

Production Planning and Growth of Manufacturing Firms in Rivers State, Nigeria

Ozighi Akpezi Gladys and Prof Needorn. S. Richard

Doctoral Student, Department of Management and Professor of Management, Department of Management, University of Port Harcourt, P.M.B. 5232 Choba, Port Harcourt, Nigeria odirigladys01@gmail.com, needorn.richard@uniport.edu.ng

Abstract: This study was carried out to investigate the nexus between production planning and growth of manufacturing firms in Rivers State. The study was anchored on three dimensions (material requirement planning, output level) and measures (sales volume and assets growth) with a moderating variable of organizational culture. Seven objectives, hypothesis and research questions were raised for the study whilst the study was carried out across selected twenty three (23) manufacturing firms in the study area of Rivers State in Nigeria. Quasi experimental research design was adopted for the study to ascertain the effect of production planning on firm's growth. In existence of a significant relationship between the dimensions of production planning and firm's growth among production firms in Rivers State within the study area was established. It was then conduced by agreeing to the observation that there is a significant and positive relationship between production planning and firm's growth among firms in the study area. The study recommends that manufacturing firms in Rivers State, should improve on their operation with effectiveness, efficiency and optimal utilization to improve the quality of goods and services. Also take serious the concept of production planning has become a fulcrum activities in organizations, as firms should carefully coordinate their personnel and invest in them since they are the most valuable assets in firms.

Keywords: Product Planning, Growth, Material Requirement Planning, Output Level, Sales Volume, Assets Growth

Introduction

The substantial growth of every firm does not depend only on the size of firms but its personnel, assets growth, technology level, output level among other factors. Through the creation and expansion of firms the economy of any nation generates new opportunities, making possible more employment for the people. Recognizing the importance of firms' growth, government, economists and international development agencies have devoted substantial resources to the creation and implementation of programmes to assist firms' growth and thus foster economic prosperity. In order to ensure that these programmes provide adequate results, thus public and private resources are not wasted, it is pertinent to design highly effective and efficient programmes to improve firms' growth because the economy of any nation depend on firm growth. Consequently, it is imperative to understand the process and the variables that grant or constrain firms' growth. Not many theoretical frameworks of firm formation and growth have been formulated and very few have been tested extensively (Davidsson, Kirchhoff, Hatemi, & Gustavsson, 2002).

Firm growth is the result of exploring opportunities. Firms are a collection of various resources that provide the means to successfully take advantage of those opportunities and grow (Barney, 1986, 1991; Penrose, 1959). There is no limit to the growth of firms; Davidsson (1989) and Storey

(1994) have argued that firm location may be important determining growth since the local market binds firms. Firm venture is successful if it is growing, growth can be defined in terms of revenue generation, value addition, and expansion in terms of volume of the business. It can also be measured in the form of qualitative features like market position, quality of product, and goodwill of the customers (Kruger 2004). This connote the economy gain of every nation in terms of providing opportunities and employment generation since growth is a vital indicator of a flourishing enterprise.

Production can be explained as an act of manufacturing, mining or production of goods (commodities) generally in bulk for trade. Production is a method employed for making or producing essential goods and services for consumers. It is a process that puts intangible inputs like ideas, creativity, research, knowledge and wisdom in use or action. It is a process that transforms (convert) tangible inputs like raw-materials, semi-finished goods and unassembled goods into finished goods or commodities. According to Ray (2010), production planning is defined as; "A process concerned with the determination, acquisition and arrangement of all facilities necessary for future operations.

Production is the most important activity of an enterprise. It occupies significant position in an organization because other functional areas of management viz., financing, marketing, personnel revolve around it. Production is concerned with transforming raw material into finished product with the use of energy, capital, manpower and machinery which makes it a very complex and process. Production is carried out by following various production policies initiated by production department of an organization. The aim of a good production policy is to achieve maximum output with minimum input. It is of importance that production department of any organization should be managed by experts in such a manner as to ensure good usage in material resources and production time.

Production planning means to fix the production goals and to estimate the resources which are required to achieve these goals. It prepares a detailed plan for achieving the production goals economically, efficiently and in time. It forecasts each step in the production process. It forecasts the problems, which may arise in the production process and tries to remove these problems. It also tries to remove the causes of wastage. As such production planning provides answers for two major questions, viz., what work should be done and how much time will be taken to perform the work. As such, production planning decides the process and means of achieving production. It shows the direction. It is based on sales forecasting. It is a prerequisite of production control. Similarly, the concept of production planning is of great importance to an organization. This is to say that a proper and efficient production planning system offers effective utilization of resources, steady flow of production, estimation of the resources, ensures optimum inventory, coordinates activities of departments, minimize wastage of raw materials, improves the labour productivity, helps to capture the market, provides a better working environment, facilitates quality improvement, improve consumer satisfaction and reduce production costs in the organization.

Organizations irrespective of the industry they operate have always strive to grow from one level to another and or one stage to another. This is no surprise because the growth of firm is very important to organization, because for when a firm is growing profitability is guaranteed, return on assets to stakeholders is sure and even to the nation where the firm is operating due to increased

capacity for expansion which brings about employment opportunities. Growth of firms also has shown positive implication to the nations (government) through increased GDP as well as taxations. This simply shows that the growth of firms does not pose advantage only to organizations, individuals or stakeholders but likewise to the entire nation at large. For these reasons many scholars and researchers have suggested, theorized as well as made several postulations on how organizations can grow. For instance, Prior and Nelda, (2001), showed that a firm using less than 100% planning utilization will apparently boost their operations activities without acquiring exorbitant depreciation costs coupled with procuring brand-new appliances or properties which will ultimately yield an improved production giving rise to growth in the long run.

Anyanwu (2000) posit that when organization automates it process for production, it will guarantee high level of growth and profitability. Also, Johan (2003) explained that when an organization motivates it employee, there is bound to be growth because the workers will put in their best at work and become committed. Similarly, Pettinger (2012) posited that, as long as there are no conflicts, chaos or politics in the organization, and then firms are bound to grow and become profitable. According to works carried out by Hashim (2003), he opines that firm growth is an essential viable metric for organizations, and also it's a major industrial symbol when related to total productive capacity. This metric serves as a yardstick for measuring the productivity. As such, firm's growth is essential for appraising a firm's present operating performance and it also helps to clarify cost structure both in the short term and in the long term.

Looking at the pool of literatures and scholarly works bothered on growth of firm with regards to Rivers State, Nigerian working environment context, there are few research on production planning process with regards to growth of firms. It is based on this observed gap in literature in management that this work intends to discuss the relationship between production planning and growth of manufacturing firms in Rivers State, Nigeria.

Statement of problem

It is generally held that in Nigeria, manufacturing workers record low productivity (Akerele, 1991; ASCSN, 2001) which gives rise to a reduced or limiting growth of the firm. This opinion portrays under-utilization (or ineffective utilization) of the production service labour force. Thus, customer demand, satisfaction and having competitive edge in the resource market has been a problem in the manufacturing sector, the inability to curb these bane has led to limited growth within the manufacturing sector. However the up to date knowledge of the level of production planning in relation to growth of firms in the Nigerian manufacturing industry is limited.

The gross under-utilization of resources in Nigerian Manufacturing Industries has been traced to; a fall in the demand for locally manufactured goods, irregular power outages, and insufficient funds to acquire inputs. From the information and researches carried out example Anyanwu (2000) which talks about automation as one of the criteria for organizational growth. Looking at the concept of automation, it has to do with or is a factor of steady power which is not achievable in Nigeria and this poses a problem towards achieving growth. In terms of crisis as opined by Pettinger (2012), there is no possibility of working in an organization within the Nigerian context without crisis, conflict and chaos. Also, since human beings are not entirely economic entities as such not only the economic promises that get them committed to work. As such, even when they are motivated, they are not committed to work. All these factors as postulated by scholars have

been observed not to be obtainable or working in the Nigerian business context. It is based on this that this project tends to look at it from the angle of production planning with regards to growth of manufacturing firms in Rivers State, Nigeria.

Conceptual Framework



Figure. Conceptual Framework of Production Planning and Growth of Manufacturing Firms.

Source: Production planning adopted from Kaplan (1986) and Joseph Orlicky (1964), growth of manufacturing firms Penrose, (1959).

Aim of the Study

The aim of the study is to determine the relationship between production planning and growth of manufacturing firms in Rivers State, Nigeria.

The specific objectives are to;

- i. Examine the relationship between material requirement planning and sales volume of manufacturing firms in Rivers State, Nigeria.
- ii. Determine the relationship between material requirement planning and assets growth of manufacturing firms in Rivers State, Nigeria.

- iii. Examine the relationship between output level and sales volume of manufacturing firms in Rivers State, Nigeria.
- iv. Ascertain the relationship between output level and assets growth of manufacturing firms in Rivers State, Nigeria.

Research Questions

The following research question were proffered for the study

- i. What is the relationship between material requirement planning and sales volume of manufacturing firms in Rivers State, Nigeria?
- ii. What is the relationship between material requirement planning and assets growth of manufacturing firms in Rivers State, Nigeria?
- iii. What is the relationship between output level and sales volume of manufacturing firms in Rivers State, Nigeria?
- iv. What is the relationship between output level and assets growth of manufacturing firms in Rivers State, Nigeria?

Research Hypotheses:

Based on the above research questions the following null hypotheses relevant to this study are formulated.

Ho1: There is no significant relationship between material requirement planning and sales volume of manufacturing firms in Rivers State, Nigeria.

Ho2: There is no significant relationship between material requirement planning and assets growth of manufacturing firms in Rivers State, Nigeria.

Ho3: There is no significant relationship between output level and sales volume of manufacturing firms in Rivers State, Nigeria

Ho4: There is no significant relationship between output level and assets growth of manufacturing firms in Rivers state, Nigeria.

Literature review

Theoretical Framework

This study drawn inspiration from baseline theory of theory of production;

Theory of Production

Theory of production means knowledge of what is permanent and normal in industrial production. Traditionally, this knowledge has been accumulated in <u>tacit</u> form in the professional skill of industrial managers and artisans, but today more and more of it is being documented in writing by researchers. Most studies of production use either one of two alternative approaches, that is, they have either descriptive or normative purpose. The two resulting theory paradigms differ quite much from each other even when the object of study is the same. <u>Descriptive</u> theory contains knowledge about past or present production but does not much help for modifying it to correspond better to

latest requirements. Academic or historical studies are often of this type. They are sometimes categorized in two types: extensive studies of a large number of cases, and intensive studies of one or a few cases.

<u>Normative</u> theory of production contains generally applicable knowledge and tools that can be used in the management of production, especially for optimizing existing production and planning new production. Research for creating normative theory is usually <u>extensive</u> because it needs a large number of cases for its material. Production is a process of combining various inputs to produce an output for consumption. It is the act of creating output in the form of a commodity or a service which contributes to the utility of individuals. In other words, it is a process in which the inputs are converted into outputs. The Production function signifies a technical relationship between the physical inputs and physical outputs of the firm, for a given state of the technology.

$$\mathbf{Q} = \mathbf{f} (\mathbf{a}, \mathbf{b}, \mathbf{c}, \dots, \mathbf{z})$$

Where a,b,cz are various inputs such as land, labor ,capital etc. Q is the level of the output for a firm. If labor (L) and capital (K) are only the input factors, the production function reduces to $-\mathbf{Q} = \mathbf{f}(\mathbf{L}, \mathbf{K})$

Production Function describes the technological relationship between inputs and outputs. It is a tool that analysis the qualitative input, output relationship and also represents the technology of a firm or the economy as a whole.

Concept of Production Planning

Production planning is a predetermined process which includes the use of human resource, raw materials, machines etc. PP is the technique to plan each and every step in a long series of separate operation. It helps to take the right decision at the right time and at the right place to achieve maximum efficiency. The main elements of Production Planning include; routing, loading, scheduling, dispatching, follow up, inspection and corrective

Routing: It is about selection of path or route through which raw materials pass in order to make it into a finished product. The points to be noted while routing process are full capacity of machines, economical and short route and availability of alternate routing. Setting up time for the process for each stage of route is to be fixed. Once overall sequence are fixed, then the standard time of operations are noted using work measurement technique.

Loading and scheduling: Loading and Scheduling are concerned with preparation of workloads and fixing of starting and completing date of each operation. On the basis of the performance of each machine, loading and scheduling tasks are completed.

Dispatching: Dispatching is the routine of setting productive activities in motion through the release of orders and instructions, in accordance with previously planned time and sequence, embodied in route sheet and schedule charts. It is here the orders are released.

Expediting / **Follow-up**: It is a control tool which brings an idea on breaking up, delay, rectifying error etc., during the progress of work.

Inspection: Inspection is to find out the quality of executed work process.

Corrective: At evaluation process, a thorough analysis is done and corrective measures are taken in the weaker spots.

Production is carried on by following various production policies initiated by production department of an organization. The aim of a good production policy is to achieve maximum output with minimum input. It is of vital importance that production department of the organization should be managed in such a manner as to ensure economy in material resources and production time. Production management is primarily concerned with formulation and design of various production policies. According to Elwood (2010), "In a broader sense, production management is concerned with coordination of materials, men, methods, machines and money in manufacturing goods.

Types of Production Planning

Production planning involves scheduling, estimating, and forecasting the future demands for products. This takes into account customer orders, production capacities and capabilities, forecasting of future trends, and inventory levels. Once that is done, there are five main types of production planning: Job, Method, Flow, Process and Mass Production methods. Each is based on different principles and assumptions. Each has their own merits and demerits.

Job Method

Under this method, the complete task of manufacturing a product is handled either by a single worker or by a group. The type of jobs using this method could be small scale or complex. This method is usually incorporated when customer specifications are essential in the production. Tailors, cooks, and hairdressers are all examples of professionals who use the Job method of production planning. Small scale jobs are those for which production is relatively easy, as the worker has the required skill-set for the job. Also relatively little specialized equipment is usually needed in such tasks. Due to those considerations, the customer's specific requirements can easily be included at any time during the progression of the job. Complex jobs involve the use of high technology, making project control and management essential. Construction businesses, for example, are complex operations that still use the Job method of production planning.

Batch Method

As businesses grow, and their production volumes grow with them, the Batch method of production planning becomes more common. It requires the division of work into parts. For a part of work to proceed it is essential that the previous part gets completed. Electronic parts manufacturing businesses use the batch method. The Batch method requires specialization of labor for each division.

Flow Method

This method is similar to the batch method. Here the aim is to improve material and work flow, reduce labor and labor costs and finish the work faster. Unlike the batch method, where one batch is completed after another, in this method, work progresses as a flow. Assembly lines that make televisions typically use this method. The product is manufactured by a number of interconnected operations in which the material moves one stage to the second without time lags and interruptions.

Process and Mass Production Method

Here the product is produced using a uniform and standardized sequence. Highly sophisticated machinery is used here. The production is continuous. In this method, goods are produced using standardized techniques like balanced production and product-wise layout.

Push Production

In production planning, the most common approach for solving the production optimisation challenge is the "*push production*" approach (Haverila *et al.*, 2009). Push production is based on the detailed scheduling of each of the production steps from the first processing step to the last. The flow of production starts from the first processing step and the following step is initiated when the previous step is finished. This requires confidence in long-term forecasting from the company using this approach, so production can be adjusted to the actual demand, without overproduction. Naturally, the company can also suffer from stock-outs, if the production volumes are underestimated. The challenge of push production is also the accumulation of intermediate stock and work in progress for the production process; in many cases, this is due to the variation in the process steps and mismatch between the actual demand and the produced quantities (Mann, 2015).

Pull Production

Pull production is manufacturing of products or parts to meet only the actual immediate demand. In the manufacturing process, the signals to trigger processing travel from the end of the process towards the beginning. Typical signals are Kanban cards, which indicate the need to start processing. The pull production approach has become famous, its origins on the Toyota production system and the lean philosophy, that is, the essential fabric for sustaining a pull production system and its benefits (Haverila *et al.*, 2009; Liker, 2004).

Dimensions of Production Planning Material requirements planning (MRP)

Material Requirement planning (MRP) is a production planning, scheduling, and inventory control system used to manage manufacturing processes. MRP was created initially to supply the Polaris program then, in 1964, as a response to a firm (Toyota) Manufacturing Program, Joseph Orlicky developed material requirements planning (MRP). The first company to use MRP was <u>Black & Decker</u> in 1964, by 1975, MRP was implemented in 700 companies. This number had grown to about 8,000 by 1981. While In 1983, <u>Oliver Wight</u> developed MRP into manufacturing resource planning (MRP II). In the 1980s, Joe Orlicky's MRP evolved into Oliver Wight's manufacturing resource planning (MRP II) which brings master scheduling, rough-cut capacity planning, <u>capacity requirements planning</u>. In 2011, the third edition of "Orlicky's

Materials Requirements Planning" introduced a new type of MRP called "demand driven MRP" (DDMRP). Material requirement planning (MRP) as a production planning function that helps an organization in ensuring that materials are available for production, products available for delivery to customers, that and a firm maintains a minimal possible material and product levels in the store. Thus, most MRP systems are <u>software</u>-based, but it is possible to conduct MRP by hand as well. Material requirements planning (MRP) is a computer-based inventory management system designed to assist production managers in scheduling and placing orders for items of dependent needs. Dependent demand items are components of finished goods, such as raw materials, component parts, and subassemblies for which the amount of inventory needed depends on the level of production of the final product. An MRP system is intended to simultaneously meet three objectives; ensure raw materials are available for <u>production</u> and <u>products</u> are available for <u>delivery</u> to customers, maintain the lowest possible material and product levels in store and plan manufacturing activities, delivery schedules and <u>purchasing</u> activities.

MPR is also known as manufacturing resources planning or MRP II used materials for a certain finished product into a production and purchasing plan for components, thus used to link the various functional areas across an entire business environment. Kwahng Kim (2014) posit that MRP process has become a cornerstone of the manufacturing industry that has been around for many years which the theoretical calculations were being utilized in the production process. It has become a robust and complicated tool used in many of the manufacturing industries for effective production. MRP has become so engrained in the manufacturing industry that one of the biggest challenges in improving customer service is the fact that not all users understand the complexity of the system. Due to this complexity, it is difficult to make changes to a process because the total impact may not be known.

Firms must understand the complexity of MRP to create a specify delivery times and order quantities from a forecasted demand. The forecasting is both external and internal to the firm. Once the customer's need is determined, the forecasting on efficiency, utilization, and availability of the manufacturing resources begins. In addition, firms dependent on the MRP report of what to order next to meet the forecasted needs and become less receptive to the daily urgencies of their customer and to remain competitive in the business environment. MRP enable firms to also synchronize the flow of materials, components, and parts in a phased order system to successful production planning, considering the production schedule. All firms use MRP for common goals. These include making sure that the inventory level is at a minimum in their firm, but high enough to provide for the customer need, and which them plan all of the activities, including delivery, purchasing, and manufacturing.

However, the largest problems related to MRP are (Aiello, 2008):

i. Inventory accuracy: without accurate inventory records, MRP will make wrong proposals and may cause stock-outs.

ii. BOM accuracy: if the BOM is not correct, the MRP will propose supply in the wrong quantities or wrong materials.

Output Level

Is the tangible and intangible products that result from production activities and the benefits that production planning is design to deliver. The results chain that provides both theoretical and practical model for defining the interrelated components of production planning that are required for its success is the output level. By developing indicators that track these different production components that enable firms to be able to assess whether an initiative is being implemented as planned, if it is leading to improvements in production planning and either it is necessary to adjust

production activities to maximize benefit and overcome unanticipated obstacles. Thus, the process for developing indicators should begin at the production conceptualization and design phase. As a first step, firms should be able to clearly articulate the factors that underpins their production planning process towards achieving their objectives. Firms should clearly and explicitly describe the way that they expect their output level over time and resources to produce the intended benefits, organizations must provide a firm foundation for developing indicators that capture those production elements that are important to measure. It is usually important to track output level at regular intervals over the period of production, as a way of assessing progress towards firm goals and detecting delays. While achieving production outputs offers no guarantees that production planning will be successful, without achieving the firm outputs, the chances of success may be minimum.

Concept of Firms' Growth

Growth is an organizational outcome resulting from the combination of firm-specific resources, capabilities and routines (Nelson & Winter, 1982). A firm's growth opportunities are highly related to its current organizational production activities (Coad, 2009). Path-dependency is thus an important theme of firm growth (Coad, 2009). Firm growth is also uncertain: environmental conditions such as competition and market dynamics play their roles. For small firms, growth is also influenced by personal ambition of an entrepreneur.

Mosselman, Frederiks and Meijaard (2002) observed that only 16% of the small business owners in the Netherlands aim to grow. Although recent studies attempt to link determinants from different perspectives or dimensions (Baum, Locke & Smith, 2001; Covin & Slevin, 1997; Lumpkin & Dess, 1996), their explanatory power is low due to the relatively small number of variables (Davidsson, Delmar, & Wiklund, 2006). It is therefore of special interest to examine the determinants of firm growth in an integrated way, and to identify the most important determinants of firm growth. The growth of a firm is to a certain extent a matter of decisions made by an individual entrepreneur.

Sales Volume

Sales volume is the number of units sold within a <u>reporting period</u>. This figure is monitored by <u>investors</u> to see if a business is expanding or contracting. Within a business, sales volume may be monitored at the level of the product, <u>product line</u>, <u>customer</u>, <u>subsidiary</u>, or sales region. This information may be used to alter the <u>investments</u> targeted at any of these areas.

A business may also monitor its <u>break even sales</u> volume, which is the number of units it must sell in order to earn a <u>profit</u> of zero. The concept is useful when <u>sales</u> are contracting, so that management can determine when it should implement <u>cost reductions</u>. This can be a difficult concept to employ when there are many different products, and especially when each product has a different <u>contribution margin</u>. The sales volume concept can also be applied to services. For example, the sales volume of a consulting firm may be considered the total number of hours billed in a month. Brooke and Gudergan (2001) explored the role of various factors on effectiveness among sales force, through an exploratory study in eight Australian pharmaceuticals companies and found positive relationship between sales force autonomy and effectiveness in all the companies. The study also concluded that market knowledge led to a greater market orientation, which in turn, has a positive effect on sales force effectiveness. Matsuo and Kusumi, (2002) focused their research on Sales person's procedural knowledge, experience and performance in Japan. Procedural knowledge would indicate the type of selling methods or strategies to be adopted in specific situations.

Asset Growth

Assets growth is one of the unit of observation used in measuring firm growth, as a parameter it is highly correlated with other comparable and related measures of assets growth. Assets growth can be define as the size and growth of a firm, and are more rigid to changes in the internal process of a firm. When a firm increases in stock value, sales and employment capacity it also increases its assets growth, not all of them react so fast to internal and external changes due to their characteristics because some are more volatile than others. Kirchhoff and Norton (1992) compared three measures (employment, assets growth and sales) and showed that they are interchangeable because they produce the same results when tested over a seven-year period.

Assets growth impact on firm growth spread across employment, industry concentration, firm survival and economic activity of a region and this often lead to increase in the number of employees of a firm, growth on its economic activities, level of efficiency and policy making on price mechanism of variables in a business environment of the industry. Also, Thornhill (2005) connote that innovations are positively correlated with firm performance, as measured by assets growth. Thus, in advance there is an indication that in literatures there is a heterogeneity in the analysis of firm growth in the measure used to analyse growth and in the results. Assets growth is a crucial interest and important variable used in measuring firm growth and its determinants.

Relationship between Firm's Growth and Production Planning

With production planning, a firm can meet customer requests for delivery times when feasible, meet the present goals for inventory levels, and minimize per unit cost of production. Past study by Umoh et al., (2013) observed that production planning is a veritable weapon for improved productivity performance in Nigerian manufacturing firms. It was gathered that 56.5% variation in growth is accounted for by variations in production planning. Their findings do not differ significantly from prior studies such as Olusegun and Adegbuyi (2010); Everette (2006), Higgins (2001) and Weimer (1999). Olusegun and Adegbuyi in their study revealed that a significant relationship exist between production planning operations and organizational output, though not in the Nigerian manufacturing sector. Everette (2006) reported that forecasting future demand of a firm's product helps to eliminate any form of disruption to meet expected demand, which consequently enhances profitability and shareholders worth of the business. Higgins (2001) observed that firms with effective production planning system outperform those with an adhoc approach to production operations in around performance measures. Weimer (1999) revealed that productivity is significantly low when there is lack of production planning operations which may result from wastages, error in product design and rework. Consequently, it is safe to say that productivity can be significantly enhanced with adequate production planning operations in manufacturing companies.

Method

To measure production planning, 15 item scale developed by (Ritchie, 2014) will be put to use which includes "MPR 4 items and Output level 4 items Firms Growth will be measured using the twelve (12) items scale developed by Okah, (2018). Six items each will be used to measure sales

volume and asset growth. The data obtained in the field was analyzed using the Kendall's Tau. Kendall's Tau is a <u>non-parametric</u> measure of relationships between columns of ranked data. The Tau correlation coefficient returns a value of 0 to 1, where: 0 is no relationship and 1 is a perfect relationship. A quirk of this test is that it can also produce negative values (i.e. from -1 to 0). Unlike a linear graph, a negative relationship does not depict much with ranked columns, as such it allows for one to remove the negative sign when carrying out interpretation. The reason for its choice is owning the fact that, it dedicates the degree of effectiveness in predicting one ranked variable based on another ranked variable.

However, the sample respondents were been selected using systematic random sampling from the list of the population. The hypothesis were simultaneously independently analyzed which offered a significant help to either accept or reject the null hypotheses.

Results and Analysis Hypotheses Testing Result

Hypotheses Testing Results

HO₁: There is no significant relationship between material requirement planning and sales volume of growth of manufacturing firms in Rivers state, Nigeria.

Correlations				
			MATERIAL	SALES
			PLANNING	VOLUME
			REQUIREM	
			ENT (MPR)	
Kendall's tau_b	MATERIAL PLANNING REQUIREMENT	Correlation	1.000	.790
		Coefficient		
		Sig. (2-tailed)		.000
		Ν	140	140
	SALES VOLUME	Correlation	.790	1.000
		Coefficient		
		Sig. (2-tailed)	.000	
		Ν	140	140

HO₂: There is no significant relationship between material planning requirement and asset growth, growth of manufacturing firms in Rivers state, Nigeria.

Correlations					
			MATERIAL PLANNING REQUIREME NT (MPR)	ASSET GROWTH	
	MATERIAL PLANNING REQUIREMENT	Correlation Coefficient	1.000	.645	
		Sig. (2-tailed)		.001	
Kendall's tau_b		Ν	140	140	
	ASSET GROWTH	Correlation Coefficient	.645	1.000	
		Sig. (2-tailed)	.001		
		Ν	140	140	

HO3: There is no significant relationship between output level and sales volume of growth of manufacturing firms in Rivers state, Nigeria.

			OUTPUT LEVEL	SALES VOLUME
Kendall's tau_b	OUTPUT LEVEL	Correlation Coefficient	1.000	.618**
		Sig. (2-tailed)	•	.005
		Ν	140	140
	SALES VOLUME	Correlation Coefficient	.618**	1.000
		Sig. (2-tailed)	.005	
		Ν	140	140

**. Correlation is significant at the 0.01 level (2-tailed).

HO4: There is no significant relationship between output and asset growth, growth of manufacturing firms in Rivers state, Nigeria.

Correlations				
			OUTPUT LEVEL	ASSET GROWTH
Kendall's tau_b	OUTPUT LEVEL	Correlation Coefficient	1.000	.507**
		Sig. (2-tailed)		.000
		Ν	140	140
	ASSET GROWTH	Correlation Coefficient	.507**	1.000
		Sig. (2-tailed)	.000	
		Ν	140	140

**. Correlation is significant at the 0.01 level (2-tailed).

Discussion of the Findings

This study glanced upon the relationships that exist between the dimension of production planning and measures of growth of manufacturing firms. The indicative outcome is explained under the sub headings;

Material Requirement Planning (MRP) with Sales Volume and Asset Growth

The result of the tested hypotheses shows tau value of $.790^{**}$ for hypothesis one; $.645^{**}$ for hypothesis two. The analysis show p-value of .000, .001 < 0.05. This results show that there is a substantial strong relationship between material requirement planning of production planning and sales volume with regards to firm growth. The results means that the material requirement planning of production planning is very significant and must be properly operationalized, designed and use as this will help the organization towards achieving increased sales volume geared towards achieving asset growth.

Output level with Sales Volume and Asset Growth

This study based on output level of production planning with sale volume and asset growth shows tau value of .618^{**} for hypothesis five; .507^{**} for hypothesis six. This depict a strong significant relationship between control phase with sales volume and asset growth. This study supports study by Umoh, *et al.*, (2013) which measured Corporate Productivity Performance in the areas of cost minimization, enhanced equity capital and growth.

Conclusion

Based on the outcomes of the investigation, the research settles that there exist a substantial association between production planning in terms of material requirement planning (MRP), personnel and output level, while firm growth with regards to sales volume and asset growth. The implication for this research is that for production to take place, there must be a proper production planning process and procedures which will cover the three most important phase and requirement of production as this will impact positively of the overall performance of the firm goods and services giving rise to growth especially in terms of the firm's asset. Also, firms must strategize properly by coordinating every contributing factors towards production planning in order to achieve sales volume and assets growth with skilled personnel, proper handling of production management issues which include; inventory control, production scheduling and control, equipment selection and control, maintenance, size and location of plants, plant layout and structure, quality and inspection, traffic and material handling and methods.

Recommendations

The following recommendations were made from the study outcome;

- i. Manufacturing firms in Rivers state, Nigeria should take seriously the concept of production planning, because production planning has become a fulcrum activities in organizations. The material requirement planning (MRP) which seems to be the primary phase production should be properly applied and managed to give room for easy implementation and control by personnel to minimize waste.
- ii. Firms should carefully coordinate their personnel and invest in them since they are most valuable assets in firms. The indication that a personnel that is entrepreneurially incline and skilled in terms of personality traits, growth motivation, personnel competencies and personal background are the most pertinent determinants that determine the growth of a firm (Baum *et al.*, 2001; Delmar, 1996; Shane, Locke & Collins, 2003).
- iii. With the fierce competition in business environment, changing customer demand and trend in business world, firm output level must be on point to meet customer demand, make huge sales volume and maintaining market position.

Reference

- Anyanwu, A. (2000). Automation Process in Productivity in Business Operation and Growth. Journal of Management and Social Sciences. 4 (2) 234-344.
- Covin, J.G. & Slevin, D.P. (1989). Strategic management of small firms in hostile and benign environments. Strategic Management Journal, 10, 75–87.
- Davidsson, P. (1989). Continued Entrepreneurship and Small Firm Growth, Ph.D. Dissertation, Stockholm School of Economics.
- Davidsson, P., B. Kirchhoff, J.A. Hatemi, and H. Gustavsson (2002). Empirical Analysis of Business Growth Factors Using Swedish Data, Journal of Small Business Management, 40(4): 332-349.

- Davidsson, P, & Delmar, F. (2006). High-growth firms: characteristics, job contribution and method observations. Mannhiem: RENT XI Conference.
- Delaney, H. and Huselid, I. (1996). Performance measures and metrics in a supply chain environment. Int J. Prod. Oper. Man. 21(1/2):71-87.
- G.I. Umoh, Ify Harcourt Wokocha, Edwinah Amah (2013): Production Planning and Corporate Productivity Performance in the Nigerian Manufacturing Industry. *IOSR Journal of Business and Management* (IOSR-JBM). www.iosrjournals.org.
- Hamilton, RT, & Dana, LP. (2003). An increasing role for small business in New Zealand. *Journal* of Small Business Management, 41(4), 402–408.
- Hashim, P. (2003). *Multifactor Productivity Growth Cycles at the Industry Level*. Australia Productivity Commission, Staff Working Paper. Canberra, Australia.
- J. Orlicky, Net Change Material Requirement Planning, IBM Systems J. (1973) in Jos Peeters, Early MRP Systems at Royal Phillips Electronics in the 1960s and 1970s, IEEE Annals of the History of Computing.
- Joseph Orlicky, Materials Requirement Planning, McGraw-Hill 1975
- Krajanowski, D. (2007). "Maturing Businesses Must Keep Their Focus on Profit." Los Angeles Business Journal. 4 (11) 17-21.
- Kruger, ME. (2004). Entrepreneurial theory and creativity (chapter 2). University of Pretoria. <u>http://upetd.up.ac.za/thesis/available/etd-08242004-145802/unrestricted/02</u> <u>chapter 2</u>. pdf. Accessed on 19th June 2013.
- Lumpkin, G.T. & Dess, G.G. (1996). Clarifying the entrepreneurial orientation construct and linking it to performance. Academy of Management Review, 21(1), 135–172.
- Okah, V., Nduka, O. I., & Ugwuegbu, C. O. (2018). Production planning and organizational effectiveness. *Strategic Journal of Business and Social Science (SJBSS)*1(3)45-58.
- Penrose, E. (1959). The theory of the growth of the firm. Oxford: Oxford University Press.
- Pettiger, (2012). Campaign planning and scheduling for multiproduct batch operations with applications to the food-processing industry. *Manuf. & Serv. Op. Man.* 6, 253-269.
- Ray, L., Christine, D., & John, V. (2010). The impact of Theory of Constraints (TOC) in an NHS trust. J. Manage. Dev. 24(2):116-131.
- Storey, D. (1994). Understanding the Small Business Sector, Rutledge, New York.
- Thornhill, A. & Saunders, M. (2005). *Research Methods for Business Students*. 2ndedition, London, UK: Pearson Education ltd.
- Umoh, G. I., Wokocha, I H. & Amah, E. (2013). Production Planning and Corporate Productivity Performance in the Nigerian Manufacturing Industry. *IOSR Journal of Business and Management (IOSR-JBM)*. 14, (2). 01-07.