

# Production Optimization and Corporate Productivity in the Nigerian Manufacturing Industry

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## Abstract

Production optimization is a required process in any manufacturing sectors; it involve challenges that manifested in form of seasonal variations, size of market, unpredictable circumstances, challenges of dynamic modern technology that provide competitive edge in the industry, other break through strategies and much more. Production optimization involves production planning and control which is defined as planning, direction and coordination of firms' resources towards attaining the set objectives. In Nigeria, manufacturing sector has been characterized by low quality products, lack of continuity and high cost of production which is traced to unscientific method of production and lack of product planning. The objectives of the paper are to determine the impact of production optimization (PO) on corporate performances (OP) and also to ascertain the relationship between production optimization practices (Pop) and product quality (PQ). Data were sourced from primary sources using questionnaire as the instrument of data collection. Structured questionnaire were administered in the manufacturing companies used as case study (Cadbury Nigeria PLC, Guinness Nigeria Plc, Honeywell Flour Mill PLC and Vitafoam Nigeria PLC). Data collected were analyzed using non parametric statistical tool of Chi Square on Statistical Package for Social Scientists (SPSS 20.0). It was discovered that Production optimization (PO) has significant impact on organizational performances (OP) and that production optimization practices has help management to achieve organization goals and responding to threats and opportunities in the industry. Therefore it was recommended that proper production planning and control that rely on empirical research should be performed from time to time in other to improve and enhance the competitive edge.

**Keywords:** Production optimization, corporate performances, organization profitability, organization efficiency

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## 1.0 Introduction

In each nation, human beings act in line with the nations' level of development and engaging in production process according to the need of the country and level of technology. They establish enterprises, industries and organizations to satisfy their various needs and objectives. Thus, an organization consists of human being who work together to achieve their own specific goals and the organization's goals. The relationship between firm's resources and performance has been underlying factor in theories for strategic management. The modern business environment is dynamic and any organization that requires surviving and remaining in business must have a long term on how to remain going concern. These long term planning need to harness all resources at her disposal; allocate them efficiently in other to obtain optimal returns on each of the resources invested. These returns are in form of increased productivity, profitability and efficiency in production which is expected to translate to improve share price in the market.

An organizational capability is hinge on her ability to conduct operational activities necessary to convert inputs into outputs (Helfat and Peteraf, 2009). Capabilities of the firm are shaped by the processes, structure and strategic plans in place to manage those processes and remain in business for the present and future (Eisenhardt & Martin 2000; and CCoen, & Maritan, 2001). The path of which the capability development undertakes solely depends on management choices. Production therefore has been the major function directed at creating value and therefore growing wealth in society right from evolution of man (Bestwick and Lockyer, 2008). Ovunda, Elemchukwu and Vurasi (2019) identified production as the organized activity that leads to the transformation of raw materials into useful products. Hence for a successful production, series of activity are involved; it includes optimal utilization of resources available to the organization maximally.

Production planning and control is the planning, direction and coordination of firm's resources towards attaining the set objectives. It is a tool available to the management that enhances performance in achieving organization's goals and objectives. It helps to ensured flow of materials at the right time and required quality without interruption. It involves sequence of activities performed before the real production process. These processes include schedule of production, economic batch quantities, dispatch of priorities and operation sequence. Therefore production control ensures the observation and implementation of all plans for production such as

initiation of production, dispatching of items, monitoring of production activities among others. Production planning and control deals with implementation of set out plans, involving the detailed scheduling of jobs, assigning of workloads to machines and people as well as the actual flow of work. While production planning and production optimization is a required process in any manufacturing sectors, it comes with challenges that limit performance. These challenges manifested in form of seasonal variations, size of market, unpredictable circumstances, challenges of dynamic modern technology that provide competitive edge in the industry, other break through strategies and much more.

When firm fail to plan or plan are not effectively implemented in production process, it may lead to increase in wastage, low productivity and increase in operational cost, decrease in revenue and possibly collapse of such organization. Hence the importance of production planning and control is to minimize cost and optimize production within constrain created by the business environment ranging from poor road network to epileptic power supply.

Though production optimization has continued to be a germane issue in production management and operations research, it continues to attract attention of researchers, scholars and professional in the field of operational research. It is observed by Scholars that business growth and performance depend on lot of changes which affects cost and planning, especially in developing country like Nigeria. The need for production planning is to reduce waste thereby minimize cost with aim of increased production at minimal cost thereby improve sales and loyalty which lead to enhance performance. In developing economy like Nigeria for instance, external factor dictate how businesses operate, these factors involve poor infrastructure- epileptic power supply, road network, communication, double taxation, security even ease of doing business. All gave rise to cost of production and higher uncertainty in the availability of basic raw materials for production.

In Nigeria, the size of industry, small, medium, and large scale, has a significant effect on both the numerical strength of staff and level of involvement in inventory management of both raw material and the finished product. The type of inventory system in practice in any organization depends on many factors among which are economic stability of the place, infrastructural facilities available, transportation network and many more which are called constraints. As noted in most companies in Nigeria, low quality products, underproduction, lack of continuity and high cost of production could be easily traced to unscientific method of production and lack of product planning. These challenges demand stringent production planning and control to ensure survival of a business.

These factors have over bearing effect on how production planning and control which will affect the profit margin of business organizations. In all these, it is expected that flexibility will equally help in dealing with some of these unexpected factors, by allowing management to take action. It is against this background that the researchers seek to critically assess the impact of production optimization (PO) on corporate performances (OP) in the Nigerian manufacturing industry and also to ascertain if production optimization practices (Pop) have significant relationship on product quality (PQ) in Nigeria manufacturing industry.

Therefore to achieve these objectives, this paper is divided into four sections, first section is the introduction, second section is on the conceptual framework and the literature review while the next take care of methodology and the last chapter is about summary of findings, conclusion and recommendations.

## **2.0 Literature Review**

Enhanced Corporate Performance (CP) is important to managers in all business organizations; it leads to continuity in and going concern in business. Production optimization (PO) influences corporate productivity, and brought about efficiency in production. Pineda, (2009) acknowledged that PO is crucial factor in organizational efficiency and effectiveness. Buffa (2001) argued that for business organizations to make impact in economic growth, they must be able to optimize their production technology to ensure optimal performance with measured cost minimization which will enhanced equity capital and growth dimensions.

## **2.1 Conceptual framework**

Production system is a design process which helps transform various elements into useful products (Vollman et al, 2007). Jain and Aggarwal, (2008) observed that it is a process that transform a set of inputs like men, materials, capital, information and energy into a specified set of output like finished products and services in proper quantity and quality in other to achieve set objectives of an enterprise. Aggarwal (2008) further posit that production is a process or procedure developed to transform a set of inputs like men, materials, capital, information and energy into a specified set of output like finished products and services in proper quantity and quality, thus achieving the objectives of an enterprise. Therefore production is effective if an appropriate and efficient production control techniques are put in place.

Umoh and Wokocha (2014) opined that production system is the design process by which elements are transformed into useful products. It is an organized procedure for accomplishing the conversion of inputs into output. Jain and Aggarwal (2008) state that, every manufacturing activity requires resource input in terms of men, materials, money and machines. They went further to state that in any business that produces a product or service

production activity must be related to market demands as indicated by the continuous stream of customers' orders. It follows therefore that for maximum effectiveness, this must be done in such a way that customers' demands are satisfied, but at the same time production activities are carried on in an economic manner. They went further to explain that one of the processes of developing this kind of relationship between market demands and production capability is the function of production control (PC) which has been described as the design and use of a systematic procedure for establishing predetermined manufacturing requirements of such things as available basic materials, detailed equipments, production runs, order priority, money, man and production process within the scope of the enterprise for efficient production of goods to match its sale requirements and controlling all these elements of activities in the plan to meet the requirements of the organization.

Craig and Harris (1973) assertion that production control is the design and use of a systematic procedure for establishing plans and controlling all the elements of activities in the production plan to meet its requirements. Singh and Kumar (2018) noted that production planning and control alone cannot be completed without consideration to cost management. Cost management is an important concern for effective performance and financial management of companies. Therefore, Production planning is a multi objective constraint problem and needs the help of experts to optimize the production scheduling.

Stock management has and remains to be a thorny issue in most manufacturing organizations in Nigeria. Most managers in these organizations do not effectively apply the appropriate stock management techniques in their day to day affairs of handling stock in the respective organizations. Stock being an invaluable investment in any successful organization today it needs to be appropriately and effectively managed to safeguard an organization's long term survival. Therefore with the increasing mismanagement and loss of stock the question of effective control and management is highly critical.

## 2.2 Theory of Production

**Theory of production** is an attempt to explain management decision on the quantity of each product it will produce and various syntheses of factors of product (labour, raw material, fixed capital good) needed that is employed to produce known quantity of product. This theory relies on fundamental principles of economics which involve relationship between costs of production which is compose of cost of factors of production (the prices of commodities and the prices/wages or rents of the productive factors) used to produce them and also the relationships between the prices of commodities and productive factors, on the one hand, and the quantities of these commodities and productive factors that are produced or used. () posited that decisions concerning production process by organization can be divided into three categories according to increasing complexity.

The first one is the decisions about methods of producing a given quantity of the output given a known quantity of factors of production, it is known as short-run cost minimization. The second category involve analyses of most efficient combination of factors of production that produce optimum output which is known as short-run profit maximization while the division is the determination of the most profitable size and equipment of plant which is known as long-run profit maximization. Graves, (1999) noted that much of a product produced is produce as cheaply as possible, taking the quality of the product and the prices of the productive factors as given, which is the usual situation with Nigeria firms. Organization's problem is to determine the cheapest combination of these factors of production that can produce the desired output which is best understood using production function. Production function (PF) is an equation that expresses the relationship between various combinations of factors employed and the amount of output. It written in mathematical model as;

$$y = f(x_1, x_2, \dots, x_n; k_1, k_2, \dots, k_m)$$

Where,  $y$  denotes the quantity of output,  $x_1$  to  $x_n$  denote quantity of variable factors employed in the production (wages/salary paid per hour to production workers, units of capital employed the quantities of which can be increased or decreased. While  $k_1$  to  $k_m$  represent fixed factors (Land, factory, Machine and machinery, furniture and fittings which cannot be varied in short run). The formula expresses the amount of output that results when specified quantities of factors are employed. Although quantities of the factors input determine the quantity of output, the reverse is not true. Novak and Popesko, (2014) observed that there are many combinations of factors of production that could produce the same output. Thus finding the cheapest of these combinations is the problem of cost minimization.

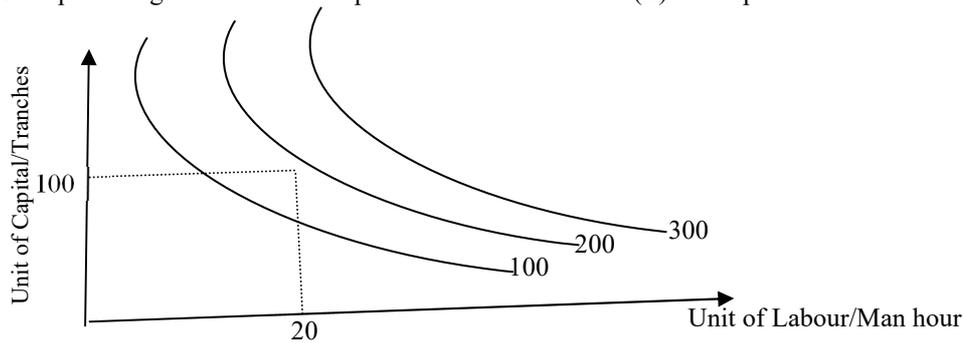
Therefore cost of production is the sum of the costs of all of the various factors. It can be written:

$$C = p_1x_1 + \dots + p_nx_n + r_1k_1 + \dots + r_nk_n$$

Where  $x_1$  to  $x_n$  denote variable factors of production while  $p_1$  to  $p_n$  denotes the price per unit of the variable factor, while  $k_1$  to  $k_n$  represent fixed factors of production and  $r_1$  to  $r_n$  denotes the annual cost of owning and maintaining the fixed factor engaged in production. It should be noted that the first group of equation is variable cost (or direct costs of production). These can manipulated in a short run while the second part is fixed cost (or overhead costs), which cannot be manipulated in short run.

The principles involved in selecting the cheapest combination of variable factors using principle of isoquant diagram (Figure 1). This diagram is a graphic display of the relationships expressed in the production function.

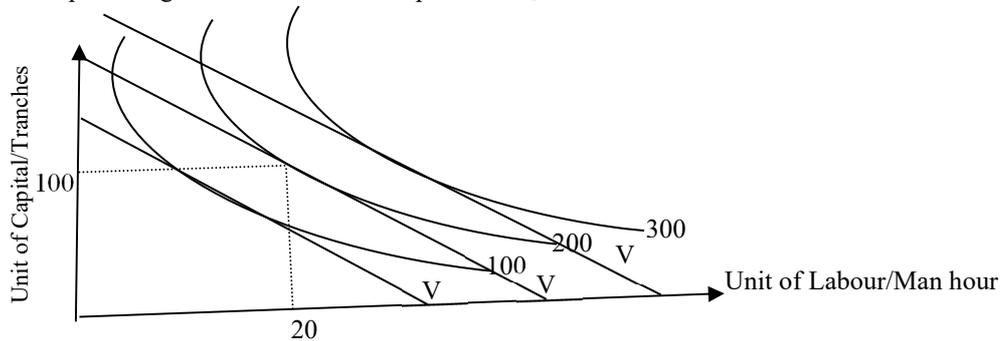
**Figure 1:** Isoquant diagram of variable inputs of labour / man hour (L) and capital measure in tranches (K)



**Source:** Eretan and Babajide (2020)

The isoquants help to explain factor substitution which explains how one variable factor can be substituted for another and still produce the same level of output that is the more of one factor that is employed, the less of the other will be needed to maintain the stated output; this is the graphic representation of factor substitutability or diminishing marginal rates of substitution. Cost data can be introduced to the technological data as represented by Isoquant. The variable cost of using known unit of variable units of factor of production ( $x_1, x_2$ ) known as Isocost can then be written  $p_1x_1 + p_2x_2$ . The isocost is the combinations of input that can be purchased for a specified variable cost. It is of note that the cheapest combination for the production of any quantity is found at the point at which the relevant isoquant is tangent to an isocost line. This point is also given by Marginal Rate of Substitution (MRS) or Marginal Rate of Technical Substitution (MRTS) any firm taking decision to minimize cost of production. Therefore Managers will do well to mindful of the point because it is appoint at which where he will be able to purchase or hire factors of product in quantities such that the marginal rate of substitution will equal the ratio of their prices.

**Figure 2:** Isoquant diagram for two factors of production,  $x_1$  and  $x_2$



**Source:** Eretan and Babajide (2020)

This theory has been subjected to criticism, one important condemnation is that the concept is not derived from observation or practice. It is based on the assumption that that there are no changes in the rest of the economy while individual firms and industries are making the adjustments described in the theory; it does not recon with changes in the technique of production; and it pays no attention to the risks and uncertainties that are part of the environment in which business operates. These criticisms can be overcome by applying techniques of linear programming or any other empirically based models.

The two most popular empirically backed production functions are the Cobb-Douglas and the **Elasticity of Substitution (CES) production functions**. These efforts are an attempt to fit empirical results for production, employment, and capital stock in manufacturing in a simple function (Cobb and Douglas, 1928) thus;

**Cobb–Douglas Production Model**

This model was propounded in 1928 based on linear equation thus;

$$Y = AK^\beta L^{1-\beta} \tag{1}$$

The assumption is based on the fact that

$$Y = F(K, L) \tag{2}$$

This show relationship between output (Y) , capital (K), and labour (L) based on the assumption that F is continuously differentiable. For every output price level p, Labour is reward with wage rate (w), and capital reward is rental rate (r), then  $K^*(r, w, p)$  and  $L^*(r, w, p)$  maximize profit,

$$pF(K, L) - rK - wL \tag{3}$$

The first order conditions for an interior maximum are

$$pF_L(K^*,L^*) = w \tag{4}$$

$$pF_K(k^*,L^*) = r \tag{5}$$

where  $F_K$  denotes the partial derivative of  $F$  with respect to its first variable  $K$ , and  $F_L$  is with respect to  $L$ . The model assumed that the fraction of output paid to labor is a constant ( $\beta$ ).

The constancy can be written:

$$\beta pF_L(K^*,L^*) = wL \tag{6}$$

$$(1-\beta)pF_K(k^*,L^*) = rK \tag{7}$$

When you divide (4) by (6)

$$\frac{pF_L(K^*,L^*)}{\beta pF_L(K^*,L^*)} = \frac{w}{wL} \tag{8}$$

$$\frac{pF_L(K^*,L^*)}{\beta pF_L(K^*,L^*)} = \frac{1}{L^*} \tag{9}$$

Using Chain rule then (9) is

$$\frac{\partial}{\partial L} \ln F = \frac{\beta}{L} \tag{10}$$

Similarly, (5) is divided by (7)

$$\frac{\partial}{\partial k} \ln F = \frac{\beta}{k} \tag{11}$$

In (10) and (11)  $p$ ,  $r$ , and  $w$ . has been eliminated, so the equations hold for every  $(K^*,L^*)$  input that maximize profit. But if (6) is integrate, then;

$$\ln F(L, K) = \beta \ln L + h(k) + c \tag{10}'$$

$$\ln F(L, K) = (1-\beta) \ln k + g(L) + c \tag{11}'$$

where  $h(K)$  is a constant of integration that may depend on unit of capital input ( $K$ ) and  $g(L)$  is a constant of integration that may depend on labour input ( $L$ ). Combining, thus this;

$$\ln F(K,L) = \beta \ln L + (1-\beta) \ln K + C \tag{12}$$

express both side in exponential format;

$$F(K,L) = AL^\beta K^{1-\beta} \tag{13}$$

Works based on empirical and theoretical work has questioned the validity of the Cobb-Douglas as a model in the developed economy. Some Scholars believe that the more general CES may be a more appropriate choice.

### Elasticity of Substitution (CES) Production Function Model

Arrow, Chenery, Minhas and Solow (1961) developed the CE's Model to explained production function. They make used of three variables  $Q$ ,  $C$  and  $L$ , and three parameters **expressed in the form:**

$$Q = A [aC^{-\theta} + (1-\alpha)L^{-\theta}]^{-1/\theta}$$

where  $Q$  is the total output,  $C$  is capital, and  $L$  is labour.  $A$  is the efficiency parameter indicating the state of technology and organisational aspects of production. It is based on assumption that the model is homogenous of degree one. If we increase the inputs  $C$  and  $L$  in the CES function by any ratio it will result in the same ratio for instance by  $n$ -fold, output  $Q$  will also increase by  $n$ -fold. The assumption display constant returns to scale. Also CES production function show that the average and marginal products in the variables  $C$  and  $L$  are homogeneous of degree zero like all linearly homogeneous production functions., this account for the slope of an isoquant, which is the MRTS of capital for labour as shown in graph above that is convex to the origin. The parameter theta ( $\theta$ ) in the CES production function determines the elasticity of substitution.

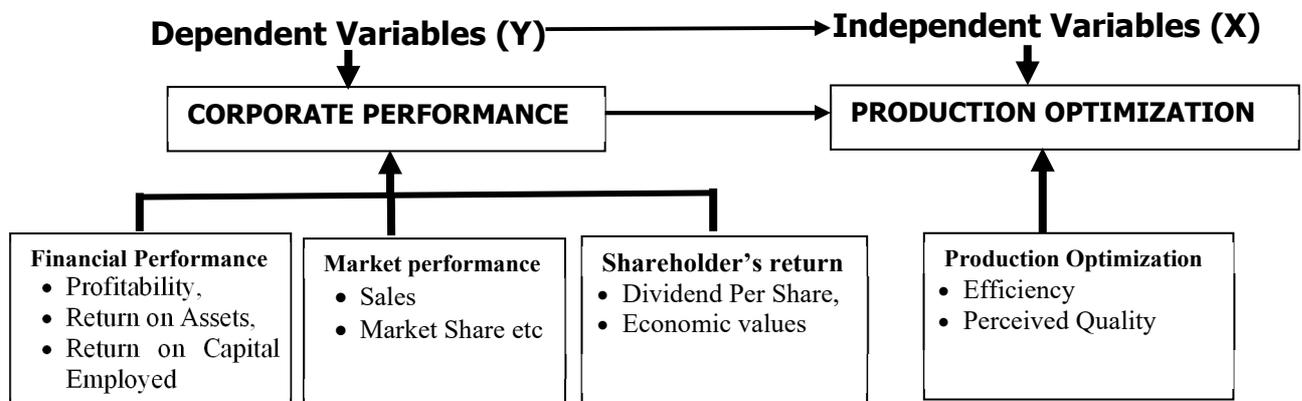
It shows that with technological and/or organizational changes, the efficiency parameter leads to a shift in the production function,  $\alpha$  (alpha) is the distribution parameter or capital intensity factor coefficient concerned with the relative factor shares in the total output, and  $\theta$  (theta) is the substitution parameter which determines the elasticity of substitution.

### 3.0 Methodology and Analyses of Data

The production optimization through product planning and control and its implication on corporate performance are analyzed to comprehend its efficacy in manufacturing industry in Lagos State. It is observed that in any manufacturing company, lack of production planning leads to inefficiency, chaotic production and drop in quality, these manifested in rise in operation cost, and eventually dissatisfied customers and then drop in revenue and lack of organization growth. It is posited that production plans involves the coordination of production activities such as sales, finance, quality, engineering, production, production engineering, schedules, stock control, buying, stores, and progress. Hence the ultimate purpose of production planning and control in manufacturing industries is to part of overall organizational strategies that is tailored to satisfy customers, make profits, high return on investment and employment generation through meeting customers' needs

In this research, two key variables formed the main focus of this study and they were categorised into Dependent ( $Y$ ) and Independent Variable; the dependent variable is the corporate performance whereas, the

independent variables is the method of production optimization adopted in selected quoted manufacturing corporation in Lagos State. The objective of the research paper is to identify the relationship that exists between the variables over time. The research framework and the relationship intended to be deduced in this research study is described in figure 2 below



Source: Eretan and Babajide (2020)

We defined CPP as measured by cost minimization, enhanced equity capital and growth. It was assumed that the practices of Production Optimization (PO) will trigger Corporate Performance (CP). It is assume efficiency in utilization of factors input and through its dimensional proportional combination will lead to cost minimization, which will results in enhanced profitability (Profit Before Tax-Pbt, Return on Equity-roe, return on capital employed-roe) and growth as a measure of performance. Therefore two (2) research hypotheses are formulated thus;

**H<sub>01</sub>:** Production optimization (PO) does not have significant impact on corporate performances (OP)

**H<sub>01</sub>:** Production optimization practices (Pop) does not have significant relationship on product quality (PQ)

### 3.1 Population and data collection

Study population for this study comprise of all manufacturing company in Lagos State, Nigeria, that is all the staff of the organization. Sample is drawn from the population of study in such a way that will have all characteristics of the study population. Four (4) of such organization are selected randomly viz;

#### **Cadbury Nigeria PLC.**

The origins of Cadbury Nigeria Plc. date back to the 1950s when the business was founded as an operation to source cocoa beans from Nigeria and as a precursor to enable the company's founders to tap opportunities for serving the local consumer-market with world-famous, Cadbury-branded products.

In the early 1960s, an initial operation was established to re-pack imported bulk products. This packing operation grew rapidly into a fully-fledged manufacturing operation and resulted in the incorporation of Cadbury Nigeria Limited in January 1965. In 1976, the firm became a publicly listed company with shares traded locally on the Nigerian Stock Exchange. The most popular brand is Bournvita.

#### **Guinness Nigeria Plc**

Guinness Nigeria Plc is home of the first Guinness brewery outside of the British Isles. The first bottle of Guinness Foreign Extra Stout in Nigeria was brewed on the 30th of November 1963, three years after Nigeria's independence - opening up opportunities for the overseas Guinness Foreign Extra Stout brewing in other parts of the world. Two years later, in 1965, Guinness Nigeria was listed on the Nigerian Stock Exchange. We are proud to be the world's second-largest market for Guinness, and a major part of the inspiring long history of brand Guinness. The major brand is Guinness Stout and Harp Lager which prompted the building of three more major breweries in Nigeria.

#### **Honeywell Flour Mill PLC**

Honeywell Flour Mills PLC (HFMP) is one of the major flour milling company in Nigeria and was initially registered as Gateway Honeywell Flour Mills Limited in 1985. However, in June 1995, a change in the company ownership structure led to a change of name to Honeywell Flour Mills Limited (HFML). Over the years HFMP has positioned itself as a market leader in milling, processing & packaging of flour and other wheat based products. After its initial public offering (IPO) in 2008, the company became a public liability company and was listed on the Nigerian Stock Exchange (NSE) in 2009. Honeywell Flour Mills PLC produces and markets seven major product brands:

#### **Vitafoam Nigeria PLC.**

Vitafoam Nigeria Plc was incorporated on 4th August, 1962 and listed on the floor of the Nigerian Stock Exchange in 1978. The company is leading manufacturer of flexible, reconstituted and rigid foam products in Nigeria. It has the largest foam manufacturing and distribution network which facilitates just in time delivery of finished products

throughout West African Sub region.

Data were collected from the four organization, the results of data analyzed will be useful to other manufacturing companies. Therefore respondents were drawn from production, finance and management departments. The categories of staffs were chosen due to their strong involvement in daily planning of production and financial requirement for production activities such as recording and management of daily inventory orders, economic lot size quantities, production, sales and costs associated with these production activities.

### 3.2 Method of Data Collection

In obtaining information for this study, the primary and secondary source of data collection were used. Structured questionnaires as presented in Appendix B were sent to staff of the researched organizations. The questions were developed after a thorough review of relevant literatures. The questions are close ended, given the respondent to respond precisely. The question was divided into sections: section A bothered on the demographic information of the respondents, section B deals on questions accessing the level to which production planning and control was implemented, while section C deals with the level to which production planning and control affect operational cost. Also, an empirical relationship between production planning and operational cost was established through the daily recording of the achieved proportion of production components and the proportion of cost reduced. A 5 scale point format was adopted for the questionnaire (That is, 1 to 5). 1 represents the very weakest response, while 5 represents the strongest response. The secondary data were obtained through literatures.

### 3.3 Analysis

Descriptive information of the sample revealed that 65% of respondents were male while 35% of the respondents were female. Additionally, 28% of the total respondents were above 51 years of age while those between 41 to 50 years are the majority with 43%. Those on age group 30 to 40 years are 22% and those below 30 years are 7%. Marital status of the respondents' show that 41% are married, 40% are single, 10% are divorced and 9% are widow. Analyses of the educational qualification of the respondents show that 52% have either university or Higher Diploma or its equivalent, 17% have National Diploma or its equivalent, 20% are Secondary School Certificate or its equivalent while 11% have higher qualification. The years of experience of respondents show that those who have below 5 years on the job are 22% those with 5 to 10 years are 34% and those with 11 years and above are 44%. Distribution of respondents according to department show that majority of the respondents are from production department with 74% of the total respondents while 15% are from top management, 7% are from marketing department and 4% are from human resources department. On an average, majority of the respondents are aware of various production strategies adopted by their organization with 65% while the 10% are not aware and the remaining disagreed that there is any strategy.

### 3.4 Hypotheses Testing

The measurement model test presented a good fit between the data and the proposed measurement model. For instance, the Chi Square/degrees of freedom (396/194) were used because of the inherent difficulty with the sample size. The  $X^2/d.f$  value was 2.04 which fall in the recommended range of two and five as suggested by Joreskog and Sorbom (2003) and this shows that the model has a good fit to the data. The various goodness-of-fit statistics are shown in Table below.

**H<sub>01</sub>:** Production optimization (PO) does not have significant impact on organizational performances (OP)

**Table 1: Chi Square ( $X^2$ ): Impact of Production optimization (PO) and organizational performances (OP)**

		Freq	%	$X^2$ Cal	$X^2$ Table	df	LS	Remarks
6	Yes	305	61					
	No	195	39					
	<b>Total</b>	500	100					Sig
7	Yes	400	80.0					
	DK	30	6.0					
	No	70	14.0					
	<b>Total</b>	500	100.0					Sig
8	Yes	345	69.0					
	DK	25	5.0					
	No	130	26.0					
	<b>Total</b>	500	100.0					
13.	Yes	450	90.0					
	DK	40	8.0					
	No	10	2.0					
	<b>Total</b>	500	100.0	62.72	7.82	3	0.05	Sig.

**Decision:**

In Table 1 presents the significant structural relationship among the research variables and the standardized path coefficients. The Chi Square Calculated is 62.72 while Chi Square Table equal 7.82 with degree of Freedom (df) =3 at 0.05 Level of Significant level (LS) and  $P < 0.01$ . It is observed that Chi square ( $X^2$ ) Table is less than Chi square ( $X^2$ ) Calculated therefore reject the null hypothesis that Production optimization (PO) does not have impact on organizational performances (OP). The result indicated that Production optimization (PO) have impact on organizational performances (OP).

**H<sub>02</sub>:** Production optimization practices (Pop) does not have significant relationship on product quality (PQ)

**Table 1: Chi Square ( $X^2$ ): Analysis Respondents on relationship between Production optimization practices (Pop) and product quality (PQ)**

		Freq	%	$X^2$ Cal	$X^2$ Table	df	LS	Remarks
5	Yes	305	61.5					
	No	195	38.5					
	<b>Total</b>	500	100					Sig
9	Yes	400	10.0					
	DK	30	80.0					
	No	70	10.0					
	<b>Total</b>	500	<b>100.0</b>					Sig
10	Yes	345	69.0					
	DK	25	5.0					
	No	130	26.0					
	<b>Total</b>	500	100.0					
11.	Yes	450	90.0					
	DK	40	8.0					
	No	10	2.0					
	<b>Total</b>	500	100.0	44.480	7.82	3	0.05	Sig.

**Decision**

Table 2 above presents the Chi-square of the relationship between Entrepreneur practices (EP) and Government Policies (GP). The result show that the Chi square calculated ( $X^2_{cal}$ ) is 44.480 while Chi square table ( $X^2_{tab}$ ) is 7.82 with degree of Freedom (df) =3 at 0.05 Level of Significant (LS). Therefore reject the null hypothesis that Production optimization practices (Pop) does not have significant relationship on product quality (PQ), thereby establishing that Production optimization practices (Pop) have relationship with product quality (PQ).

**3.5 Discussion of Findings**

Observation from the analyses of responses to items in the questionnaire administered in the four (4) manufacturing companies as well as the hypotheses testing is as follow;

The statistical analyses of responses to items in the questionnaire on impact of Production optimization (PO) and organizational performances (OP) show that majority of the respondents agreed that efficient production planning and control were designed for proper functioning of any manufacturing organization and they agreed that there is production planning and control by their organization as part of overall strategy of the organization.

Majority of the respondents also agreed that these PO has impact on organization profitability, return on assets and return on capital employed over time. They also agree that PO has help to increase sales and market share as result of efficiency in production which has reduced cost of production and resulted in increase competitive edge. Therefore it was established that Production optimization (PO) has significant impact on organizational performances (OP).

In the same vein, it was established Production optimization practices (Pop) has help the organizations to determine most efficient combination of factors input which lead to improvement in product quality (PQ) over time.

Production control help companies to meet customer demand in time of quality and delivery time maintain the goals for inventory levels, and minimize cost of production. A brief analysis of these findings revealed that even in most organizations where there is no formal planning, effort are always made in controlling operations by ensuring that actual output conforms to expected output.

The outcome of this study aligns with previous studies reported by Ikan (2003) that production optimization has help management to achieve organization goals and responding to threats and opportunities in the industry. Mula, Poler, Garcí'a-Sabater, and Lario, (2006), opined that customers' need for quality products that provide satisfaction will be solve by production optimization. Olalekan, and Tajudeen, (2015), established that value-added, quality product enhance customers loyalty and provide competitive edge in the industry.

#### 4.1 Conclusion

The analyses carried out on quoted manufacturing companies showed that production optimization comprises of product planning and control and these depend on several components such as material requirement, factor inputs regulation and control, manufacturing resource. If all these are effectively implemented it will reflected in the cost price and quality of product relatively with the other similar product in the industry. Therefore it was observed that production planning and control is relevance to operational cost and product quality.

#### 4.2 Recommendations

In this paper, an attempt has been made to establish the need for production optimization in manufacturing companies in Lagos State, Nigeria. The following recommendations are drawn from this study:

- ❖ Proper production planning and control that rely on empirical research should be performed from time to time in other to improve and enhance the competitive edge of the companies in the industry as well as to established customers loyalty.
- ❖ Like every other strategic planning production optimization should be review periodically in other to improve the strategy and for perfection.
- ❖ Research and development should be improve upon to help the companies master the production planning and control
- ❖ Since production optimization enhances corporate performance, Nigerian manufacturing companies must deliberately strive for production efficient, effective and planning of production activity irrespective of the size and age of the firm by application of advanced manufacturing technology, such as computer assisted design and manufacturing (CAD/CAM), robotics and flexible, manufacturing systems.
- ❖ There should be collaboration between manufacturing firms and the research institutions. This help to make research activities and findings efficient and effective.
- ❖ New innovation should be encouraged within the companies either as an attempt to improve quality of existing products or new product entirely.

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