

PRODUCTION PLANNING AND EMPLOYEE PRODUCTIVITY IN RIVERS STATE OIL REFINING INDUSTRY

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ABSTRACT

The study examined the impact of production planning on productivity of refining industry in Rivers state. The study population consists of 80 employees of selected oil refining industry in Rivers State. Spearman rank correlation coefficient was used for the analysis with the aid of Statistical Package for social sciences (SPSS) version 21. The results revealed that production scheduling significantly relate with productivity of refining companies in Rivers State. The study recommends amongst others that on-time production and delivery of products through proper scheduling and capacity enhancement is essential for company's success and competitiveness.

INTRODUCTION

Continued changes in consumer taste and satisfaction drives have stimulated the adoption of new processes. Production planning is vital in order to meet changing demands, so as to sustain and withstand competition; it requires continuous improvement in all the functional areas of the company (Jolanta, 2015); the author argued that competitive strategies adopted by firms need to be consistent. In addition, the competition maintenance strategies are globally, classified into three places, namely: quality, item and its cost (Jolanta, 2015). Further, an author said that the strategies interrelate to each other and any shift in one automatically affects the other (Kolinski, 2011). Production planning is defined as business processes that seek at establishing target schedules for the outputs of factories for scheduling the launch of new manufacturing lots in factories, for determining schedules for procurement of raw materials, supporting new production, for scheduling the allocation and shipment of intermediate products for follow-on uses, and for quoting delivery dates in responses to customer inquiries (Robert, 2013). It also involves ensuring on-time delivery of customer orders, with ensuring that the raw materials needed to support production are made available when required, and with deferring the best deployment of supply-chain and manufacturing assets, considering the available market opportunities (Robert, 2013). Production planning plays an important role in the coordination of the flow of material and exchange of information between customers and suppliers in the determination of product value/quality (Jolant, 2013). According to Brzezinski (2002), production planning is part of global process of strategic, tactical and operational planning in business. Production planning ensures free flow of material, adequate utilization of the employees and equipment, and it responds to customer expectation (Gustavsson, 2009). The main goal of production planning is the coordination of sales of company's products and services with customers' demands (Slack et al., 2007). In short, the essence of production planning is meeting with customer expectations. Enhancement of the production planning and control process is an essential part of the quality decisions and strategy of manufacturers in the refining sector. It requires an identification of the process client and the objectives defined for the process is also paramount in meeting clients' needs (Jolanta, 2015). The author further posited that: *Execution of the actions entailed in the production planning and control process, requires identification of the external customers' needs (regarding, among others, assortment, quantity, timing and terms of delivery), followed by their translation into the demand for the products and their components, as well as the means of labour, work, and knowledge.*

The ultimate focus of production planning is the coordination of the flow of material and information, monitoring and the correction of ongoing purchases, production, and shipment orders (Szatkowski, 2014). Also, it aims at coordinating sales of products and services in line with the demand from customers (Slack et al., 2007).

On the other hand, productivity explains company's ability to achieve set goals in all ramifications. Paul (1994) sees productivity as the ratio between the output volume and the volume of inputs. Therefore, productivity determines how efficiently inputs used for production which include labour and capital, are being applied in an industry to produce a desired level of output. Paul asserted that productivity is a key factor used to measure economic growth and competitiveness. According to Akinyele (2010), determining the company's survival and growth directly links to the amount of productivity of its workforce.

Several studies have been consulted. Among them are Deepak et al., (2014); Robert (2013); Jolanta (2015) and others. However, it was observed that none of these studies were done to determine the productivity of selected refining companies in Rivers State. Thus, this serves as the knowledge gap which the present study seeks to cover.

Statement of the Problem

In the refineries sector and other sectors of any economy, the issue of production planning is found to be of great importance to customer satisfaction (Jolanta, 2015). Despite its relevance to timely delivery and meeting up with customers' orders, some organizations pay deaf ears to its incorporation into the activities of management. For example, refineries in Rivers State sometimes run out of product (petrol, kerosene, diesel etc.), or they are simply unable meet up with demands. This usually causes hitches in terms of consumption and for further business operations. Consequent upon this backdrop, it becomes imperative for refineries to adopt effective production planning in order to achieve better product availability and delivery. Therefore, the main problem of this study is to empirically evaluate the influence of production planning on the productivity of refineries in Rivers State.

Historical Overview of Production Planning

The issues of contemporary production planning have been in existence since the late 19th century. It took place in the field of scientific management, whereby, the job of an individual or each machine used for operation (production) is stipulated early before the time (Free Encyclopaedia, 2004). The origin of production planning dates back to the same century (19th century). According to Kaplan (1986), it was summed that the quest for organization's internal planning process, and control emanated due to the demand which arose in the first half of the same century during which companies in the areas of textiles and rail road's employed the activities of internal administrative means to harmonize the range of processes involved in the performance of basic functions, which is the actual transforming of inputs (raw materials) into finished goods by textile mills and the transportation of passengers and freight by the railroads.

Analyzing the issues that led to new approaches for internal planning and control, Herman (2006) said the factories then were quite simple and relatively small. He further said that the factories produced a small number of products in large batches. Accordingly, the benefits of productivity came through the use of interchangeable parts in order to eradicate those operations termed time-consuming. During the 1800s, production-based firms were more concerned with productivity maximization of the expensive equipments in the factory, whereby, keeping utilization high was a critical goal. During this period, foremen were totally in charge of the shop, by coordinating all necessary functions needed for the small amount of goods and services that they were responsible for. They decided to employ operators, made materials purchases, were in charge of managing production and the delivery of the products. According to literature, they were professionals with high level of technical skills that effectively did production planning. Also, as their factories grew, things were not complex; rather they were just bigger (Hermann, 2006).

Aim and Objectives of the Study

The aim of this research is to determine the impact of production planning on the productivity of refineries in Rivers State. Its specific objectives include:

- To determine the influence of capacity planning on productivity of refineries in Rivers State.
- To examine the impact of scheduling on productivity of refineries in Rivers State.

Research Questions

Premised upon the objective, the following research questions were states as:

- To what extent does capacity planning influence productivity of refineries in Rivers State?
- To what extent does scheduling affect productivity of refineries in Rivers State?

Study Variables/Model Specifications

The study involves two main variables and their sub-variables. The predictor variable is production planning with its dimensions as capacity planning and scheduling. On the other hand productivity is our criterion variable measured with revenue increase and sales volume. They are functionally related as:

$$\begin{array}{llllllll}
 P & = & f(PP) & -- & - & - & - & - & (i) \\
 PP & = & f(CP, S) & & - & - & - & - & (ii) \\
 P & = & f(RI, SV) & & - & - & - & - & (iii)
 \end{array}$$

Where:

PP	=	Production Planning
CP	=	Capacity Planning
S	=	Scheduling
P	=	Productivity
RI	=	Revenue Increase
SV	=	Sales Volume

Production Planning: This is a plan done by organizations for future production in which the material needed are harmonized to ensure customer satisfaction.

Productivity: It is the ratio used to determine how well an organization is able to meet up with it obligations

Capacity planning: It is the determination of production capacity needed by an organization to meet up demands for its product.

Revenue Increase: This is the increase or growth in the amount of money that an organization achieves in a given time period.

Sales Volume: It is the total number of company's products sold over a certain time frame.

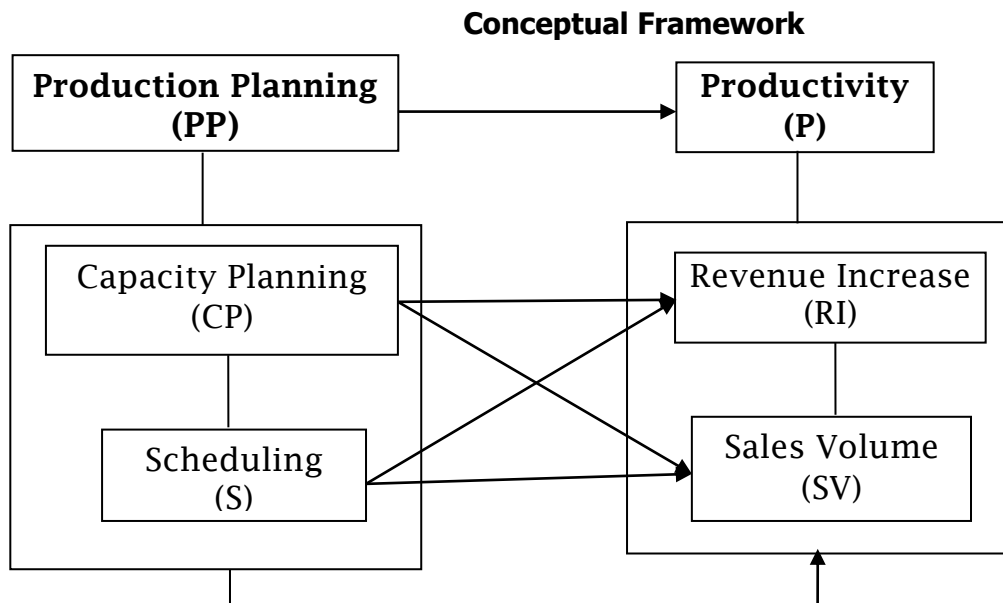


Table 1: Conceptual and Operational Framework of the Association between Production Planning and Productivity of Refineries in Rivers State

Source: Desk Research, 2018

Research Hypotheses

Based on the research questions and objective, the following hypotheses have been formulated and stated as follows:

- Ho₁: There is no significant relationship between capacity planning and revenue increase in refineries in Rivers State.
- Ho₂: There is no significant correlation between capacity planning and sales volume of refineries in Rivers State.
- Ho₃: There exist no signification association between scheduling and capacity planning of refineries in Rivers State.
- Ho₄: There is no positive and significant association between scheduling and sales volume of refineries in Rivers State.

Literature Review

Concept of Production Planning

In the field of administration, managers are engulfed with several challenges of ensuring adequate policies towards company's productivity enhancement. Being productive shows how well a firm has performed in terms of overall maximizations of their resources. In order to really maximize productivity, refineries must continue to device best plans and streamline toward its production activities. This is based on the heels that the product of refineries are too numerous as their services are multi-purposes to the general society.

Production planning is a plan for the future production in which the facilities needed are determined and arranged. It deals with the scheduling of jobs, assigning of workloads to machines (and people) and actual flow of work through the system (Deepak, Sharma & Jai, 2014). It is also defined as the part of business process that establishes target schedules for the output of factories, for scheduling the launch of new manufacturing lots in factories, for determining schedules for procurement of raw materials supporting new production, for scheduling the allocation and shipment of intermediate products for follow-on uses, and for quoting delivery date in response to customer inquires (Robert, 2013). In addition, Robert (2013) said that production planning borders on ensuring on-time delivery of customers' orders, by making sure the needed raw materials that aid production are made rightly available as needed, and with ascertaining the

best deployment of supply-chain and manufacturing assets considering the available market opportunities.

This is an all-encompassing definition of production planning, because, it started with ensuring the need for the material, goes ahead to procure materials needed and then scheduling when to produce and deliver to the customer to ensure satisfaction. In other version of Roberts's definition of production planning; he said production planning is a business process that is concerned with taking decisions with regard to changes to the firm's asset, i.e., purchase of new equipment, salvaging the existing equipment, and increasing or decreasing of staff levels.

Production plan and activities exist in a good number of all the industries; it ensures adequate and timely conversion of raw materials into output (finished goods), it should maintain proper utilization and maximization of natural and human resources (such as money, men, machine, materials and time). Production planning and control exist in organizations to effectively coordinate the activities of: production, marketing, logistics, warehousing and other functional areas depending on the line of the firm's operations. According to Roberts (2013) production planning and control helps in making decisions, collates data gotten from the marketing department, it provides clear ideas on the proper utilization of manufacturing resources for production.

According to Deepak et al. (2014), production planning and control as a department plays an essential role in manufacturing firms as it provides various forms of information to different departments in an organization and makes available information about manufacturing resources to marketing department. In their conclusion, production planning and control is an important task in overseeing the affairs of any business firm in the market because, it has the ability to affect the quality of the product either positively or negatively (Yiwei, Erhan & John, 2011). Production planning is an aspect of hierarchical planning, capacity resource allocation, and scheduling and control framework. For them, production plans focus on capacities of company resources, time periods, and supply and demand over a long-term planning horizon on a high standard. There is an association between production planning and scheduling/control which is certainly there, not just that the scheduling/control decisions are embedded in the planning decisions but because an interruption/disruption during the execution and control phase has the ability to hamper production optimality and/or achievability of both the plan and the schedule (Yiwei et al., 2011).

For Fargher & Richard (1996), production planning involves the planning of production and manufacturing modules in an industry. It makes use of resourceful allocation of functions of employees, materials and production capacity in order to effectively satisfy different customer groups. In addition, the author stated that there are different methods of production: single item manufacturing, batch production, mass production and continuous production etc., but each production method has its individual production planning techniques. Production planning is geared towards future production, by which the facilities required are determined and arranged. A production plan is made on periodical bases for a given period of time known as planning horizon. Production planning involves the under listed set of activities:

- It is used to ascertain the needed product mix and factory load to satisfy customers' needs and wants;
- It is used for matching the expected level of production to the existing resources;
- It is used for scheduling and choosing the actual work to be started in the manufacturing facility;
- It is used for setting up and delivery production facility.

It is recorded that the most essential part in production planning is the accurate estimation of the production capacity of available resources, but, it is regarded as one of the most difficult activities to optimally perform excellently. Production planning according to Bertrand & Ruttern (1999) must take into cognisance material availability, resource availability as well as the knowledge of future demand.

Production Planning Objectives

There are several objectives that production process seeks to achieve, they include:

- **Nature of inputs:** According to Deepak et al., (2014) in order to manufacture a product, different forms of input are required. The quality of the product is determined by the type and nature of inputs. Therefore, production planning is carried out here to ascertain the very nature of input.
- **Quantity of inputs:** Before the Production of goods and services can take place, the quantity (amount) of inputs needs to be determined (Deepak et al., 2014).
- **Proper coordination of Production activities:** The goal of this stage is to ensure effective coordination of organizational workforce, machine and equipment so as to avoid wastage of resources and for assurance of smooth flow of production (Deepak et al., 2014).
- **Better control:** The aim of this is to ensure there is no deviation from firm's planned performance.
- **Assurance of uninterrupted production:** Production planning ensures the regular and timely supply of raw materials and other components.
- **Capacity utilization:** This ensures effective utilization of company resources (Deepak et al., 2014).
- **Timely Delivery:** Production planning in this regard, makes sure finished goods do not get lacking in the market, and helps build better customer relationship with the firm.

Capacity Planning

Capacity planning is seen as the process of determining production capacity needed by an organization to meet demands for its products (Rouse, 2006). Capacity planning focuses on the maximum amount of task that an organization is capable of completing in a given period due to constraints such as quality problems, delays, material handling etc. Rouse (2006) argued that demand for a firm's capacity changes depending on changes in production output, such as increasing or decreasing the production quality of an existing product, or producing new products. Effective use of current capacity can be achieved via the enhancement in the areas of the total equipment and materials management. Increasing the number of workers or machines, increasing the number of shifts and the acquisition of all defined production equipments are seamlessly used to increase capacity. According to Stevenson (2009), capacity planning serves as a vital strategic component towards the designing of a system. It guides companies and provides information on future demand (Sule, Ogbadu, Elijah & Olukotun, 2012). According to them, the primary aim of capacity planning is matching of supply with demand. Similarly, they posited that there are several reasons why companies embark on capacity planning and these include current changes in demand, changes in technology, environmental changes as well as perceived opportunities and threats.

Sule et al., (2012) argued that major problems facing Nigerian organizations/institutions is capacity planning. According to them, Nigerian higher institutions are facing the challenge of electricity, water supply; hostel accommodation etc. This paper asserts that our refineries in Rivers State are facing similar problems bordering on infrastructure (such as electricity, road network, inexperienced workforce etc).

Adequate capacity planning is there to put some measures in place in case of deviations that are mostly caused by change in the environment (especially the external environment). Therefore, effective capacity planning results to improved productivity. This is because, the research sees capacity based decision as almost the same as contingency plan, which exists to replace some of the plans that have malfunctioned. It is imperative that capacity plan be focussed upon productivity as it determines the numbers of production outputs to meet demand. This therefore, will enhance sales and profits.

The Need for Capacity Planning

According to Stevenson (2009), there are several reasons why capacity decisions are fundamental to all the design decision. They are:

1. Capacity related decisions are important because capacity has real influence on meeting future demand both for products or services. Capacity planning allow companies to satisfy future customer demands which offers tremendous benefits to the firm.
2. Capacity planning decisions affect operating costs. Stevenson said that capacity and demand requirements are matched together, and this will result in reduced operating cost.
3. Capacity related decisions are usually done based on the long-term commitment of company's resources. The reason being that once such a decision is taken and implemented; it is always hard for modification with the involvement of huge cost.
4. Capacity decisions make management functions easier. The involvement of right or appropriate decisions make management activities easier than when the presence of capacity is found wanting or mismatched.
5. Capacity planning decisions affect firm's competitiveness. Enough capacity in place and ability to introduce new capacity serve as competitive barriers strategy for intending new entrants and this serves as a competitive advantage to firms.

Scheduling

The term scheduling is seen as a process of arranging, controlling and optimizing work and workloads in a production process (Marcus & Nilay, 2003). According to Zhenya & Mananthy (2003), companies (such as refineries) introduce both backward and forward scheduling to allocate plant and machinery resources, plan human resources, plan production process and for the purchase of materials. It serves as an essential factor for manufacturing and engineering, because, it plays a great impact in improving productivity of a process (Toumi, Jurgen, Jungo, Maier, Papavasikiou & Petrides, 2010). Accordingly, the essence of scheduling for manufacturing is to reduce the amount of time involved in the production process, by way of informing/commanding a facility used for production when to make, the type and number of staff and the nature of equipment needed for the production. In the same vein, scheduling is targeted at maximization of efficiency, enhancing productivity and maximization of product costs (Papavasileiou, Koulouris, Siletti & Petrides, 2007).

For Beasley (2009), production scheduling involves a plan for individual commodities to be produced in each time period such as production, staffing and inventory, etc. It stipulates when and how much of each product that will be required/demanded. Production schedule specifies the number of each product that should be produced and sold within a particular time frame, and determines how inventories should be used (Lindholm, Giselsson, Lidestam, Johnsson & Forsman, 2013).

Productivity

Productivity isn't everything, but in the long run, it is almost everything. A nation's and organization's ability to improve its standard of living over time depends almost entirely on its ability to raise its output per worker (Paul, 1994). It is noteworthy that whatever a company does must be focused on greater output if actually the company wants to remain in business. The greater the output, the more the company is said to have performed, but the lesser the output of an organization the more the chances for failure.

Paul (1994) defined productivity as a ratio between the output volume and the volume of inputs. Productivity measures how efficiently production inputs (like labour & capital) are being utilized in an economy in order to arrive at a certain level of output. Productivity is core determining factor for economic well-being of any nation and organization in particular. Paul (1994), went further to argue that productivity is the basic statistical information for many international companies, as well as country's performance assessment.

In Nigeria and Rivers State in particular, several measures have been put in place in reaction to the level of productivity. This has led the government of Nigeria to bring some incentive packages

as motivating factors that encourage higher performance, higher productivity and improvement in all establishments (Eghe, 2001; Choudhary, 2004). Increased productivity is associated with improved standard of living (Yesufu, 2000). The issue of productivity is of paramount importance to organizations (such as refineries) since it contributes immensely to the enhancement of employees, the firm itself, the citizens and the nation at large, and at the same time, brings about reduction of mass poverty and improves organizational performance (Yesufu, 2000; Akinyele, 2007). According to Osaba (1999) and Umeh&Usman (2000), it is said that low productivity manifested into the establishment of National Productivity Centre under the Federal Ministry of Employment, Labour and Productivity. Accordingly, the primary function of this body is to enhance productivity consciousness among the citizens of Nigeria, the development and supply of the right technical solutions to productivity problem across all the sectors of the economy; this is as clearly stipulated by the Decree No. 7 of the 1987.

In organizations, it is the duty of all and sundry in the organization to work towards productivity actualization. However, it is the most primary function of managers to influence others by way of motivation in order to perform optimally (Steers & Porter, 2002; Caldwell, 2001; Chistesey, 2002). There is a consensus that the more managers are able to answer the question of motivating their workers, the more the chances of how effective they will be at maximizing productivity, enhancing productivity and improving employees' accountability to firm's resources (Chernis& Kane, 2004).

Productivity reflects the several measures of efficiency of production. A productivity measure expresses output ratio to input used in the production process, i.e. output per unit of input. Productivity is seen as a crucial factor for firm's performance relative to production. Enhanced productivity increases living standard of the employees and citizens of a nation. This is because, the increase in income of people and organization increases the ability to acquire more raw material and other investments for firms and improves purchase power of the individual to buy goods and services, enjoy leisure, improve housing and education and contribute to social and environmental programs; it helps corporate organization to be more profitable in their operations (Fuller, 2014).

Revenue Increase

The word revenue can mean different things to different sets of people. It is used to mean the amount of income an enterprise is able to acquire from its business operations, mostly gotten through the sales of its products (goods and services) to the customers. It can also be tagged as sales turnover depending on the context it is used (Joseph, 2008). A company's revenue may also be acquired through interest from some capital investment, royalties and other fees (Joseph, 2008). For refineries, revenue can be gotten through direct sales of products (Core and by-product). Generally, the word revenue is referred to as business income, or amount of money. It can also be seen as a monetary unit a firm earns during a specified period of time. As periods differ, company's revenue may grow or decline. In order to determine the exact period in which a corporate entity makes more revenue, number of sales could be one of the indices; revenue also implies income received by a firm in form of physical cash or something equivalent. Sales revenues are incomes an organization received from sales of goods and services over a period of time (Free Encyclopaedia).

Revenue can also imply the consumption and savings opportunity gained by an entity within a specified time frame, which always appear in monetary terms (Barr, 2004). Whether companies (like refineries), households or individuals, revenue is the sum total of all the wages, salaries, profits, interest payments, rents, and other types of achieved earnings (Case & Fair, 2007). Based on this background, refineries in Rivers State must determine the production planning and processes to ensure continuous customer satisfaction. Revenue generation does not just surface; it is an evidence of a well-planned and implemented set of company activities. These activities may include adequate planning of the production processes/capacity, well designed production scheduling, and overall process rearrangement.

Sales Volume

Irrespective of the industry, most organizations engage in stiff challenge aimed at improving sales; whereas sales volume is defined as the quantity goods or services sold in the normal operations in a specified period of time (Business Dictionary, 2007). Every marketer strives very hard to increase the number of company's products and/or services in a certain time frame. Free Encyclopaedia opined that marketers need to keep the company's sales upward, to enable their organization remain competitive in the highly competitive business environment.

In the words of Jobber & Lancaster (2000), one of the greatest objectives of an organization is to increase the number of sales. In the quest to achieve this goal, it may involve some complex mechanisms since the products are of varying alternatives. Similarly, Nobilis (2010) stated that, it has become an obvious truth that the major desire of most product and service organization is to increase number of sales of its products for the sole aim of enhancement of profits. Hills & Sullivan (2004) opined that refineries must device best means and strategies to satisfy customers through innovative ideas that enhance value delivery that will not only benefit such firm on short-term bases, but this will reinforce into building positive perception of customers that may involve repeat purchase behaviour, word-of-mouth and advocacy. The number of a company's products in terms of sales will continue to appreciate.

METHODOLOGY

The study adopted a survey and descriptive research methods design. A quasi experimental research design was employed through the help of cross-sectional survey to generate data. Four (4) refining companies in Rivers State were randomly selected, and twenty copies of questionnaire structured using five-point scales were administered to each organization making the sample size eighty (80). Both primary and secondary sources of data were employed in the study. The study was analyzed using Spearman's Rank Correlation Coefficient (Rho) with the aid of Statistical Package for Social Science (SPSS) version 21.0.

Table 2: List of Registered refining companies in Rivers and Delta State

S/ N	Names of Firms	Location	No. of selected respondents from each Organization	No. and % valid	No. and % Invalid
1	Global Gas & Refining	Port Harcourt	20	18 (22.5%)	2 (2.5%)
2.	Poi Investment company	Port Harcourt	20	19 (23.8%)	1 (1.3%)
3.	Nigerian National Petroleum Corporation	Port Harcourt	20	20 (25%)	0 (0%)
4.	Shell Petroleum Development Corporation (SPDC)	Port Harcourt	20	20 (25%)	0 (0%)
	TOTAL		80	77 (96.3%)	3 (3.7%)

Source: Retrieved from https://www.m.vconnet.com/rivers-port_harcourt/list-of-refineries-c42 on 30th October, 2017

Table 3: Summary of Reliability Test

Case Processing Summary

	N	%
Valid	100	40.0
Cases Excluded ^a	0	.0
Total	100	40.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.816	.840	4

Item Statistics

	Mean	Std. Deviation	N
Capacity Planning	1.5000	.78591	40
Production Scheduling	2.0000	1.18818	40
Revenue Maximization	2.8333	1.50489	40
Sales Volume	2.0000	1.18818	40

Inter-Item Correlation Matrix

	Capacity Planning	Production Scheduling	Revenue Maximization	Sales Volume
Capacity Planning	1.000	.756	.671	.567
Production Scheduling	.756	1.000	.888	.425
Revenue Maximization	.671	.888	1.000	.395
Sales Volume	.567	.425	.395	1.000

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
8.3333	14.706	3.83482	4

Source: Survey Data, 2017

The results indicate that the instrument has optimum reliability since the Cronbach's alpha is 0.816 and the inter-item correlations are above 3 which also imply that the instruments are appropriate for measurement.

Table 4: Questionnaire Distribution and Retrieval

Questionnaire	Frequency	Percentage (%)
Retrieved and usable	77	96.3
Not Retrieved/Retrieved but not Usable	3	3.7
Total	80	100

Source: Field Survey Data, 2017

From the table above, eighty (80) copies of questionnaire were distributed to employees of the selected refining companies in Rivers State. Out of the 80 copies of the questionnaire, seventy-

seven (77) corresponding to 96.3% copies were completely filled, retrieved and useful, which were used for analysis while 3 corresponding 3.7% were among the not retrieved or retrieved data but invalid for the analysis.

Testing of hypotheses

As specified in chapter three, the hypotheses were tested using the multiple regression analysis and a partial correlation analysis. To know the direction of the relationships between the variables, the table below is used to interpret the nature of the relationships.

Decision rules

The strength of association and statistical significance decision are made and interpreted based on the following table 4.5.0.1 below;

Where (+) stands for positive relationship and (-) means negative relationship.

Table 5: *Decision table For the Strength of variable relationships*

S/ No	Statistical Significance	Association/ Relationship
i.	$\pm 0.0 - 0.19$	Very Weak
ii.	$\pm 0.2 - 0.39$	Weak
iii.	$\pm 0.4 - 0.59$	Moderate (<i>Significant</i>)
iv.	$\pm 0.6 - 0.79$	Strong
v.	$\pm 0.8 - 1.00$	Very strong

Source: survey data, 2017

Test of Hypothesis One

Ho₁: Capacity planning does not significantly relate with revenue maximization of refining industry in Rivers state

Correlations

			Capacity Planning	Revenue Maximization
Spearman's rho	Capacity Planning	Correlation Coefficient	1.000	.734
		Sig. (1-tailed)	.	.000
		N	77	77
	Revenue Increase	Correlation Coefficient	.734	1.000
		Sig. (1-tailed)	.000	.
		N	77	77

**. Correlation is significant at the 0.05 level (1-tailed).

Source: Field Survey Data, SPSS 21 Output

Decision: Table 4.5.1 above reveals a spearman's correlation coefficient of 0.734 and probability value of 0.000 (PV<0.05). This result indicates that there is a strong positive and significant relationship between capacity planning and revenue maximization of refining industry in Rivers state. Therefore, we reject the null hypothesis and accept the alternate hypothesis which states that there is a significant relationship between capacity planning and revenue maximization of refining industry in Rivers state.

Test of Hypothesis Two

Ho₂: Capacity planning does not significantly relate with sales volume of refining industry in Rivers state

Correlations

			Capacity Planning	Sales Volume
Spearman's rho	Capacity Planning	Correlation Coefficient	1.000	.788
		Sig. (1-tailed)	.	.000
		N	77	77
	Sales Volume	Correlation Coefficient	.788	1.000
		Sig. (1-tailed)	.000	.
		N	77	77

**. Correlation is significant at the 0.05 level (1-tailed).

Source: Field Survey Data, SPSS 21 Output

Decision: Table 4.5.2 above reveals a spearman's correlation coefficient of 0.788 and probability value of 0.000 (PV<0.05). This result indicates that there is a strong positive and significant relationship between capacity planning and sales volume of refining industry in Rivers state. Therefore, we reject the null hypothesis and accept the alternate hypothesis which states that there is a significant relationship between capacity planning and sales volume of refining industry in Rivers state.

Test of Hypothesis Three

Ho₃: production scheduling does not significantly relate with revenue maximization of refining industry in Rivers state

Correlations

			Productivity Scheduling	Revenue Maximization
Spearman's rho	Productivity Scheduling	Correlation Coefficient	1.000	.614
		Sig. (1-tailed)	.	.000
		N	77	77
	Revenue Increase	Correlation Coefficient	.614	1.000
		Sig. (1-tailed)	.000	.
		N	77	77

**. Correlation is significant at the 0.05 level (1-tailed).

Source: Field Survey Data, SPSS 21 Output

Decision: Table 4.5.3 above reveals a spearman's correlation coefficient of 0.614 and probability value of 0.000 ($PV < 0.05$). This result indicates that there is a strong positive and significant relationship between production scheduling and revenue maximization of refining industry in Rivers state. Therefore, we reject the null hypothesis and accept the alternate hypothesis which states that there is a significant relationship between production scheduling and revenue maximization of refining industry in Rivers state.

Test of Hypothesis Four

Ho₄: production scheduling does not significantly relate with sales volume of refining industry in Rivers state

Correlations

			Productivity Scheduling	Sales Volume
Spearman's rho	Productivity Scheduling	Correlation Coefficient	1.000	.817
		Sig. (1-tailed)	.	.000
		N	77	77
	Sales Volume	Correlation Coefficient	.817	1.000
		Sig. (1-tailed)	.000	.
		N	77	77

**. Correlation is significant at the 0.05 level (1-tailed).

Source: Field Survey Data, SPSS 21 Output

Decision: Table 4.5.4 above reveals a spearman's correlation coefficient of 0.817 and probability value of 0.000 ($PV < 0.05$). This result indicates that there is very a strong positive and significant relationship between production scheduling and sales volume of refining industry in Rivers state. Therefore, we reject the null hypothesis and accept the alternate hypothesis which states that there is a significant relationship between production scheduling and sales volume of refining industry in Rivers state. Also, the result reveals that production and sales volume had the highest correlation of 0.817 relative to others.

Discussions of Findings

In this present chapter, we discussed the results of each hypothesis that reflect the relationships highlighted in the earlier conceptual framework. Hence these will be explained in detail serving as a foundation to the conclusion and recommendation.

Hypotheses one and two were tested using the Spearman's Rank Correlation Coefficient. Our analysis of data revealed that capacity planning significantly relates with revenue maximization and sales volume with a correlation of *.734 and *.788 respectively.

Hypotheses three and four were tested using the Spearman's Rank Correlation Coefficient. Our findings revealed that production scheduling significantly relate with revenue maximization with a correlation of *.614 while it had very strong significant relationship with sales volume as the correlation result is *.817.

CONCLUSION

Based on findings, the paper concludes that production planning significantly relates with productivity of refining companies in Rivers State.

RECOMMENDATIONS

- Companies that want to achieve high sales volume should enhance their production scheduling; as findings revealed that scheduling has higher positive relationship with sales volume.
- The refining industry should focus more on how to improve their capacity planning in order to gain stronger relationship with revenue maximization and sales volume.
- The paper equally recommended that on-time production and delivery of products through proper scheduling and capacity enhancement is essential for company's success and competitiveness.

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