST	.0621342	.0734548	1.331654	[.681]

Source: Gret L. package

**Profitability Equation** 

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# Table 2.2a: Regression result of value added by supply chain on profitability of Flour Mill of Nigeria plc.

Method of Estimation = ordinary least squares

F (Zero slopes) = 7.62668 [.000]

R-square + 512660

Adjusted R-squared = 445441

Variable	Estimated	Standard Error	t-statistic	P-value
	coefficient			
∆C	15.5529	3.98060	3,90718	[.001]
△LPROD	-179243	.171230	-1.04680	[.304]
<u> </u>	-014780	.826302E-02	-178871	[.084]
<u> </u>	.289034	.181993	1.58816	[.123]
$\bigwedge$ LTNOR	-1.69249	.745011	-2.27177	[.031]
$\triangle$ lnvt	.48792	.041235	2.116138	[.638]
△ LPRCUST	.228917	0.231185	1.99872	[.7718]
△ LTECH	-346728	0.52146	2.66731	[.000]
△ LCAPU	294261	0.332464	1.99344	[.616]

Source: Gret L. package

# Table 2.2b: Regression result of value added by supply chain on profitability of Dangote Flour Mill plc.

Method of Estimation = Ordinary Least Squares

F (zero slopes) = 2.19421 [.096]

R-squared = .245321

Adjusted R-squared = .133517

Variable	Estimated	<b>Standard Error</b>	t-statistic	p-value
	Coefficient			
С	11.9486	1.60526	7.44336	[.000]
$\triangle$ LPROD	-119611	.092745	-1.28968	[.208]
$\triangle$ LCAST	.52447	.219705	.237817	[.813]
$\triangle$ LEXCHR	.01449	.038174	.377724	[.709]
$\Delta$ LTNOR	.182497	.092997	1.96240	[.060]
$\triangle$ LNVT	.0411821	.318604	1.61330	[.000]
$\triangle$ LPRCUST	.0623618	.046412	1.18920	[0.101]
$\triangle$ LTECH	.0812322	.063141	-2.34350	[.818]
△LCAPU	0.0431631	.046824	1.181176	[.005]

Source: Gret L. Package

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# Table 2.2c: Regression result of value added by supply chain on profitability of Honeywell Flour Mill plc.

Method of Estimation = Ordinary Least Squares

F (Zero slopes) = 12.2497 [.000]

R-squared = .702000

Adjusted R-squared = .64469i3

Variable	Estimated coefficient	Standard error	T-statistic	P-value
∠c	12.1673	1.63992	7.41946	[.000]
<b>∠</b> LPROD	149544	.105400	-1.41882	[.167]
△LCAST	.671002	.219790	.305293	[.762]
<u> </u> LEXCHR	.013291	.037992	.349840	[.729]
LTNOR	.194749	.094557	2.05959	[.049]
<u> </u>	.284728	.024118	2.11318	[.056]
LPRCUST	.73358	.216470	1.93426	[.031]
<u> </u>	.185658	.0718510	2.359651	[.042]
△LCAPU	.162425	.0314620	.416182	[.004]

Source: Gret L. Package

**Budget Equation** 

# Table 3.3a: Regression result of Budget on investment of Flour Mill of Nigeria plc.

Method of Estimation = Ordinary Least Squares

F (zero slopes) = 60.6091 [.000]

R-squared =.899791

Adjusted R-squared=.884945

Variable	Estimated	Standard	t-statistic	P-value
	coefficient	Error		
$\triangle$ C	4.91534	3.60048	1.3619	[.183]
$\triangle$ LINV	143381	2.76488	-2.518581	[.608]
$\triangle$ LPRT	.385298	1.75352	2.19728	[.037]
$\triangle$ LTNOR	013046	.016981	768282	[.449]
∆ LFAST	.660997	.119042	5.55263	[.000]
∆ LCAST	347878	.18792	1.98722	[.116]
∆ LCAPU	.256671	.07672	2.25831	[.221]
$\triangle$ EXCHR	.465135	.128153	1.94432	[.011]

Source: Gret L. Package

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# Table 3.3b: Regression result of Budget on investment of Dangote Flour Mill plc.

Method of Estimation = Ordinary Least Squares

F(zero slopes) = 299.437 [.000]

R-squared =.977955

Adjusted R squad =.974689

Variable	Estimated	Standard	t-statistic	P-value
	coefficient	Error		
$\triangle$ C	33.7875	63.4163	.532788	[.599]
$\triangle$ LINV	-2.90529	5.18621	560195	[.580]
$\triangle$ LPRT	.017767	1.63076	2.010895	[.991]
$\triangle$ LTNOR	.054903	.947989	2.057916	[.954]
∆ LFAST	1.41947	3.19415	1.644397	[.660]
∆ LCAST	76.1360	3.40986	2.23282	[.034]
∆ LCAPU	0.28722	2.38711	2.92134	[.104]
$\triangle$ EXCHR	0.37789	1.99861	1.32413	[.0100]

Source: Gret L. Package

# Table 3.3c: Regression result of Budget on investment of Honeywell Flour Mill plc.

Method of Estimation = Ordinary Least Squares

F (zero slopes) = 36.3714 [.000]

R-squared =.8947216

Adjusted R squad =.872548

Variable	Estimated	Standard	t-statistic	P-value
	coefficient	Error		
$\triangle$ C	244.098	497.122	1.491022	[0.627]
$\triangle$ LINV	-268.351	791.836	4.338897	[.737]
$\triangle$ LPRT	-391.948	1103.46	7.355200	[.725]
$\triangle$ LTNOR	-287.030	121.193	-2.36837	[.025]
∆ LFAST	.13993E-02	.011201	.116949	[.908]
∆ LCAST	.228917	0.231185	1.99872	[.778]
∆ LCAPU	.48792	0.412358	2.1161381	[.6387]
$\triangle$ EXCHR	.06384.1	0221.1841	.245538	[.003]

Source: Gret L. Package

#### SUMMARY OF FINDINGS

The findings of this work are summarized based on the empirical results. The study records thus:

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- I. The regression result of table 1.1a, 1.1b and 1.1c indicates that the estimated coefficient for these results are statistically significant at 0.6 per cent (Flour Mill of Nigeria plc), better than 0.1 per cent for both (Dangote flour mill Plc) and (Honeywell flour mill Plc). This implies that Dangote Flour Mill Plc and Honeywell Flour Mill Plc increase turnover, leads to increase in inventory which in turn increase level of profitability. The regression coefficient of inventory for Flour Mill of Nigeria plc and Honeywell Flour Mill Plc are statistically not significant at 0.7 per cent and 0.1 per cent but Dangote Flour Mill Plc is statistically significant at better than 0.1 per cent. This implies that in Flour Mills of Nigeria plc, Dangote Flour Mills Plc and Honeywell Flour Mills Plc increase in inventory shortage leads to decrease in profitability which is against management expectation. The coefficient of profitability, budget and technology are statistically significant at 0.7 per cent (profitability), 0.9 per cent (budget) and 0.9 per cent for (technology). This further reveals that turnover contributes meaningfully to high profitability, budget and through the application of technology and innovation installed of companies studied as well as high level of economic growth in the country.
- II. From regression analysis of table 2.2a, 2.2b and 2.2c, the estimated coefficient for these results are statistically significant at better than 0.1 per cent Flour mill of Nigeria plc,

Dangote flour Mill of Nigeria and Honeywell flour Mill plc. This implies that at zero performance of all the independent variables, profitability facilitate performance at 15.5529 for Flour Mill of Nigeria Plc, 11.9486 for Dangote flour mill and 12.1673 for Honeywell flour mill Plc respectively. The regression coefficient of production cost for Flour mill of Nigeria Plc, Dangote flour mill Plc and Honeywell flour mill Plc are statistically not significant at 0.3 per cent, 0.2 per cent and 0.1 per cent. The coefficients of inventory, turnover and capacity utilization are statistically significant at 0.6 per cent (inventory), better than 0.1 per cent (turnover) and 0.6 per cent (capacity utilization). This further reveals that efficient use of inventory as well as high turnover and high capacity utilization and installation facilitate the profitability of flour milling sub sector.

III. The regression result of table 3.3a, 3.3b and 3.3c shows the estimated coefficient of investment, profitability, current asset and capacity utilization are statistically significant at various levels. This implies that budget variables associated with investment contributes meaningfully to the profitability of the flour milling industries.

# CONCLUSIONS

This study has been able to provide empirical information on production planning and Profitability of manufacturing firms in Nigeria, on the basis of the findings the following conclusions are made:

Inventory increase turnover of flour milling industry sub sector, value added by supply chain have the potential of facilitating profitability and sustaining the growth of the flour milling firms in Nigeria. Budget influence on investment has linkages to the profitability of flour milling sub sector. Thus, there is functional relationship between production planning variables

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and profitability, particularly in the manufacturing sub-sector, these linkages are important for the growth of organizations. The study concludes that increase in turnover, profitability and budget are vital sources of facilitating growth in the flour milling firms. The growth facilitates improvement in investment, technology, rate of turnover, profitability, reduction in procurement and, production cost and inventory shortage.

## RECOMMENDATIONS

Based on the findings and conclusions, the following recommendations are made:

- 1. Top management of Flour mill of Nigeria Plc, Dangote flour mill Plc, and Honeywell flour mill Plc in making corrective decisions well in time should use the of linear regression methods in their production planning. This method will determine the future production patterns and outlook resulting in the establishment of new production units, while planning for maximizing profits of the company.
- 2. Profitability growth as one of the key preconditions to survive in the market is forcing companies to compete on global markets and at the same time defend domestic market share from their global competitors, the effect of that is increased complexity of supply chains, pressure to decrease cost burden and improve service level. To cope with the complexity of production, increase customer requirements, and profitability efficient management of the supply chain is a prerequisite.
- 3. Production firms most especially the flour millers should integrate their supply chain management operations efficiently to enhance their sales and profitability and also adopt the supply chain strategy/models that was developed in this study to align with their operations and target customers.

# SUGGESTIONS FOR FURTHER STUDY

The study focuses on Production planning and profitability of manufacturing firms in Nigeria for the period 1990 -2014. The use of other tools like linear programming, and forecasting technique of analysis may provide different results from the one used in this study on Production Planning and profitability of manufacturing firms in Nigeria

Another useful extension of this work could be to analyze uncertainties in production situations. Some of the uncertainties in the form of machine failures and demand forecast errors often exist in real life situations. Production planning with stochastic demand would be a good generalization of this research. Situations like variability in processing times of jobs and variability in process yields are very common, especially in process industries. We have focused primarily on deterministic production planning in this research. The information about the problem instances is known with certainty in deterministic planning. Modeling production planning decisions with stochastic parameters would help in capturing some common uncertainties in production planning.

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# **APPENDIX 1**

## Table 1.1a:Turnover Equation.

Turnover: = a (INVT, PRT, BGT, TECH, EXCHR, IMP<sub>t</sub>-1, FAST, CAST) e<sub>t</sub>------(i)

Profitability Indicators of Flour Mills of Nigeria Plc (1990-2014)

YEAR	TNOR	INVT	PRT	BGT	ТЕСН	EXCHR	IMP <sub>t</sub> -1	FAST	CAST
1990	399715	206192	79686	306916	0	8.04	47707900	283546	35205
1991	1199144	268643	109823	399578	1	9.91	89011200	369102	45975
1992	3181699	349932	129237	521170	2	17.10	14790340	481535	59640
1993	415732	455998	145304	677565	3	21.89	16809340	625770	78285
1994	5387776	593798	183425	885945	4	21.89	16478280	818836	100636
1995	7084189	774195	200119	1146751	5	21.89	75712280	1058475	134218
1996	9079137	1007200	235794	1511085	6	21.89	75712270	1398033	167689
1997	12173431	1315385	275794	1929167	7	22.89	56462260	1777390	234965
1998	15063981	1706214	327565	2604089	8	22.89	83941690	2416710	268103
1999	21456312	2239942	379816	3183411	9	92.69	86451470	2915461	436792
2000	23735633	2878700	602878	4628855	10	102.1	9649390	4334669	367518
2001	30922902	3841126	390828	4355615	11	111.9	13569590	3976256	942857
2002	43306511	4794974	1537104	5500059	12	121.9	15825292	5103860	159696
2003	42250029	6728404	254995	6295028	13	129.4	19581134	5067655	2668874
2004	53563211	5525509	1370485	7130930	14	129.4	12254462	5958094	2574855
2005	40017290	7954274	1027108	117830866	15	133.5	15886930	5261612	437538
2006	50985842	12899963	1304675	12891483	16	132.1	15907521	10770073	2121410
2007	64864235	11887898	3015210	17289423	17	128.7	14682982	13785283	3804140
2008	104051379	14924094	4324760	29395534	18	131.4	15492489	21951793	7443741
2009	147388331	20739600	2469512	23660692	19	130.7	15360997	22868239	4171386
2010	157094863	22024084	13370731	64307716	20	130.3	15178823	35384783	5359078
2011	161796284	23260224	10095752	54153698	21	155.8	15344103	42063788	26657467
2012	0	28787944	-12339687	847475251	22	156.7	15261463	79495468	29867608
2013	225629747	40992727	8440528	113405605	23	156.7	15302783	92601111	27326132
2014	245701366	45371104	11113370	90606309	24	157.3	15282123	98943111	25143051

Sources: Nigeria Stock Exchange Fact Book (Various Issues) Publication for different Flour Milling Firms CBN Statistical Bulletin (Various Issues)

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## **APPENDIX 2**

## Table 1.1b:Turnover Equation.

Turnover: = a (INVT, PRT, BGT, TECH, EXCHR, IMP<sub>t</sub>-1, FAST, CAST) e<sub>t</sub>------(i)

Profitability Indicators of Dangote Flour Mills Plc (1990-2014)

YEAR	TNOR	INVT	PRT	BGT	TECH	EXCHR	IMP <sub>t</sub> -1	FAST	CAST
1990	1667126	54902	254471	897503	0	8.04	47707900	551032	324846
1991	2186756	71522	332087	1168655	1	9.91	89011200	775304	423148
1992	2814623	93183	431327	1523855	2	17.10	14790340	877791	551389
1993	3745645	121384	564933	1982111	3	21.89	16809340	1448121	718054
1994	4698223	158166	729049	2589454	4	21.89	16478280	1185251	936116
1995	6238707	205986	965750	3356878	5	21.89	75712280	3159111	1218046
1996	7855980	268511	1221396	4411485	6	21.89	75712270	3966643	1590301
1997	10860141	349446	1675853	5659149	7	22.89	56462260	5510689	2063837
1998	12707801	456088	1988334	7575305	8	22.89	83941690	6389239	2707065
1999	19872622	592251	3039225	9402143	9	92.69	86451470	10142828	3484447
2000	18250781	776012	2925778	13323772	10	102.1	9649390	9024888	4636748
2001	21494464	1000741	3152671	14882658	11	111.9	13569590	11260768	5816593
2002	15007097	1327294	2698885	25088658	12	121.9	15825292	6789007	8093651
2003	27981831	1674928	3606456	32433102	13	129.4	19581134	15732529	9356129
2004	39623810	2138288	2235977	46686687	14	129.4	12254462	18571245	13861857
2005	45399901	5106133	740685	46686687	15	133.5	15886930	19311930	27374757
2006	35672696	4289231	721983	51264394	16	132.1	15907521	14153520	59841510
2007	31303845	1094309	290335	23001803	17	128.7	14682982	21907492	1094309
2008	30109610	337950	1704092	23489809	18	131.4	15492489	23157859	263950
2009	41839919	460695	5359861	27210276	19	130.7	15360997	26749581	463695
2010	42695383	2829608	3753248	29318762	20	130.3	15178823	26489154	2829608
2011	38679844	2556286	920383	27267763	21	155.8	15344103	31199169	2472543
2012	29859976	9785585	-3138119	57832629	22	156.7	15261463	36916232	9613645
2013	14050996	13359244	-7217001	51925552	23	156.7	15302783	36744670	24768875
2014	41265972	15997510	-6119400	32965300	24	157.3	15282123	36830451	20923122

Sources:

Sources: Nigeria Stock Exchange Fact Book (Various Issues) Publication for different Flour Milling Firms CBN Statistical Bulletin (Various Issues)

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## **APPENDIX 3**

## Table 1.1c:Turnover Equation.

Turnover: = a (INVT, PRT, BGT, TECH, EXCHR, IMP<sub>t</sub>-1, FAST, CAST) e<sub>t</sub>------(i)

Profitability Indicators of Honeywell Flour Mills Plc (1990-2014)

YEAR	TNOR	INVT	PRT	BGT	ТЕСН	EXCHR	IMP <sub>t</sub> -1	FAST	CAST
1990	843643	206192	16769	10623	0	8.04	47707900	236008	151401
1991	1097723	268643	21893	138773	1	9.91	89011200	307533	197345
1992	1433206	349932	28414	180797	2	17.10	14790340	400494	256858
1993	1859964	455998	37265	235523	3	21.89	16809340	522104	335177
1994	2439654	593798	47978	306867	4	21.89	16478280	679379	435398
1995	3140238	774195	63817	399701	5	21.89	75712280	886934	570131
1996	4178724	1007200	80115	520900	6	21.89	75712270	1151203	736066
1997	5241991	1315385	111337	678202	7	22.89	56462260	1509598	974326
1998	7286896	1706214	129009	884499	8	22.89	83941690	1944012	1233873
1999	8439076	2239942	205001	1150106	9	92.69	86451470	2584782	1689106
2000	13421614	2878700	182027	1503392	10	102.1	9649390	3247255	2012513
2001	11895615	3841126	432977	1946926	11	111.9	13569590	4507091	3054804
2002	28369226	4794974	113106	2563249	12	121.9	15825292	6234673	2982734
2003	28369226	6728404	168827	3277530	13	129.4	19581134	7286599	3126873
2004	7,317,620	5525509	170,492	4412216	14	129.4	12254462	5,182,747	2838596
2005	7,790,058	7968618	167,161	5420372	15	133.5	15886930	9,390,452	3415149
2006	13146833	2468618	722557	7816277	16	132.1	15907521	2948121	4868156
2007	15599805	2077229	636343	8444840	17	128.7	14682982	3584465	4860375
2008	18773815	4934457	816452	12640469	18	131.4	15492489	5190480	7449989
2009	25964192	4032490	209107	12865953	19	130.7	15360997	5399587	8137475
2010	28483098	3285067	1948396	32141154	20	130.3	15178823	14275123	17866031
2011	29310102	3226626	2412769	35293612	21	155.8	15344103	15815570	19478042
2012	38052227	4931032	2787775	64946292	22	156.7	15261463	17016014	18916157
2013	45709382	10009275	2843520	73990561	23	156.7	15302783	18553083	20468350
2014	55084305	11287037	3351564	84435687	24	157.3	15282123	20605248	27744989

Sources: Nigeria Stock Exchange Fact Book (Various Issues) Publication for different Flour Milling Firms CBN Statistical Bulletin(Various Issues)

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# **APPENDIX 4**

## Table 2.2a:Profitability Equation.

Profitability: = a(CPROD,FAST, CAST, EXCHR, TNOR, INVT, PRCUST, TECH,CAPU) et-----(ii)

Profitability Indicators of Flour Mills of Nigeria Plc (1990-2014)

YEAR	PRT	CPROD	FAST	CAST	EXCHR	TNOR	INVT	PRCUST	TECH	CAPU
1990	79686	2253564	236008	151401	8.04	399715	206192	731792	0	52.0
1991	109823	2927336	307533	197345	9.91	1199144	268643	953303	1	52.8
1992	129237	3833357	400494	256858	17.10	3181699	349932	1242073	2	52.7
1993	145304	4948652	522104	335177	21.89	415732	455998	1617837	3	52.7
1994	183425	6551419	679379	435398	21.89	5387776	593798	2108383	4	52.6
1995	200119	8294537	886934	570131	21.89	7084189	774195	2745127	5	52.5
1996	235794	11359720	1151203	736066	21.89	9079137	1007200	4655360	6	52.4
1997	275794	13523891	1509598	974326	22.89	12173431	1315385	6084707	7	52.3
1998	327565	18205934	1944012	1233873	22.89	15063981	1706214	7881374	8	52.2
1999	379816	21076496	2584782	1689106	92.69	21456312	2239942	10372746	9	52
2000	602878	23132755	3247255	2012513	102.1	23735633	2878700	13271376	10	51.8
2001	390828	30532074	4507091	3054804	111.9	30922902	3841126	17846863	11	51.5
2002	1537104	31268078	6234673	2982734	121.9	43306511	4794974	21967266	12	51.2
2003	254995	31679423	7286599	3126873	129.4	42250029	6728404	31573323	13	51.0
2004	1370485	35238466	5,182,747	2838596	129.4	53563211	5525509	34328475	14	51.6
2005	1027108	44959132	9,390,452	3415149	133.5	40017290	7954274	45095629	15	50.8
2006	1304675	49823543	2948121	4868156	132.1	50985842	12899963	39712052	16	50.9
2007	3015210	52688223	3584465	4860375	128.7	64864235	11887898	67061759	17	51.0
2008	4324760	91688824	5190480	7449989	131.4	104051379	14924094	94411465	18	51.3
2009	2469512	133311104	5399587	8137475	130.7	147388331	20739600	135324317	19	51.4
2010	13370731	22648927	14275123	17866031	130.3	157094863	22024084	162003056	20	51.1
2011	10095752	92681637	15815570	19478042	155.8	161796284	23260224	188681796	21	51.3
2012	- 12339687	162714347	17016014	18916157	156.7	157110371	28787944	169372405	22	51.3
2013	8440528	202445764	18553083	20468350	156.7	225629747	40992727	207991186	23	51.3
2014	11113370	216422044	20605248	27744989	157.3	245701366	45371104	213169770	24	51.3

Sources: Nigeria Stock Exchange Fact Book (Various Issues) Publication for different Flour Milling Firms CBN Statistical Bulletin(Various Issues)

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# **APPENDIX 5**

# Table 2.2b:Profitability Equation.

Profitability:= a(CPROD,FAST, CAST, EXCHR, TNOR, INVT, PRCUST, TECH,CAPU) et-

Profitability Indicators of Dangote Flour Mills Plc (1990-2014)

YEAR	PRT	CPROD	FAST	CAST	EXCHR	TNOR	INVT	PRCUST	TECH	CAPU
1990	254471	96699	551032	324846	8.04	1667126	54902	1297530	0	52.0
1991	332087	126106	775304	423148	9.91	2186756	71522	1691182	1	52.8
1992	431327	163991	877791	551389	17.10	2814623	93183	2201409	2	52.7
1993	564933	214328	1448121	718054	21.89	3745645	121384	2782138	3	52.7
1994	729049	277644	1185251	936116	21.89	4698223	158166	3732088	4	52.6
1995	965750	365341	3159111	1218046	21.89	6238707	205986	4884325	5	52.5
1996	1221396	467592	3966643	1590301	21.89	7855980	268511	6311940	6	52.4
1997	1675853	628429	5510689	2063837	22.89	10860141	349446	8341035	7	52.3
1998	1988334	774347	6389239	2707065	22.89	12707801	456088	105494787	8	52.2
1999	3039225	1110937	10142828	3484447	92.69	19872622	592251	14428318	9	52
2000	2925778	1212109	9024888	4636748	102.1	18250781	776012	17356043	10	51.8
2001	3152671	1313280	11260768	5816593	111.9	21494464	1000741	25928911	11	51.5
2002	2698885	1515622	6789007	8093651	121.9	15007097	1327294	26139225	12	51.2
2003	3606456	1920307	15732529	9356129	129.4	27981831	1674928	27312555	13	51.0
2004	2235977	3811142	18571245	13861857	129.4	39623810	2138288	27489661	14	51.6
2005	740685	5152188	19311930	27374757	133.5	45399901	5106133	27843874	15	50.8
2006	721983	5063299	14153520	59841510	132.1	35672696	4289231	27135449	16	50.9
2007	290335	5107744	21907492	1094309	128.7	31303845	1094309	28552300	17	51.0
2008	1704092	5295523	23157859	263950	131.4	30109610	337950	25718597	18	51.3
2009	5359861	31842774	26749581	463695	130.7	41839919	460695	32155962	19	51.4
2010	3753248	33659644	26489154	2829608	130.3	42695383	2829608	33019066	20	51.1
2011	920383	31372618	31199169	2472543	155.8	38679844	2556286	32634410	21	51.3
2012	- 3138119	39310274	36916232	9613645	156.7	29859976	9785585	50976880	22	51.3
2013	- 7217001	42699112	36744670	24768875	156.7	14050996	13359244	78497790	23	51.3
2014	- 6119400	48204693	36830451	20923122	157.3	41265972	15997510	49737335	24	51.3

Sources: Nigeria Stock Exchange Fact Book (Various Issues) Publication for different Flour Milling Firms CBN Statistical Bulletin(Various Issues)

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## **APPENDIX 6**

## Table 2.2c:Profitability Equation.

Profitability: = a(CPROD,FAST, CAST, EXCHR, TNOR, INVT, PRCUST, TECH,CAPU) et-----(ii)

Profitability Indicators of Honeywell Flour Mill Plc (1990-2014)

YEAR	PRT	CPROD	FAST	CAST	EXCHR	TNOR	INVT	PRCUST	ТЕСН	CAPU
1990	16769	146523	236008	151401	8.04	843643	206192	777372	0	52.0
1991	21893	190881	307533	197345	9.91	1097723	268643	1012561	1	52.8
1992	28414	248688	400494	256858	17.10	1433206	349932	1319555	2	52.7
1993	37265	323956	522104	335177	21.89	1859964	455998	1718129	3	52.7
1994	47978	422137	679379	435398	21.89	2439654	593798	2240534	4	52.6
1995	63817	549640	886934	570131	21.89	3140238	774195	2913854	5	52.5
1996	80115	716772	1151203	736066	21.89	4178724	1007200	3807749	6	52.4
1997	111337	932147	1509598	974326	22.89	5241991	1315385	4933813	7	52.3
1998	129009	1218167	1944012	1233873	22.89	7286896	1706214	6489436	8	52.2
1999	205001	1578278	2584782	1689106	92.69	8439076	2239942	8312003	9	52
2000	182027	2076228	3247255	2012513	102.1	13421614	2878700	11156306	10	51.8
2001	432977	2658606	4507091	3054804	111.9	11895615	3841126	13779703	11	51.5
2002	113106	3570077	6234673	2982734	121.9	28369226	4794974	19689214	12	51.2
2003	168827	4405740	7286599	3126873	129.4	28369226	6728404	21649895	13	51.0
2004	170,492	6304490	5,182,747	2838596	129.4	7,317,620	5525509	22561355	14	51.6
2005	167,161	6912730	9,390,452	3415149	133.5	7,790,058	7968618	22738435	15	50.8
2006	722557	10862148	2948121	4868156	132.1	13146833	2468618	23604274	16	50.9
2007	636343	13245102	3584465	4860375	128.7	15599805	2077229	23611031	17	51.0
2008	816452	16345616	5190480	7449989	131.4	18773815	4934457	23677516	18	51.3
2009	209107	19497273	5399587	8137475	130.7	25964192	4032490	23764546	19	51.4
2010	1948396	22648927	14275123	17866031	130.3	28483098	3285067	23590485	20	51.1
2011	2412769	24081476	15815570	19478042	155.8	29310102	3226626	24889278	21	51.3
2012	2787775	30934899	17016014	18916157	156.7	38052227	4931032	42500517	22	51.3
2013	2843520	37788322	18553083	20468350	156.7	45709382	10009275	39211063	23	51.3
2014	3351564	44626674	20605248	27744989	157.3	55084305	11287037	45789971	24	51.3

Sources: Nigeria Stock Exchange Fact Book (Various Issues) Publication for different Flour Milling Firms CBN Statistical Bulletin(Various Issues)

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# **APPENDIX 7**

## Table 3.3a:Budget Equation.

Budget := a(INV, PRT, TNOR, CAST, FAST, CAPU, EXCHR) e<sub>t</sub>------(iii)

Profitability Indicators of Flour Mill of Nigeria Plc (1990-2014)

YEAR	BGT	INV	PRT	TNOR	CAST	FAST	CAPU	EXCHR
1990	306916	23326	79686	399715	35205	283546	52.0	8.04
1991	399578	30343	109823	1199144	45975	369102	52.8	9.91
1992	521170	39635	129237	3181699	59640	481535	52.7	17.10
1993	677565	51395	145304	415732	78285	625770	52.7	21.89
1994	885945	67109	183425	5387776	100636	818836	52.6	21.89
1995	1146751	88276	200119	7084189	134218	1058475	52.5	21.89
1996	1511085	113052	235794	9079137	167689	1398033	52.4	21.89
1997	1929167	151776	275794	12173431	234965	1777390	52.3	22.89
1998	2604089	187379	327565	15063981	268103	2416710	52.2	22.89
1999	3183411	267950	379816	21456312	436792	2915461	52	92.69
2000	4628855	294186	602878	23735633	367518	4334669	51.8	102.1
2001	4355615	319359	390828	30922902	942857	3976256	51.5	111.9
2002	5500059	396199	1537104	43306511	159696	5103860	51.2	121.9
2003	6295028	1227373	254995	42250029	2668874	5067655	51.0	129.4
2004	7130930	1050055	1370485	53563211	2574855	5958094	51.6	129.4
2005	117830866	1050055	1027108	40017290	437538	5261612	50.8	133.5
2006	12891483	1050796	1304675	50985842	2121410	10770073	50.9	132.1
2007	17289423	1513320	3015210	64864235	3804140	13785283	51.0	128.7
2008	29395534	999999	4324760	104051379	7443741	21951793	51.3	131.4
2009	23660692	404500	2469512	147388331	4171386	22868239	51.4	130.7
2010	64307716	240000	13370731	157094863	5359078	35384783	51.1	130.3
2011	54153698	4307969	10095752	161796284	26657467	42063788	51.3	155.8
2012	847475251	24705717	-12339687	0	29867608	79495468	51.3	156.7
2013	113405605	24780625	8440528	225629747	27326132	92601111	51.3	156.7
2014	90606309	30925712	11113370	245701366	25143051	98943111	51.3	157.3

Sources: Nigeria Stock Exchange Fact Book (Various Issues) Publication for different Flour Milling Firms CBN Statistical Bulletin(Various Issues)

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## **APPENDIX 8**

## Table 3.3b:Budget Equation.

Budget: = a(INV, PRT, TNOR, CAST, FAST, CAPU, EXCHR) et.....(iii)

Profitability Indicators of Dangote Flour Mill Plc (1990-2014)

YEAR	BGT	INV	PRT	TNOR	CAST	FAST	CAPU	EXCHR
1990	897503	2577	254471	1667126	324846	551032	52.0	8.04
1991	1168655	3363	332087	2186756	423148	775304	52.8	9.91
1992	1523855	4373	431327	2814623	551389	877791	52.7	17.10
1993	1982111	5718	564933	3745645	718054	1448121	52.7	21.89
1994	2589454	7401	729049	4698223	936116	1185251	52.6	21.89
1995	3356878	9754	965750	6238707	1218046	3159111	52.5	21.89
1996	4411485	12448	1221396	7855980	1590301	3966643	52.4	21.89
1997	5659149	16815	1675853	10860141	2063837	5510689	52.3	22.89
1998	7575305	20528	1988334	12707801	2707065	6389239	52.2	22.89
1999	9402143	29918	3039225	19872622	3484447	10142828	52	92.69
2000	13323772	31665	2925778	18250781	4636748	9024888	51.8	102.1
2001	14882658	68089	3152671	21494464	5816593	11260768	51.5	111.9
2002	25088658	26905	2698885	15007097	8093651	6789007	51.2	121.9
2003	32433102	177362	3606456	27981831	9356129	15732529	51.0	129.4
2004	46686687	469778	2235977	39623810	13861857	18571245	51.6	129.4
2005	46686687	80335	740685	45399901	27374757	19311930	50.8	133.5
2006	51264394	0	721983	35672696	59841510	14153520	50.9	132.1
2007	23001803	7553637	290335	31303845	1094309	21907492	51.0	128.7
2008	23489809	7553637	1704092	30109610	263950	23157859	51.3	131.4
2009	27210276	7463637	5359861	41839919	463695	26749581	51.4	130.7
2010	29318762	7463637	3753248	42695383	2829608	26489154	51.1	130.3
2011	27267763	7750559	920383	38679844	2472543	31199169	51.3	155.8
2012	57832629	00	-3138119	29859976	9613645	36916232	51.3	156.7
2013	51925552	00	-7217001	14050996	24768875	36744670	51.3	156.7
2014	32965300	00	-6119400	41265972	20923122	36830451	51.3	157.3

Sources: Nigeria Stock Exchange Fact Book (Various Issues) Publication for different Flour Milling Firms CBN Statistical Bulletin(Various Issues)

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## **APPENDIX 9**

## Table 3.3c:Budget Equation.

Budget: = a(INV, PRT, TNOR, CAST, FAST, CAPU, EXCHR) et.....(iii)

Profitability Indicators of Honeywell Flour Mill Plc (1990-2014)

YEAR	BGT	INV	PRT	TNOR	CAST	FAST	CAPU	EXCHR
1990	10623	199745	16769	843643	151401	236008	52.0	8.04
1991	138773	226026	21893	1097723	197345	307533	52.8	9.91
1992	180797	373210	28414	1433206	256858	400494	52.7	17.10
1993	235523	304867	37265	1859964	335177	522104	52.7	21.89
1994	306867	814762	47978	2439654	435398	679379	52.6	21.89
1995	399701	99838	63817	3140238	570131	886934	52.5	21.89
1996	520900	234449	80115	4178724	736066	1151203	52.4	21.89
1997	678202	65065	111337	5241991	974326	1509598	52.3	22.89
1998	884499	84692	129009	7286896	1233873	1944012	52.2	22.89
1999	1150106	110501	205001	8439076	1689106	2584782	52	92.69
2000	1503392	143576	182027	13421614	2012513	3247255	51.8	102.1
2001	1946926	187928	432977	11895615	3054804	4507091	51.5	111.9
2002	2563249	242798	113106	28369226	2982734	6234673	51.2	121.9
2003	3277530	320987	168827	28369226	3126873	7286599	51.0	129.4
2004	4412216	407407	170,492	7,317,620	2838596	5,182,747	51.6	129.4
2005	5420372	555555	167,161	7,790,058	3415149	9,390,452	50.8	133.5
2006	7816277	666666	722557	13146833	4868156	2948121	50.9	132.1
2007	8444840	999999	636343	15599805	4860375	3584465	51.0	128.7
2008	12640469	999999	816452	18773815	7449989	5190480	51.3	131.4
2009	12865953	999999	209107	25964192	8137475	5399587	51.4	130.7
2010	32141154	999999	1948396	28483098	17866031	14275123	51.1	130.3
2011	35293612	999999	2412769	29310102	19478042	15815570	51.3	155.8
2012	64946292	10126471	2787775	38052227	18916157	17016014	51.3	156.7
2013	73990561	6868962	2843520	45709382	20468350	18553083	51.3	156.7
2014	84435687	5874818	3351564	55084305	27744989	20605248	51.3	157.3

Sources: Nigeria Stock Exchange Fact Book (Various Issues) Publication for different Flour Milling Firms CBN Statistical Bulletin(Various Issues)