# The Impact of Forecasting on Strategic Planning and Decision Making: An Exploratory Study of Nigerian Stock Exchange *(pp. 179-205)*

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## Abstract

*Ineffective application of effective planning in many organisations is the main thrust for their inability to predict and make a sound decision which lead to the failure to achieve projected performance. This paper examines the decision making and planning process with the use of multiple regression analysis model to forecast the stock market activities of each sector listed on Nigerian stock Exchange by using the number of deals in share and number of share in unit to explain the strength of relationship and the extend of relationship between the value of share in Naira i.e. capitalization in stock for every listed trading sector on Nigerian Stock Exchange market. This study was designed to give strategic managers practical suggestions for better understanding of the forecast so that managers can plan their reactions effectively to enable better performance. The prime objectives of this paper is to develop an operational research model that will assist investor, investment manager and stock broker that participate in stock exchange trading to have an accurate forecast of trading activities on Nigeria stock market. Also, to determine the most suitable planning strategies for the investment manager in relations to Nigeria stock market*

*activities. A dynamic regression model was used as an input data to analyse part of this empirical study that consist of activity summary of Nigerian Stock Exchange. The paper suggestion was based on the recognition that forecasts are derived to serve specific strategic planning and decision making, and that these decisions must be congruent with the company strategy. It therefore concludes that future forecasting must be based on several factors that can affect market value which call for the broadening the understanding of the role of forecasts in strategic decision making.*

**Introduction**
During the past decade, many industries have witnessed a multitude of dramatic changes, such as the deregulation of the financial sector, competition from other financial institutions, and new information technology such as the Internet. All of these changes have produced a combined effect, leading to the unprecedented present day competitive market environment. In order to survive in this highly volatile industry, competent forecasting and planning have become vital activities for organisations. The managers of these institutions require timely and accurate forecasts of variables such as deposits, loans, exchange rates, and interest rates, etc. in order that they might fulfill their planning and control responsibilities in an effective manner.

Forecasting generally involves using information from the past to make decision concerning the future; manager or stockbroker have faced a dilemma in this regard, namely that of whether and how to use the past to tell beforehand, what will happen in the future. In this respect some manager or stockbrokers attempt to make a distinction between a prediction and forecast. Herein a prediction is defined to be the use of subjective judgment or experience in making an estimate of the future, while a forecast is defined to be the extrapolation of past data into the future using some scientific or statistical method.  We do not attempt to make a distinction between forecasts and predictions in this stage, but in this research work our major emphasis was on forecasting rather than prediction (Yokum and Armstrong, 1995). Managers that understand the tie between the resource decision and the forecast horizon can be more flexible in their resource plans on long-term decisions. This flexibility facilitates better implementation of forecasts and better strategic planning.

In practice, prediction is often related to a specific situation, and few explicit predictive models are available. It should be emphasized, however, that may be possible to make very good accurate subjective estimates of future occurrence. Many forecasting techniques are techniques are statistical in nature. As such, they are based on the statistical concept, which is reviewed in the theoretical framework of this paper.

The ability to make a good forecast is also of importance to other quantitative model, for example, inventory control model are based on the ability to forecast the future demand for a given goods or item. Also it is often very useful to initially calculate a forecast by some scientific method, and then use subjective judgement to further refine the forecast. If a manager is aware of a planned advertising campaign with respect to a particular product, he or she would certainly want to use this information in increasing demand forecasts made from extrapolation of past data.

Accurate forecasting enables the manager to select the right combination of human and material resources to produce the physical goods or services require for the firm. This paper introduces several methods that can be used to help forecast how the operations of an organisation will proceed in the future.

Forecasting objectives prior to actually making a forecast is a critical necessity. Definition of such forecasting objectives include appraisal of the purpose of the forecast that is how is the forecast to be used? If the manager is interested in a forecast of anticipated yearly demand for a new product that must be produced using a special pieces of equipment. In this instance, a fairly gross forecast may be sufficient to allow the manager to make a decision concerning the acquisition of the new equipment. In another instance, the manager may need to actually schedule the work force for a particular time period, translated into production requirements would need to be made with a fairly high degree of accuracy.

The time span involved in the forecasting problem may be an important forecasting technique. Forecasting problems can be classified according to three-time span.
i. Short range: current operations and the immediate future
ii. Intermediate range: operations in the next one to three years.

iii. Long range: operations beyond three year selecting a forecasting model to be employed.

The most assiduous task associated with developing a good forecasting model is "fitting" to the data. This task involves determining the value of certain model parameter so that the forecast are as accurate as possible. There are two broad approaches to forecasting; subjective predictions based on intuition and formalized statistical models. The intuitive approach is based on the managers' experience as related to making a judgement concerning future situation. Qualitative data and information about special events are used in making the subjective predictions. The statistical modeling approach relies on objective historical data and systematically uses this historical data to determine a summary value, which is then use as a forecast of the future. There are two basic types of models that are used within the statistical approach to forecasting:
1)      Time series analysis and projection models
2)      Causal model

Time series analysis and projection models are typically used when there are several years of data for the consideration and underlying relationships and trends of these data appear to be measured and relatively stable.

Causal model are typically used when the forecaster has several years observation data for the situation under consideration and are determine in relationship between the observed data and other economic or socioeconomic factors.

As part of the forecasting process and in order to evaluate alternative forecasting methods, forecasting effectiveness must be measured, usually, some measure of forecast error is employed to evaluate the effectiveness of the forecast.

Forecast error is defined to be the numerical difference between the forecasted and the actual situation, in a specific time period.
Forecast error = forecast observation – actual result

Obviously, the forecaster would like the forecasting errors to be as small as possible, and would choose a forecasting method to accomplish this objective.

There are numerous ways of measuring forecasting errors; but commonly used measures of forecasting errors are

Absolute measures of forecasting error: are so named because the error measurements employed are made in an absolute manner without any consideration given to the underlying level of items.

The stock market is not like every market where the owner of the goods goes to the open market and sells to whoever wants to buy. In this case of exchange market only the brokers, as authorized dealer are permitted in the selling or buying of securities. In other word, stock exchange market is a network of specialized financial institution that in various ways bring together suppliers and users of capital through their agents on the floor of the market. Increasing workforce diversity is another challenge of international firms (Aremu 2008).

On the trading floor, the broker enter into contract among themselves for the decency of a given number of shares (which must have been offered for sale at that time) for the payment of specified sum of money i.e. for a price normally quoted at each trading activities of the stock exchange market.

One of the basic problems facing the individual brokers attempting to make a forecast into the next stock market price is the selection of the forecasting method that will allow the achievement of a good estimate of future price or trading floor price.

This paper developed an operational research model or tools which broker can use to forecast i.e. extrapolation of past price data into the future by using regression based forecasting model.

Since there are myriad of forecasting technique in existence and each will take a special care to provide and select the correct forecasting technique for forecasting the value of share in naira for each sector on giving trading floor.

**Objectives of the Paper**

This paper is carried out to achieve the following objectives.

- To develop an operational research model that will assist investor, investment manager and stock broker that participate in stock exchange trading to have an accurate forecast of trading activities on Nigerian Stock Market.

- To determine the most suitable strategic planning strategies for the investment manager in relations to Nigerian Stock Market activities.
- To determine the various environmental factors that affect predicting Nigeria stock market situation, through an operational research model.
- To develop model for an investment manager to understand and know the future activities of the Nigerian Stock Market so that appropriate strategies for the next action will be put in place.

**Theoretical Frame Work**

The key reason managers insist on an accurate forecast is that they believe it reduces costs. Research shows that in many companies, 10 percent or more of net gross profit is lost because forecast inaccuracy causes overages and shortages in inventory (Ritzman and King, 1993). Additionally, the inaccurate forecast causes production replanning that creates purchasing, financing, and scheduling difficulties. Managers make resource decisions based on the forecast, only to find that in the increasingly competitive world, product configurations change rapidly. These changes cause the product specific forecast to be inaccurate and require changing resource allocations between products. Specific time horizons exist for resource commitments and when changes are made within those horizons, costly misallocation of resources can result. This misallocation occurs when the "drop dead" date for a specific resource decision passes without a change in the resource allocation. A change after the date increases costs, results in missed sales opportunities, and decreases managerial performance. Managers tend to believe the resource reallocation decision was missed due to forecast inaccuracy. Consequently, they believe their lost opportunities are the result of "poor" forecasting. These experiences may explain why less than 50 percent of managers are satisfied with quantitative forecasting methods (Sanders and Mancroft, 1994). Forecasting is a prediction of future events used for planning purposes, that has to do with the estimation of the value of a variable (or set of variables) at some future point in time. Monks (1987) defined forecast as estimate of occurrence, timing or magnitude of future events, that five-operation manager a rational basis for planning and scheduling activities, even though actual demand is quite uncertain.

Krajcwsk and Ritzman (1998) see forecast as a prediction of future events used for planning purpose and this is needed to aid in determining what resources are needed, scheduling existing resources and acquiring additional resources. Markland (1987) defined forecasting to be the extrapolation of

past data into the future using some scientific or statistical method. Taha (1997) view forecasting as the data describing the decision situation that represent what occurs in the future.

Robert (1984) defined forecast as estimate or prediction of the future, a firm which considering the possible launching of a new product would need to have good forecast of likely level of sale. Forecasting is as an attempt to foresee the future by examining the past. It consists of generating unbiased estimates of the future magnitude of some variable, such as sales on the basis of past and present knowledge and experience. The essence of forecasting is estimating future events based on past patterns and applying judgment to projection of past patterns. Therefore, mere extensions of past sale tendencies into the future do not constitute forecasting, projections are mechanical functions, forecasting require judgment.

Forecast can be either macro (applying to an aggregate unit, such as the economy) or micro (applying to a smaller unit, such as the firm). Finally forecasts differ with regard to the products considered means of measurement, buyer categories encompassed and geographic area covered.

The forecasting process involves a number of steps model, testing the model, applying the model and revision and evaluation. Successful forecast will depend on the receipt of valid input data. Thus the forecaster must be familiar with sources and uses of these variable sources exist both inside and outside the organisation.

Donald (1989) emphasised that every management decisions are based on forecasts. Every decision become effective at some point in the future, so it should be based on forecasts of future condition. He gave example in his book title A practical Introduction to Management Science that when British Aerospace plans its production, it does not make enough airplane to meet current demand, but enough to meet forecast demand when the plane are ready for sale.

**Effect of Stock Exchange on the Nigerian Economy**
The role so far played by the Nigerian Stock Exchange in Nigerian economy cannot be overemphasized. Nigerian Stock Exchange has always played a significant role in the economic growth of our nation.

In the time of economic boom, it assisted in the establishment of productive facilities and in the current period of economic stagnation, it has been providing finance for maintaining existing facilities, diversification and acquisitions.

The Nigerian stock exchange is at the forefront of the ongoing ambitious and prudent structural adjustment of our national economy which, without any doubt will call for a big financial commitments. A substantial proportion of the financial needs under this structural rearrangement will obviously be met through the assistance of the Nigerian Stock Exchange.

It is in its efforts to support the current revitalization of the economy that the Nigerian Stock Exchange launched the second-tier securities market. It is aimed at alleviating some of the problems related to the apathy of indigenous companies towards seeking stock exchange quotations and also at providing a wider cheaper and long-term source allocation in the economy. The economic development of this nation depends on a large extent on the growth and development of its small to medium sized companies.

> In addition to the second tier security market the Nigerian Stock Exchange has embarked on another strategy in its struggle for the economic recovery and development of the nation which is the evolution of a bonds market to specifically cater for the financial need of the various levels of government (Federal, State and Local) in this period of unpredictable revenue from oil and non oil sector of the economy.

**Application of Forecasting Models and Theories**

Inventory control/production planning: Forecasting the demand for a product enables us to control the stock of raw materials and finished goods, plan the production schedule etc. At the root of most business decisions is the challenge of forecasting customers demand. It is a difficult task because the demand for goods and services can vary greatly.

Inventory policy: Forecasting financial information such as interest rates, exchange rates, share prices, which is the area of concentration in this paper. This is an area in which forecasting technique have not being fully applied.

Economic policy: Forecasting economic information such as the growth in the economy, unemployment, the inflation rate, etc is vital both to government and business in planning for the future.

### Linear Regression Analysis
The general equation of a simple linear regression is

$$y = a + bx$$

We estimate a and b by

$$b = \frac{n\Sigma xy - n\Sigma x\Sigma y}{n\Sigma x^2 = (\Sigma x)^2}$$

and $a = Y - bx$

Where the x's and the y's are the observed values; x and y are their respective means, and n is the number of observations. Thus linear regression is called the best linear unbiased estimator.

### Coefficient of Determination
The formulation and computation of coefficient of determination is

$$r^2 = \frac{(n\Sigma xy - n\Sigma x\Sigma y)^2}{n\Sigma x^2 - (\Sigma x)^2) \cdot n\Sigma y^2 - (n\Sigma y)^2}$$

### Multiple Regression

$$Y = a + bX$$

For example, sales of a product related to the amount spend on advertising:

$$S = a + bX$$

Where: $X$ = Advertising cost, and $S$ = Sales

Suppose though, that sale was also related to price, unemployment rates, average incomes, competition, and so on. In other words, the dependent variable, y, is not set by a single independent variable, x, but by a number of separate independent variables xi.

Then we could write:

$$y = a + b_1x_1 + b_2x_2 + \ldots\ldots\ldots + b_nx_n$$

Or in this example
$$S = a + b_1 X + b_2 P + b_3 U + b_4 I + b_5 C + \ldots\ldots + b_n X_n$$

Where:

X = Advertising cost,      S = Sales, P = Price, U = Unemployment rate

I = Income, C = Competition

By using more independent variables we are trying to get a better model for describing sales. We might find, for example, that advertising explains 70% of the variation in sales, but that adding another term for price explains 65% of the variation, and adding another term for unemployment explains 73% of the variation, etc..

We are looking for a linear relationship between a dependent variable and a set of independent ones, so we should really call this approach.

**Multiple Equation Method**
Method of this type is frequently used in economic modeling (econometrics) while they are many dependent variables that interact with each other via a series of equations, the firm of which is given by economic theory.

Let x = personal income,   y = personal spending, I = personal investment, r = interest rate

From economic theory suppose that we have
$y = a + b_1(x - a_1)$ (spending a linear function of disposable income)
$I = a_2 + b_2 r$ (Investment linearly related to the interest rate)
and the balancing equation is
$x = Y + I$ (Income = spending + investment)
Where:   $a_1, a_2, b_1, b_2$ are constants.

Here we have 3 equations in 4 variables (x, y, I, r) and so, to solve these equations one of the variables must be given a value. The variable so chosen is known as an EXOGENOUS variable because, its value is determined outside the system of equation whilst the remaining variables are called ENDOGENOUS variables as their values are determines within the system of equations, for example in our model we might regard the interest rate r as the exogenous variable and be interested in how x, y and I change as we alter

r. usually the constants a1, a2, b1, b2 are not known exactly and must be estimated from data (a complex procedure). Note too that these constants will probably be different for different groups of people, e.g. urban/rural, men/women, single/married, etc.

## Methodology
Apart from an in depth theoretical exposition that was to be provided in this study, empirical evidence of some theoretical links formed the core of this research. The paper used regression based forecasting model that study the relationship that exist between volume of trading to value of share in naira and number of deals. The relationship that exist between dependent variable i.e. value of share in naira and those variable that are known from experience are functionally related to y ($x_1$, $x_2$, …. $x_k$, volume of share and number of deals, independent variable, such that this relationship will be use in forecasting the value of share in naira for each sector on trading floor, this will employed multiple regression model as an extension of linear regression where a variable is thought to be linearly related to a number of other independent variable.

The population for this research work covers majority of the operators of Nigerian Stock Market. Consequently a total number of one hundred legally and bonafide Nigerian Stock Exchange Market operator on Nigerian Stock Exchange were sampled.

The sample data of the above mention dependent variables and independent variables being considered for this research thesis work are last trading activity on stock exchange market for each week of fifty-two weeks in one year for the year 2004. This is done because:

1. Sample data should be taken in a careful and accurate manner, because the larger the sample, the more accurate the regression result will be.
2. Microcomputer based forecasting package SPSS i.e Software Package for Social Science were use to express the multiple regression model formed above to evaluate the result and the package result output for research model is show in data analysis section.

There are a large number of key words and many options. It is therefore very important to be clear that SPSS is the right medium for undertaking the

analysis before starting to try to use it. However the same complexity does allow the user to undertake a wide range of computations on the data.

**Data Presentation and Analysis of Each Sector**

The data obtained from the study were presented and analysis using regression base forecasting model.

**Multiple Regression Model Building and Variables**

In simple regression method we have linear regression where a straight line of the form $y = a + bx$ is fitted to data.

It is possible to extend the method to deal with more than one independent variable x.

Suppose we have k independent variable i.e. $x_1, x_2, x_3 \ldots x_k$, then we can fit the regression line model as:

$$y = a + b_1 x_1 + b_2 x_2 + \ldots + b_k x_k$$

This extension to the basic linear regression technique is known as multiple regression model. This is plainly knowing the regression line enable us to forecast y given values of $x_1$ I = 1, 2 , ….. k.

Variable Defined

y = Value of share in naira for each sector on given trading floor

x = Value of share in unit for each sector on given trading floor

k = The number of deals in each unit of share of a given trading floor for each sector.

In this research work, fifty one data point was used as an input data which consist of activity summary of Nigerian Stock Exchange on trading floor for each last trading floor activities on every week in year 2004 i.e. from 5th January, 2004 to 24th December, 2004.
        For each data point variable consider are as follows:

Y =      Estimated value of dependent variable  (value of share in naira for each sector on given trading floor i.e. total capitalization for each sector).

X =      Value of the independent variable (value of share in unit for each sector on given trading floor).

K =      Value of the extended independent variable (the number of deals in each unit of share of a given trading floor for each sector).

Both the dependent variable data and independent variable data were collected for twenty- four sector of the Nigerian stock Exchange and the multiple regression result we present in table 1 below:

**Sectorial Analysis**

Each sector presented in a tabular summary of the regression result which were obtained using SPSS computer software package from the multiple regression model were analysis, sector by sector of Nigeria stock Exchange for the year 2004 as a tool to forecast each sector for year 2005 trading activities on the trading floor.

**Agricultural Sector (AY)**

$$Y_{agric} = 23785.5 + 5278.835 K_{agric} + 0.182 X_{agric}$$
$$(0.977) \qquad (0.158) \qquad\qquad (0.049)$$

$R^2 = 0.001$

SEE = 1184200

F-test = 0.025

Durbin Watson Statistic = 2.082

The result shows that both number of deals in share (A.K) and number of share in unit (A.X) are weakly but positive correlated with the value of share in naira (A.Y) in the Agriculture sector of Nigerian stock Exchange. The parameter estimates are statistically not significant at 5 percent level of significance.

Therefore, we conclude that the slope estimates are statistically not different from zero and that the explanatory variable does not significantly influence the activities of the sector (Agriculture sector). The explanatory power of the equation indicated by the R-square is very low, while the adjusted R-square is negative. The analysis of variance (ANOVA) as done by the F-test

revealed that the R-square is not significant and that overall the explanatory power of the equation had occurred by chance.

The calculated Durbin Watson statistic lies within the theoretical "2" and 4 – dl. Hence conclude that there is no negative autocorrelation in the disturbance term. This implies that our estimates are efficient and can be use for projection and forecast.

Automobile and Tyre Sector (AT)

$$Y_{atmb} = 1142266 + 43.462\ K_{atmb} + 0.461\ X_{atmb}$$
$$\phantom{Y_{atmb} = 1142266}\ (2.311)\phantom{+} (0.039)\phantom{+++} (1.563)$$

$R^2 = 0.049$
SEE = 3274264
F-test = 1.222
Durbin Watson Statistic = 1.873

The model result in this sector, indicates that for shares in this sector a movement in the unit traded with result to 49% movement in value of share in Naira, the strong correlation exist between the dependent variable and independent variable, therefore as a result when price of any share increase in this sector total capitalization will also increase, therefore the data is statistically significant.

**Banking Sector (B)**

$$Y_{bank} = 1.1E{+}08 + 1616.711\ K_{bank} + 5.261E{-}02\ X_{bank}$$
$$\phantom{Y_{bank} = 1.1E+08}\ (3.571)\phantom{++++} (0.105)\phantom{+++++++} (0.21)$$

$R^2 = 0.009$
SEE = 1.3E+08
F-test = 0.007
Durbin Watson Statistic = 1.769

The regression result for banking sector of Nigerian stock Exchange shows that both number of share in unit and number of deal in share cannot account for any variation in value of share in Naira for the sub-sector with R Square of 0.000 for the sub-sector. Therefore the variables considered are not autocorrelation in any style at all, as such both the variable are insignificantly related.

The inefficient of correlation for the period reviewed are 1616.711 and 5.2616.02 with standard error of estimate 13E+08 for the slope estimates. Both estimates are statistically significant at 5 percent level of significance.

The F statistic shows that the data are not statistically in significant at 0.007 (ANOVA). The Durbin Watson 769 shows that our estimates are inefficient and cannot be used for projection in banking sector.

**Building Material Sector Analysis (BM)**

$$Y_{buldmat} = -1833908 + 57844.387 \ K_{buldmat} + 17.748 \ X_{buldmat}$$
$$(-2.799) \quad (3.788) \quad\quad\quad\quad (12.461)$$

$R^2 = 0.906$
SEE = 2709379
F-test = 231.149
Durbin Watson Statistic = 1.154

The regression result for the building material sub-sector of the Nigerian stock Exchange seems to be highly satisfactory.
    The R – square is very high ($R^2$ = 90.6 percent)

The slope estimate has plausible signs and magnitude. The coefficient of correlation for the period reviewed is 57844.387 and 1.424 for estimates. Both estimates are statistically significant at 5 percent level of significance.
    The explanatory power of the equation is 90.6 percent
    The calculated F- statistics is very large (F=231.149)

However the calculated Durbin Watson d- statistic is less than the lower boundary (dl) of theoretical Durbin Watson statistics. We therefore conclude that there is positive autocorrelation. This makes the variance of the estimate to be very large.

**Breweries Sector (BR)**

$$Y_{brew} = 1.6E+08 + 252.433 \ K_{brew} - 12.227 \ X_{brew}$$
$$(1.287) \quad\quad (0.047) \quad\quad\quad\quad (-0.297)$$

$R^2 = 0.002$
SEE = 8.E+08
F-test = 0.044
Durbin Watson Statistic = 2.062

Based on this regression result it is obvious that the Breweries sector of the Nigerian stock Exchange, the R square is very low ($R^2$ = 0.002) this implies that the number of deals in shares and number of shares in units explained only 0.2 percent of the variation in the value of shares in Naira in the sector.

The number of share in unit was negatively and insignificantly related with the value of shares in Naira, while there was a positive but insignificant correlation between value of share in Naira and the number of deals in share.

The explanatory power of the equation is very weak and the R-square is not statistically significant given the very low calculated F-statistic value. There is serial correlation in the disturbance term.

**Conglomerate Sector (CS)**

$$Y_{congl} = 3.1E+07 + 81564.917\ K_{congl} - 0.270\ X_{congl}$$
$$(0.581) \qquad (0.383) \qquad\qquad (-0.168)$$

$R^2 = 0.004$
SEE = 1.E+08
F-test = 0.086
Durbin Watson Statistic = 2.078

The regression result shows that the number of share in unit is negative correlation with the value of share in Naira in the conglomerate sub-sector. All the parameter estimates are statistically not significant at 5 percent level of significance. Therefore we conclude that the slope estimates are statistically not different from zero and that the explanatory variable does not significantly influence the activities in the sector.

The R square is very low, while the adjusted R-square is negative. The analysis of variance (ANOVA) as done by the F test revealed that the R square is not significant.

The calculated Durbin Watson statistics lies within the theoretical and 4 dl, hence this implies that our estimate is reliable and can be use for projection and forecast.

**Construction Sector (CS)**

$$Y_{con} = -1442316 + 661851.2\ K_{con} + 32.175\ X_{congl}$$
$$(-.109) \qquad (.705) \qquad\qquad (.844)$$

$R^2 = 0.004$
SEE = 4.9E+07
F-test = 1.226
Durbin Watson Statistic = 2.034

Construction sector of Nigerian stock Exchange under the data consider for regression result show that the numbers of deals in shares and number of shares are weak and positively correlated with the value of share in Naira in construction sub-sector. The entire parameter estimates are statistically not significant at 5 percent level of significance.

The R square is 0.04 and the adjusted R square is - .009. The explanatory power of the equation is very low and shows that the number of share in unit and number of deal in share explain 4 percent of the variation in the value of share in Naira. The slope estimate is insignificant at 5 percent level of significance.

The calculated Durbin Watson statistic is 2.034 are satisfactory estimate.

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Chemical and Paint Sector (CP)

$$Y_{chem.} = 5.9E+08 + -1.8E+07\ K_{chem} + 174.333X_{chem}$$

(1.647)      (-1.384)          (.888)

$R^2 = 0.040$

SEE= 1.2E+09

F-test = 0.977

Durbin Watson Statistic = 2.054

</div>

**The Result for the Chemical and Paints Sectors of Nigeria Stock**
Exchange show that both number of deals in shares and number of share in unit explain only 4.0 percent of the variation in value in Naira for the sub-sector, the variable considered are not auto correlated and as such both the variable are significantly related.

The coefficient of correlation for the period reviewed are –1.8E+07 and 174.333 with standard error of 1.8E+07 and 196.381 for the slope estimate.

Both estimates are statistically significant at 5 percent level of significance.

The F statistics show that the data are not statistically insignificant. The Durbin Watson 2.054 shows that our estimates are efficient and can be use for projection and forecast.

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Electrical Technology Sector (ET)

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The result of electrical technology sector of Nigeria stock Exchange seems to be satisfactory. The R square is moderately high ($R^2$ is 50.4 percent).

The coefficient of correlation for the period reviewed show that the number of deal in share was negative and insignificantly related with the value of share in Naira and the number of share in unit is positive correlated with 1207.124 coefficient of correlation and standard error of 376.887 for the slope estimate.
The calculated F statistics is relatively high (F = 6.129).
This shows that our data are statistically significant

The calculated Durbin Watson statistic (DW = 2.015) lies between the theoretical "2" and 4dl. Hence we conclude that there is no serial correlation in disturbance term.

**Food and Beverage Sector (FB)**
The result shows that the food and beverage sector of Nigeria stock Exchange for the period under reviewed the R square is low ($R^2$ = .197) i.e. 2%. This implies that the number of deals in shares and number of share in units explained only 2 percent of the variation in the value of share in Naira in the sector. The number of share in unit was negatively and insignificantly related with the value of share in Naira, while the number of deals in share was a positive correlation between value of share in Naira and the number of deals in share.
The explanatory power of the equation is high and the analysis of variance (ANOVA) as done by the F- test 5.783revealed that the data are statistically significant.

The calculated Durbin Watson statistics is 2.270 lies between the theoretical 2 and 4 dl, hence we conclude that there is no serial correlation in disturbance term.
Health Care Sector (HC)
The result show that the health care sub-sector of Nigeria stock Exchange for the period under reviewed show that both number of deals in share and number of share in unit explain for 50 percent of the variation in value of shares in Naira for the sub-sector that the variable considered are positive auto correlated and as a result both variable are significantly related.

The coefficients of correlation for the period reviewed are 15259.933 and 1.505 with standard error of 6093.282 and .284 for slope estimate. Both estimates are statistic significance.

The explanatory power of the equation is 55.3 percent. The calculated F statistic is very high (F = 28.506) the Durbin Watson is greater than the lower boundary (dl) of the theoretical Durbin Watson statistics. We therefore conclude that there is positive autocorrelation.

### Industrial/Domestic Product (IDP)
The regression result for industrial / domestic product sector of the Nigeria stock Exchange show that both number of deals in share and number of share in unit explain only 5 percent of the variation in the variable considered are not auto-correlated and as such both variable are insignificantly related.
The coefficients of correlation for the period reviewed are 26585.698 and 1.938 with standard error of 46133.368 and 1.966 for slope estimates.

Both estimates are significant at 5 percent level of significant. The calculated F – statistic is very low, therefore the R square is not significant and that overall the explanatory power of the equation had occurred by chance.

The calculated Durbin Watson statistic DW = 2.005 lies between the theoretical "2" and 4 – dl. Hence we conclude that there is no serial correlation in the disturbance term.

### Insurance Sector (INS)
The result for insurance sector of Nigerian stock Exchange for the year 2004 regression result indicate that both the number of share in unit and the number of deal in share are weak with the value of share in Naira, all the parameter estimate are statistic not significant at 5percent level of significance. The R square is 0.04 and the adjusted R square is negative – 0.004. The explanatory power of the equation is very low, which show that the number of share in unit and the number of deal in share explain only 4 percent of the variation in the explanatory power of the equation had occurred by chance.

The analysis of variance (ANOVA) as done by the F test (6.900) revealed that the R square is significant.

The calculated Durbin Watson statistic lies within the theoretical "2"and 4

### Textile Sector (T)

The result show that the textile sector of Nigeria stock Exchange for year 2001 under reviewed both the number of deals in share and numbers of share in unit have 93% highly positive correlation with total capitalization of share i.e. value of share in Naira with $R^2 = 0.939$ and coefficient correlation of 58744.074 and 5.887 with standard error of 22073.083 and 1.864 for the slope.

This indicates that number of deal in share and number of share in unit account for 93% relationship between the values of share in Naira.
The analysis of variance (ANOVA) done by F test of 130.850 is very large and this indicates that our data are statistically significant.

### Real Estate Sector (RE)

The result for real estate sector of Nigeria stock Exchange for the period under study have R square of 38.5% ($R^2 = .385$) with coefficient correlation of 91250.45 and 6.292E.02 with standard error of 25542.038 and 0.092 for the slope. This indicate that number of deals in share and the value of share in unit only account for 38% relationship between the value of share in Naira and with calculated Durbin Watson statistic of 2.48/1 which lies between the theoretical "2" and 4dl, hence we conclude that there is no negative auto correlation in the disturbance term.

The analysis of variance (ANOVA) done by F- statistic is very large at (F = 130.850).

### Printing and Publishing Sector (PP)

By this study the result of regression in printing and publishing sector of Nigeria stock Exchange show that the R- square is very high at 99% ($R^2 = .996$). The coefficients of correlation for the period reviewed are 34199.714 and 3.12. with standard error of 136533.4 for the slope estimate . This is an indication that strong relationship exist between the value of share in unit and number of deals in share with value of share in Naira and as such the former can be use to ascertain value of share in Naira. Also calculated F statistics of 2419.382 show that at 5 percent level of significance our estimate are efficient.

**Petroleum Marketing Sector (PM)**

The regression result for petroleum marketing sector of Nigeria stock Exchange show that a very lower positive correlation, the predictor variable and dependent variable that is total capitalization i.e. Value of share in normal with $R^2 = 0.008$ R-square of 8% and coefficient of correlation for the period are –132038 and 80.446 with standard error of 6.7E+08, for slope estimates. Also take into consideration F statistic of 0.128 lies within the theoretical "2" and 4dl; hence there is no negative autocorrelation in the disturbance term. With the above result the independent variable are indirectly not responses for value of share in Naira for this sector.

**Machinery Marketing Sector (MM)**

The result for machinery marketing sector of Nigeria stock Exchange for the period study is highly satisfactory. The R-square is very high at ($R^2 = 0.969$) i.e. 96.9% and this show both the number of share in unit with number of deals are positively correlated with value share in Naira.

The calculated F statistic is very large (F = 124.596) this shows that R statistically significant and that R-square is reliable.

The coefficients of correlation for the period reviewed are 4824.080 and .954 with standard error of 2355.62 and 0.257 for slope estimates. Both estimates are statistically significant at 5 percent level of significance.

The calculated Durbin Watson d-statistics of 2.197 shows that there is negative auto correlation. We therefore conclude that strong correlation exist between the dependent variable and independent variable therefore as a result when price of any share increase in this sector the value of share in Naira will decrease also.

**Packaging Sector (P)**

Based on the regression result for the packaging sector of Nigeria stock Exchange for year 2001. The R-square is very low ($R^2 = 0.012$) this implies that the number of deals shares and number in units explain only 12% of the variation in the value of share in Naira in the sector. The number of share in unit was negatively and insignificantly related with the value of share in Naira.

The calculated Durbin Watson statistic (DW= 2.033) lies between the theoretical "2" and 4dl. Hence we conclude that there is no serial correlation in the disturbance term.

From regression result analysis we note as follows:
The value of share in Naira i.e. total capitalization in most sector of Nigeria stock Exchange are positive autocorrelation with the predictor variable which are number of deals in each unit of share and value of share in unit for each sectors on given trading floor for each sector.

Some of the regression results indicate that there is presence of disturbance factors in determining the value of share in Naira which are highlighted as follows:

a) The company financial result performance: when a company with enviable financial performance is recorded and such company is listed on the trading floor and there is assurance that such company will attain better margin in the near future as such the value of share in Naira i.e. total capitalization.

b) Government policies: the changing face of government policies and those of its agencies have significant role to play in the value of share in Naira on stock.

c) Market Nigeria stock Exchange: according to section 72 of the rule and regulation of the Nigeria stock Exchange make provision for making ex-dividend for quoted companies on the daily lists, whether the company situates in Nigeria or outside Nigeria. The same applies to making of ex-scrip for companies declaring bonus share.

d) The stockbroker: stockbroker performs the role of intermediary between the sellers and buyers of share on one hand and the stock Exchange on the other hand. It is a common saying that to error is human stock broking firms are be in represented on trading floors by individual dealing decks who sell or buy share on behalf of their clients. As a human being there may be occasion when their reaction to data available on the trading floor may appear to be rash or biased. Such actions will naturally leave a market on the value of share in Naira after all the share value in Naira of any company at any given date on the stock market is arrived at through random price making model which though may not be perfect but appear reasonable and fair.

e) The general market factor: another factor that affects decision making and planning in relations to stock market is the adverse effect of religious doctrine on trading volume of the Nigerian stock Exchange, Both religious preach against decision and earning with precision on the price movement of shares and God as related to fixed interest race securities. Consequently, it reduces demand for securities in the breweries sector and fixed coupon rate securities stocks in those sectors.

Last but not the least, Nigeria market is blessed with several trading options, which are realistically not risky but very profitable. Here we are talking about opportunities such as merchandising in essential commodities & estate development in prime locations, local purchase, order and the likes. These competing investment outlets reduce the desire of patronizing the stock market resulting to low demand by potential investor.

## Summary and Conclusion

The believability of the forecast is related to the strength of the theory underlying the forecast. The forecast must include an explanation of how and why it was constructed as well as an estimate of the accuracy of its predictions, if it is expected to be more accurate. As a result, the significance of all business forecasting depends upon forecast theory. The stock market trades in intangible products, otherwise called securities such as stocks and bonds. Evidence of transfer of ownership in the stock market is done by meticulous documentation terminating in delivery of narrative share / stock certificates, whereas, that of the products, planning and decision making in Nigeria stock market through the use of operational research tool using multiple regression model to established the strength of relationship between the predictor variable which are number of deals in shares and number of share in unit with value of share in Naira by each sector traded on Nigerian stock Exchange in the year 2004 that is twenty seven sector traded on Nigerian stock Exchange.

This will serve as a guideline for any investor in Nigeria to plan and decide his/her activities in the stock market trading into consideration as some general market factors that include among the following

A. The company:

When a company with enviable performance record is listed on the trading floor, and there is assurance that such company will attain better margin in

the near future it motivates investors through their stock brokers to aspire to own more of the shares, thus there will be demanded, which will create a desire to buy the shares at a mark up above current price.

B.   Government Policies:
The changing face of government policies and those of its agencies have significant role to play in the price movement of quoted companies share.

C.   The Nigerian stock Exchange:
According to section 72 of the rules and regulations of the Nigerian stock Exchange makes provision for making ex-dividend for quoted companies on the daily official list, whether the company situates in Nigeria or outside Nigeria. The same applies to marking of ex-scrip for companies declaring bonus shares, usually, such divided and monetary value and discounted on the share price of affected company during trading session on an appointed day.

D. The stockbroker:
Stockbroker performs the role of intermediary between the sellers and buyers of shares on one hand and the stock Exchange on the other hand. It is a common saying that to error is human. Individual dealing clerks who sell or buy share on behalf of their clients is representing stock broking firms on trading floors. As a human being there may be occasions when their reaction to data available on the trading floor may appear to be rash or biased, such action will naturally leave a market on the value of share in Naira of any company at any given date on the stock market is arrived at through random price making model which though may not be perfect but appear reasonable and fair.

**The General Market Factors**
Another pronounce factor that affect decision-making and planning in relations to stock market is the adverse affect of religious doctrines on trading volume of the Nigerian stock Exchange. Both religious preach against alcoholism and usury prediction of future earning with precision is seen to be challenge to the Almighty God as related to fixed interest rate securities. Consequently, it reduces demand for securities in the breweries sector and fixed coupon rate securities, which definitely has an impact on the price movement of shares and stocks in these sectors.

Last but not least, Nigeria market blessed with several trading options that are realistically not risky but very profitable. Here we are talking about opportunities such as merchandising in essential commodities, estate development in prime locations, local purchase order and the likes. These competing investments outlets reduce the desire of patronizing the stock market resulting to low demand by potential investor.

The degree of technology in use when taking decision and planning on stock exchange market will contribute to quality of extrapolation of dependent variable i.e. value of share in Naira or total capitalization for each sector. It is believed that now that central clearing system as implemented the adoption of electronic trading position as against the formal call over system of trading, all these innovation combined with the existing linkage with international market through the retail cable will open up more demand for share quoted on the stock market in Nigeria and will subsequently lead to more aggressive price making mechanism on the trading floors.

Nigerian Managers can make better decisions by recognizing that forecasts are used for specific resource decisions that have time specific frames. A forecast should be no more detailed than the resource decision requires. As much as possible, the forecast should be non-product specific and should be tied to specific time fences for each resource. Although forecasts must be agreed upon by all functional areas, there is no empirical evidence from this paper to suggest that increasing the number of functions (or top management) involved in the forecast development will improve forecast accuracy. There is no empirical evidence that increasing the statistical sophistication of the forecast model improves forecasting accuracy; however combining forecast methods improves forecast accuracy, especially when the combination includes a judgmental forecasting method.

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Table 1: Summary of Regression Result

| SECTOR | COEFFICIENTS | | | $R^2$ | SEE | F | DW |
|---|---|---|---|---|---|---|---|
| | CONSTANT | K | X | | | | |
| Agriculture (A) | 23785.5 (0.977) | 5278.835(0.158) | 0.182 (0.049 | 0.001 | 1184200 | 0.025 | 2.082 |
| Automobile (AT) | 1142266(2.311) | 43.462(0.039) | 0.461(1.563) | 0.049 | 3274264 | 1.222 | 1.873 |
| Banking (B) | 1.1E+08(3.571) | 1616.711(0.105) | 5.261E.02 | 0.000 | 1.3E+08 | 0.007 | 1.769 |
| Building/material (BM) | -1833908(-2.799) | 57844.387(3.788) | 17.748(12.461) | 0.906 | 2709379 | 231.149 | 1.154 |
| Breweries (BR) | 1.6E+08(1.287) | 252.433(0.047) | -12.227(-.297 | 0.002 | 8.0E+08 | 0.044 | 2.062 |
| Conglomerate © | 3.1E+07(.581) | 81564.917(.383) | -.270(-.168) | 0.004 | 1.8E+08 | 0.086 | 2.078 |
| Computer and Office Equipment | 9.3E+37(1.010) | -1.2E+35(-.194) | -3.5E+31(-.187 | .0002 | 6.0E+38 | 0.35 | 2.049 |
| Construction (CON) | -1442316(-.109) | 661851.2(.705) | 32.175(.844) | .05 | 4.9E+07 | 1.226 | 2.034 |
| Chemical and Paint (CP) | 5.9E+08(1.647) | -1.8E+07(-1.384) | 174.333(.888) | 0.040 | 1.2E+09 | 0.977 | 2.054 |
| Electrical Technology | 1.4E+07(1.049) | -6879851(-2.659) | 1207.124(3.203) | 0.254 | 7.4E+07 | 6.129 | 2.015 |
| Food and Beverage (FB) | -9088404(-.778) | 194343.7(3.374) | -.203(-.675) | 0.197 | 1.7E+07 | 5.783 | 2.270 |
| Health Care (HC) | -143310(-1.073) | 15259.933(2.504) | 1.505(.553 | .553 | 396600.2 | 28.506 | 1.661 |
| Industrial / Domestic Product (IDP) | 678665.1(.319 | 26585.698(.576) | 1.938(.986) | .250 | 5106946 | 1.146 | 2.005 |
| Insurance (INS) | 50E+08(.756) | -2062.809(-.123) | 204.039(1.329) | 0.40 | 2.2E+09 | 6.900 | 2.084 |
| Textile (T) | -5217500(-.819) | 58744.074(2.661) | 5.887(3.158) | .939 | 2.4E+07 | 130.850 | 1.929 |
| Real Estate (RE) | 1.1E+07(1.155) | 91250.457(3.573) | 6.292E.02(.682 | .620 | 4.2E+07 | 6.565 | 2.431 |
| Printing and Publishing | -22.0468(-6.499) | 3419974(15.607) | 8.120(35.497) | .998 | 136533.4 | 2419.382 | 2.071 |
| Petroleum Marketing (PM) | 1.6E+08(.901) | -132038(-.293) | 80.446(.419) | .008 | 6.7E+08 | .128 | 2.097 |
| Machinery Marketing (MM) | -4137.773(-10307) | 4824.080(0.075) | 1.954(3.571) | .969 | 453.1786 | 124.596 | 2.197 |

Source: Researcher Computation using SPSS