

Full Length Research

Production Planning and Operational Cost in Brewing Firms in Anambra State

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This research was carried out to examine the relationship between production planning and operational cost in brewing firms in Anambra. A total number of samples collected from the two brewery firms (Nigeria Breweries Onitsha and SABMiller Plc Onitsha) were 84. The descriptive and inferential statistics were applied in the analysis. The study found that different aspects of manufacturing planning operation cost were adopted and implemented by the organizations studied with average means scores of 3.83 for Material requirement planning system, 4.05 for Manufacturing resource planning system, 3.97 for enterprise resource planning and 3.88 Just-In Time. The study found that the benefits of the implementation of manufacturing planning operation cost systems included reduction in cases of stock outs (Mean 4.13) and easy monitoring of processes from all departments (Mean 4.05) among others. Finally, the findings from correlation analysis showed that operation performance was positively associated with material requirements planning with $r=0.387$, manufacturing resource planning with $r=0.547$, enterprise resource planning with $r=0.131$, Just-In-Time with $r=0.086$, while the regression analysis revealed that 70.9% of the variations on operation performance can be explained by material requirement planning manufacturing resource planning, enterprise resource planning and just in time. This study implied that, there was not just a relationship between production planning and operational cost, the effective implementation of production planning and cost operation cost will improve the overall growth of the brewery production companies through increased profit.

Keywords: Brewery, profit, operation performance, , Production Planning, Operation cost, Resources Planning.

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INTRODUCTION

The business terrain in which firms operate has witnessed tremendous change in the past in terms of material sourcing, customer satisfaction, inventory management and overall profitability. The level of globalization, which entails that many organizations find themselves operating in a highly competitive international market and the use of highly advanced strategy and technologies have challenged the very basic principles and ideologies of business management and marketing Management (Urieto, *et al.*, 2019). To compete in a global environment, therefore, organizations have had to change in order to sustain growth and break new frontiers. As a result, most industries have transformed completely from manual processes to complicated, automated and computerized technologies and strategies (Jain, and Rao, 2018).

The quality of the production plans and schedules significantly affect the supply chain in its operational level. Efficient production planning and scheduling is extremely beneficial to all industries, since some of the induced benefits are increased productivity, lower production costs and reduced energy needs and waste (Patrick-Adebisi *et al.*, 2020). Therefore, a systematic way to take planning decisions should be a cornerstone to any company that

seeks to achieve economic and environmental sustainability. Planning itself is a decision – making process since it involves selecting from among alternatives. Planning is the process of setting objectives and deciding how they are to be achieved. Planning indicates for each individual what is the expected contribution of his own work and that of his fellows to the life of the organization. Thus, plans are end product of planning process and are special types of decisions, methods that are made in advance of, and in anticipation of some occurrence (Ongbaliet *al.*, 2018).

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' (Vollman *et al.*, 2017). The production system likewise is the design process by which elements are transformed into useful products. A process then is an organized procedure for accomplishing the conversion of inputs into output. Production is effective if an appropriate and efficient production planning technique is in place. It is the understanding, design and application of this technique that form the focus of this research in the Nigerian manufacturing industry (Elewa, *et al.*, 2019).

While production planning and operation cost is very necessary in the manufacturing sectors, it also has some challenges that limit its optimum performance. Such militating factors include lack of modern automation equipment for accurate computation, seasonal variations, market, after sales service, losses due to unpredictable factors, wastage and production of order (Bertrand, *et al.*, 2019). All these can be effectively addressed with continuous review of already set out production planning and operation cost (Hung, *et al.*, 2016). Also, flexibility will equally help in dealing with some of these unexpected factors, by allowing management to take action. When planning and operation cost are not effectively adopted and implemented, operational cost will increase, which could lead to possibly collapse of an organization. This means, inappropriate handling of production planning and operation cost will affect the profit margin of business organizations.

Operational costs are those recurring costs incurred in the operation of a business. Seemingly simple in concept, the identification, allocation, and operation cost of these costs are complex and have generated a plethora of management practices (Mike, 2020). For a commercial enterprise, operating cost fall into three broad categories; fixed costs which are the same whether the operation is closed or running at 100% capacity. Variable costs, which may increase depending on whether more production is done and how it is done. Semi variable costs are necessary to keep the business in proper condition. The study postulates Operational costs as expenses associated with the maintenance and administration of a business on a day-to-day basis. The operational cost is a component of the operating income statement. While operational costs generally do not include capital outlays, they can include many components of operating a business including accounting and legal fees, bank charges, sales and marketing costs, travel expenses, entertainment costs, non-capitalized research and development expenses, office supply costs, rent, repair and maintenance costs, utility expenses, salary and wage expenses (Sunday *et al.*, 2019).

There seems to be a close relationship between production planning and operational cost. These kinds of production plans for example tend to influence or even determine inventory plans and operation cost systems. Indeed production plans tend to determine the level of quantity held in production in the system. In continuous productions, which are characterized by mass production, for example, high quantities of inventories in form of finished goods, work in progress raw materials, and spares may have to be held at any given time (Ongbali *et al.*, 2020).

There is therefore need to collectively sustain the pressure and advocacy for friendly business environment, stable macro-economic policies, consistent, clear and focused industrial strategy that will provide support and incentive for manufacturing activities, ensure value addition and job creation, to give the economy the required organizational productivity of profit maximization/cost minimization, and development in general. Thinking along the reasoning of Fowge (2017), it is our belief that interest in production planning and corporate productivity performance has spurred curiosity beyond the capacity of scholars to keep pace with it either theoretically or methodologically. This seems to us to be the case in Nigeria as we do not find sufficient evidence of empirical studies on production planning and its impact on operational cost in the Nigerian Manufacturing Industry.

The production planning and operation cost, and its implication on the cost of production are reviewed to comprehend its efficacy in any manufacturing industry. Of course, in industries, lack of plan often leads to panic, chaos, overtime cost shooting up, unite cost rising, and even dissatisfied customers. Problems arise from lack of or ill-defined objectives, activities, and priorities. While the operation cost of the production plans involves the coordination of production activities such as sales, finance, quality, engineering, production, production engineering, schedules, stock operation cost, buying, stores, and progress. Therefore, the purpose of production planning and operation cost (PPC) in manufacturing industries is to strategize plans that will not only satisfy customers, but also make profits, achieve high return on investment and provide employment through supply of commodities needed by the society

This study aims to examine the relationship between production planning and operational cost in brewery firms in Anambra state.

Specific objectives are to:

1. To determine the extent of relationship that exist between stocktaking and inventory operation cost in brewing firms in Anambra state.
2. To determine the extent of relationship that exist between machine planning and timely delivery in brewing firms in Anambra state.
3. To determine the effect material planning on direct material cost in brewing firms in Anambra state.
4. To determine the extent of relationship between manpower planning and direct labor cost in brewing firms in Anambra state.

In the course of this study, we attempt to ask the following questions thus:

1. To what extent does stocktaking relate to inventory operation cost in brewing firms in Anambra state?
2. To what extent does machine planning relate to delivery time in brewing firms in Anambra State?
3. To what extent does material planning relate to direct material cost in brewing firms in Anambra state?
4. To what extent does manpower planning relate to direct labor cost in brewery firms in Anambra state?

RELATED WORK

The production planning and operation cost, and its effect on the profit of brewery firms are reviewed to comprehend its efficacy in any manufacturing industry. Lack of implementable production plan often leads to panic, chaos, overtime cost shooting up, unite cost rising, and dissatisfied customers. The operation costcontrol of the production plans involves the coordination of production activities such as sales, finance, quality, engineering, production, production engineering, schedules, stock operation cost, buying, stores, and progress. Therefore, the purpose of production planning and operation cost in manufacturing industries is to strategies plans that will not only satisfy customers, but also make profits, achieve high return on investment and provide employment through supply of commodities needed by the society (Urieto, *et al.*, 2019). A significant number of papers have taken into consideration the impact of production planning on effectiveness of an enterprise. Some of the research has examined the impact of elements of the planning scheme (aggregate planning, business scheme, aggregate production scheme, demand management, resources and capacity planning) and production control (forecasting control, procurement and control of materials and monitoring of production activities) onto the effectiveness of the production process (timely delivery, fallout ratio, equipment utilisation and productivity) (Wackerand Sheu, 2011). Effectiveness of manufacturing planning and control systems of manufacturing competitiveness: Evidence from global manufacturing data.

Salaheldin, Salaheldin and Ismail (2017), the implementation of material requirements planning (MRP) systems in Egyptian manufacturing companies: Of 200 questionnaires sent out, 123 replies were received. Extensive quantitative methods to analyze questionnaire data were used. Frequency Analysis, Mean Value, Standard Deviation, Mann-Whitney test, T-test, Kruskal Wallis, One Way Analysis of Variance (ANOVA), Paired T-test, Spearman's Correlation Coefficient, Bartlett's test. The main findings of this study indicated that MRP practices in Egypt are relatively similar to those in the newly industrialized countries and in the west. The findings of this research indicated that Egyptian users believe that the expected benefits from MRP implementation have been obtained, though most of the companies which have installed MRP are relative beginners. However, not all MRP users attained the same degree of MRP benefits.

Bakundi (2013), effectiveness of material requirement planning in organizations: a case study of MTN Uganda Limited Mbarara Branch in Mbarara District I / MRP II have failed to achieve the expected benefits. Also, a review of the literature reveals that very little work has been done to provide mathematical models to relate these benefits to their determinants. Furthermore, it reveals that much was written about MRP practices based on case studies in developed country, but very few studies survey-based have been conducted to investigate MRP implementation in less developed countries.

Zhixiang& Jennifer (2018), manufacturing planning and control technology versus operational performance: an empirical study of MRP and JIT in China Planning (MRP) and Just-in-Time (JIT) are currently two of the most popular manufacturing technologies. Based on 246 Chinese companies' survey, we found that the degree of the MRP and JIT implementation and integration has a positive relationship with the manufacturer's performance. The hybrid MRP and JIT system, which create synergy and attains better performance, is widely accepted in China.

Higgins (2012) observed that firms with effective production planning system outperform those with an ad-hoc approach to production operations in around performance measures. Weimer (2012) 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. As regards the interrelations between operational production planning and type of production process. Small firms could be less efficient in the implementation of operational production planning procedure in some

enterprises is achieved in easier and in others in a more difficult way. In the majority of enterprises with assembly line production type, the same product constantly passes through same working posts with capacities harmonized reciprocally. In an enterprise with the assembly line production process type, it is enough to determine the rhythm of material inflow into the first processing phase, and the rhythm of outflow of final product from the final phase.

Kleber et al. (2012) study a deterministic model with dynamic demand and return in a hybrid system. The study indicates how to deal with a situation in which the company is focused on supplying the market with high-quality remanufactured products whenever there is a lack of manufactured products or a low inventory and vice versa. The results complement these studies by investigating the effect of discarding returned products and the effect of the dependency of demand and return on remanufacturing, respectively. Some articles follow other research strains.

Van der Laan (2013) evaluates the use of two approaches – net present value (NPV) and AC – in hybrid systems for determining inventory costs. This study indicates that the AC approach provides good performance when the cost parameters are properly determined. Several papers deal with inventory control policies. Pull systems, periodic and continuous review are evaluated in many ways. The effect of lead time variations and different types of costs are investigated in both systems, pure manufacturing and hybrid. The basic difference in this study is that it approaches two types of return and two types of demand, planned and not planned, and a system with repair operations only. The author present a model in which the process of remanufacturing involves defective products manufactured by the same company.

Aras *et al.* (2016) demonstrate that cost analysis is not enough to determine whether the production system should remanufacture or manufacture products. According to the study, traditional costing methods, such as activity based costing (ABC), are not adequate for remanufacturing systems. This is due to the following fact: the convergent structure of multiple sources (manufacturing and remanufacturing) means those serviceable inventories contains items that are physically and qualitatively the same, but are produced against different costs. To solve this problem, ABC methodology recommends to differentiate between the two items and set separate holding cost rates since the capital tied up in inventory differs. Analysis presented in both papers show that this methodology is fundamentally wrong and may lead to poor operational performance. In order to overcome this problem, these authors propose methods to correctly set the holding cost rates for remanufacturing systems.

Teunter *et al.* (2018) focus on scheduling optimisation. The first authors found an optimum scheduling policy for a situation in which there are three components and two remanufacturing areas, and one of them shares the processing of two components. The second authors propose an algorithm to determine the optimum cycle time using data from a case study involving the remanufacturing of automotive parts. The results indicate that a production line separation – one production line for manufacturing and another one for remanufacturing – reduces the total cost.

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METHODOLOGY

The approach and tools used in the study to achieving the stated objectives are presented in this chapter. These include area of the study, design of the study, method of data collection, population and sample size, and method of data analysis.

Research Design

This study adopted a descriptive survey research design. In reference, Nworgu (2021) described descriptive survey as collection of data for the purpose of describing systematically the characteristics, features and facts about a given population.

Population of the Study

In this study, the target population comprised employees of Nigerian Breweries Plc, and SABMiller Brewery Plc, Onitsha. Nigerian Breweries Plc, has a total population of 74 employees while SABMiller Brewery Plc, Onitsha has 89 employees. Hence, the total population of the study was 163.

Sample and Sampling Technique

Bowley's Proportional technique was adopted in administering the research instrument to the respondents. This technique helped an equal proportion of the employees within the sample frame to have equal chance of being selected. The sample size was obtained through Taro Yamane's formula, Thus, the sample size is 84 employees of the two selected breweries in South East, Nigeria.

The sample size was obtained through Taro Yamane's formula, which is given as:

$$n = \frac{N}{1 + N(e)^2}$$

Where:

n = Sample size

N = Total Population

e = sampling error (0.05) or 5%

Where N = 163

Substituting in the formula, we have

$$n = \frac{163}{1 + 163(0.05)^2}$$

$$n = 163 = 84$$

Hence, the sample size of the study is approximately 84

This study made use of judgment sampling technique in selecting participants for the study.

However, the proportion of the questionnaire to be administered to each of the selected breweries was determined using Bowley's proportional allocation formula.

Thus, the sample size is 84 employees of the two selected breweries in

Thus,

$$nh = \frac{n \times Nh}{N}$$

Where, nh = Number of questionnaire allocated to each of the companies.

n = Total sample size.

Nh = Number of employees in each of the selected breweries

N = Population size.

74 copies of questionnaire were distributed to Nigerian Breweries Plc, Onitsha

89 copies of questionnaire were distributed to SABMiller Brewery Plc, Onitsha.

Table 1. The Selected Breweries in Anambra state, Nigeria

S/N	BREWING FIRM	NUMBER OF EMPLOYEE	SAMPLE SIZE USED
1	Nigeria Breweries Onitsha	74	34
2	SABMiller Plc Onitsha	89	50
	TOTAL	163	84

(Human Resource Department, Personnel Record, 2023).

Method Of Data Collection

The researcher used the primary and secondary source of data collection. Structured questionnaires were sent to staff of the selected brewery firms. 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 operation cost was implemented, while section C deals with the level to which production planning and operation cost affect profit. 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.

Methods Of Data Analysis

Data were analyzed using both descriptive and inferential statistics in Statistical Package for Social Sciences (SPSS) vVersion 21.0 software. Interpretations were made consistent to the provisions of each test. Descriptive statistics, including measures of mean and standard deviation, were calculated to profile organization, individual respondents and the study variables.

RESULTS AND DISCUSSION

The validity of the data collected from the field were analysed.

Response Rate

The study targeted 84 respondents from 2Brewery firms out of which 62responded giving a response rate of 74%. This conforms to a 50% acceptance rate as rated by Mugenda and Mugenda (2019) as sufficient and representative.

Table 2.Extent of adoption and Implementation of production planning and its relationship to operational cost.

Statements on manufacturing planning and control systems	Mean	Std. Deviation
Manufacturing resource planning	4.12	0.640
Enterprise Resource Planning	4.05	0.750
Just in time	4.03	0.805
Materials Requirement Planning	4.00	0.755
Mean	3.80	0.81

Source: Researcher (2023)

The findings on Table 4.7 above shows that manufacturing resource planning has been adopted and implemented at a greater extent (Mean 4.05), Enterprise resource planning follows at a great extent Mean 3.97) Just in time is next at a great extent (mean 4.03) and finally manufacturing requirement planning adopted and implemented at a great extent (Mean 4.12).The overall adoption of all the production planning and operational cost in Brewery firms is to a great extent(Mean 3.80).the responses given by the respondents had o significant difference as showed by standard deviation less than one I) across all indicators used This means that production planning and operational costare adopted and implemented in the Brewery firms in Nigeria.

RESEARCH QUESTION 1: To what extent does material planning relate to direct material cost in brewing firms in Anambra state?

One of the extent of relationship between material planning and direct material cost in brewery firms the researcher considered was materials requirement planning system. In arriving at substantial judgment on the degree of utilization of production planning and control by Nigerian beverage industries, knowledge of material requirement and level of its

implementation must be known. This is because, material a key parameter in production process, as without it, there will be no production. Gupta, (2012) had underscored the usefulness and various aspects of materials for production. Also, in making plans for production, independent demand items such as fabricated components and subassemblies has to be considered too. In establishing the extent of adoption and implementation of materials requirement planning system the respondents were asked the extent to which different statement on MRP were applied in their firms. The findings are as presented in Table 4.3 below.

Table 3. Extent of relationship between material planning and direct material cost in brewery firms (N=62)

Statements on relationship between material planning and direct material cost in brewery firms	Mean	Std. Deviation
There is timely delivery of finished goods the customer	4.10	0.71
There is budgeting and planning for production in terms of raw materials, human resources capital and equipment requirements	4.08	0.90
Planning for required materials for manufacturing is done as per order size being produced	3.65	0.81
Planning for required materials for manufacturing is done as per order size being produced	3.66	0.81
Right materials required for production are available ontime	3.50	0.83
Inventory holding levels have decreased therefore decreasing the capital cost	3.60	0.85
Production materials are timely provided	4.27	0.84
Human-equipment interaction improves production	4.14	0.75
Budget and planning for production materials, equipment and manpower is efficient.	3.90	0.57
Raw material requirement matches production capacity	4.00	0.73
Mean	3.85	0.83

Source: Researcher (2023)

RESEARCH QUESTION 2: To what extent does manpower planning relate to direct labor cost in brewing firms in Anambra state?

The other MPC system in study was relationship between manpower planning and direct labor cost, the respondents were asked the extent to which different statement on its application and relevance were applied in their organizations. The findings were as presented in Table 4.4 below

Table 4. Extent of relationship between manpower planning and direct labor cost (N=62)

Statements on relationship between manpower planning and direct labor cost	Mean	Std. Deviation
There is a master production schedule encompassing all products	4.18	0.713
Materials required for production are determined through the production schedule put in place	4.11	0.601
Organization's Production Schedule is efficient	4.20	0.54
Public demands enhances production performance allocation	3.50	
Equipment and personnel are allocated as per the requirement per department.	4.08	0.640
Business Processes are standardized and automated leading to improvements in cost control and revenue	3.95	0.71
Materials Required for Production are determined by production schedules.	4.00	0.65
The production capacity is allocated according to individual orders	3.90	0.76
Healthy Working Conditions of Your workers is efficient	4.10	0.53
Mean	4.06	0.70

Source: Researcher (2023)

RESEARCH QUESTION 3: To what extent does stocktaking relate to inventory control in brewing firms in Anambra state?

In establishing the extent of adoption and implementation of enterprise growth planning (EGP) system the respondents were asked the extent to which different statement on its application and relevance were applied in their firms. The findings are as presented in Table 4.5 below

Table 5. Extent of relationship between stocktaking and inventory control (N=62)

Statements on extent of relationship between stocktaking and inventory control	Mean	Std. Deviation
There is quality management of raw materials	4.11	0.665
Increased coordination between the departments	4.03	0.730
Enhanced decision making	4.00	0.805
inventory management is easier	3.99	0.755
Budget planning and projections is efficient	3.90	0.740
There is a customer relationship management system	3.85	0.713
Management reports are prepared	3.88	0.68
The processing of products uses the minimum processes needed	4.12	0.640
Processes are planned well in advance to avoid idleness and waiting	4.05	0.750
The layout plan minimizes movement from one point to next	4.03	0.805
There is a reduction in finished products defects and a test for this	4.00	0.755
Production is planned as per order or demand	3.98	0.740
Efficient work methods are used to minimize unnecessary productions	3.96	0.771
Placing orders only when materials are required and ready to be used in production	3.90	0.713
Inventory is held for only what is required for both raw materials, work in progress and finished products	3.65	0.88
Mean	3.80	0.81

Source: Researcher (2023)

Research question 4 To what extent does machine planning relate to delivery time in brewing firms in Anambra state?

.To determine the relationship between machine planning and timely delivery, the respondents were asked the extent to which different statements on the benefits of MPC were realized in their organizations. The findings are as presented in Table 6below

Table 6. Extent of relationship between machine planning and timely delivery (N=62)

Statement on relationship between machine planning and timely delivery	Mean	Std. Deviation
Reduction in cases of stock outs	4.13	0.640
Easy monitoring of processes for all departments	4.06	0.614
Improved communication between the departments	4.00	0.708
Easy monitoring of products from raw materials to finished products	4.00	0.750
Easy communication with suppliers and customers	3.97	0.670
Reduction of backlog processes	3.92	0.614
Materials received when required and on time	3.90	0.770
Easier management of processes	3.92	0.750
Inventory Control Minimizes operational cost	4.13	0.640
Budgeting and Planning Reduce Material/Equipment Cost	4.06	0.614
Timely Delivery of Material Order Reduces Cost	4.00	0.708
Management Decision Reduces Cost	4.00	0.750
Product Quality Improves Profit Margin	3.97	0.670
Utilization of the Right Raw Material/Equipment Reduces Cost	3.92	0.614
Mean	3.95	0.720

Source: Researcher (2023)

Relationship between Operating Cost and Production Planning

In other to establish operational cost relationship with production planning and control, staff from the selected departments assisted in giving information on the daily production and cost performance. The initial production planning was recorded daily, and after the end of the day's production, the extent of production activities achieved was again recorded. Also, the effect of the daily production activities on the daily operational cost of the three companies was

recorded. This was done by recording the fraction of the actual cost expended in the execution of the daily production events as against the initial planned cost estimate. The average data for seven (7) days obtained is shown in table 9. Where C_p is the fraction of actual daily production cost as against the initial budgeted cost, MP is the fraction of actual daily material planning as against the initial estimate, RP is the fraction of actual daily resource planning as against the initial estimate, GP is the fraction of actual daily event relating to growth planning as against the initial estimate and JITP is the fraction of actual daily timely implementation of Just-In-Time planning as against the initial estimated time.

Table 7. Performance of Production Planning and Operational Cost

Days	CP	MP	RP	GP	JITP	Mean
1	0.081	0.88	0.74	0.82	0.86	0.83
2	0.101	0.85	0.85	0.88	0.98	0.89
3	0.064	0.89	0.82	0.93	0.76	0.85
4	0.082	0.91	0.72	0.78	0.92	0.83
5	0.053	0.84	0.76	0.69	0.73	0.76
6	0.068	0.87	0.84	0.73	0.81	0.81
7	0.094	0.93	0.97	0.86	0.87	0.91
Mean	0.078	0.88	0.81	0.81	0.85	0.84

CONCLUSION

The analysis carried out on the brewing firms showed that production planning depends on several components such as material requirement, manufacturing resource, organizational growth plans and just in time. Thus, their effective implementation is an indication that production planning is strongly utilized. Therefore, the analysis obtained showed that production planning and operation cost was strongly applied and implemented by the brewing firms with an overall mean of 4.077 and standard deviation of 0.0417. The results obtained revealed the usefulness of production planning and operation cost to cost minimization. Accordingly, the mean responses obtained indicated that inventory control, budgeting and planning, timely delivery of material order, management decision, product quality and the right utilization of raw material and equipment, minimizes operational cost of material and equipment cost, which as a result, reduced the operational cost of the beverage manufacturing companies. Hence, the overall mean of 3.964 and standard deviation of 0.040, affirmed that production planning and operation cost minimizes operational cost and expenses.

RECOMMENDATION

The following recommendations are drawn from this study:

- Periodic stocktaking should be adopted and fully implemented to reduce hash effect of stock out validation on operation cost. Proper production planning and operation cost should be performed by considering all components required for effective production in manufacturing industries.
- Periodic review of how machine plans effect delivery time should be seriously consider in order to detect any possible loophole that will increase operational cost as well lower product quality..
- The industry should regularly review its manpower plans to ensure that employees are properly placed in consideration of their competencies to optimize production at a cheaper cost.

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