

INVENTORY CONTROL MANAGEMENT AND REVENUE GENERATING CAPABILITIES OF OIL AND GAS DRILLING FIRMS IN NIGERIA

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Abstract

The critical role of effective inventory control has been much emphasized in the oil and gas industry which is subdivided into upstream and downstream sectors with drilling activities falling within the upstream subsector. In light of this development, this study investigates effective inventory control and effective drilling activities of oil and gas drilling firms as well as its relationship with revenue generating capabilities of oil drilling firms in Nigeria. Simple random sampling technique was adopted. Presentation and analyses of primary data collected with questionnaires and testing of the hypotheses were done using percentage and Spearman's Rank correlation coefficient. The results from the tests with the use of SPSS show positive and significant correlation between ineffective inventory management and downtime in the operations of oil and gas drilling with a correlation value of 0.682 with $p\text{-value} = 0.001 < 0.05$, which



Issue 4/2019

implies that there is 68% relationship between ineffective management and downtime drilling. There is a significant correlation between incessant downtime in operations of oil and gas drilling firms and their income level owing to poorly managed inventory control with a correlation coefficient value of 0.788 with p -value = $0.000 < 0.05$, which implies that there is 79% relationship between income (profit) level and downtime in drilling operations. Incessant downtime in drilling operations of oil and gas firms as a result of poor inventory control management has significant difference with termination of contract of oil drilling firms with the result of the F -cal value as 344.632 while F tabulated value as 3.901 leading to rejection of hull hypothesis. Based on the findings, it was recommended that oil drilling firms should strengthen their inventory management system for effective and timely work delivery in order to avert downtime, loss of income and termination of contracts. Finally, members of staff of oil and gas drilling firms in inventory units should be trained and retrained on regular basis to embrace technological changes in inventory management to improve their performances which would in turn strengthen the inventory management of such firms.

Keywords: *inventory control; downtime; oil drilling firms; termination of contract; inventory management; loss of income.*

JEL Classification: G31, H29, H32, L21, M11

1. **Introduction**

Considering the fact that huge capital of a company is tied to its inventory and that optimal, effective and efficient operation of businesses, both manufacturing and service oriented ones can considerably be influenced by the nature of inventory management put in place, it becomes important that managements of such businesses give priority attention to inventory management system and policies put in place. Elomora (2014) is of the view that inventory management is tremendously important within most businesses and that a firm's returns can get to its climax as well as improve its liquidity and reduce company's risk by managing inventory effectively. The concept of inventory management in the prior years has attracted the attention of researchers and industry operators [Prempeh, 2016; Fosu, 2016; Mensah, 2015; Mwangi 2016]. For example, Prempeh (2016) stated that there is a weighty positive association between inventory management and profitability. Confirmation from



Issue 4/2019

former researches [Appiah, 2014; Mwangi, 2016] also buttressed the direct link between inventory management and profitability. A divergent result from the studies of Mensah (2015), Sitienei and Memba (2015) entirely revealed a negative relationship.

Letinka and Lee (2000) observe that difficulties with inventory heightened as a result of the industrial revolution together with improvement in technology which encouraged mass production faster and with improvement in quality of products. Colling (1990) observes that in the advanced countries such as America and other European countries, advancement in production was attained by cutting down manpower need per unit of output. Soaring manpower requirement was reasonable in order to produce per unit of output. Besides, it is observed that big production companies, such as the American Automobile Assemblers, procure more or less 60 per cent worth of materials it uses to produce its merchandise. What it means is that effective inventory is a *sine qua non* for output enhancement. In such a firm as the American Automobile Assemblers, poor inventory procurement could lead to shut down of operations. Mid 1980s, Japanese companies applied Just-In-Time (JIT) inventory model in their companies and they received a boost in terms of quality and quantity of goods and services. The fundamental objectives of businesses after industrial revolution were effectiveness and production of goods in large quantity coupled with enhanced satisfactory customer's knowledge at the point of purchase. A group of experts in Harvard University in 1930s developed punch card for efficient stocks control. In the late 1940s and early 1950s, researchers fashioned the prototype of the contemporary bar coding device as they got to know vendors wanted an improved platform. In this case, 'ultraviolet light-sensitive ink and readers' are applied in making marks on materials for sale. The system was deficient in computation capacity necessary to ensure it worked; again it was burdensome'.

The Universal Product Code (UPC) or Modern Bar Code, Radio Frequency Identification (RFID) using microchip to a scanner including other statistics gathering gadgets, that are more powerful than bar codes in several ways which can sense materials piled on high shelves in stockroom are some modern technologies put in place for a functional inventory system. Economic steadiness of a place, availability of infrastructural facilities, transportation structure/system and many more can influence inventory system to be used [Ogbo et al., 2014; Hamlett, 2006]. Poor inventory system could lead to under-production, stoppages and high production cost in many businesses.



Issue 4/2019

Inventories may be considered as unused resources which have monetary values [Ogbo *et al.*, 2014]. The bringing together of materials, ease of access, controlling and consumption of stock at a point in time is seen as inventory control. Inventory management is the control of stocks stored in a concern with the purpose of making accurately available what is needed where and when it is required applying the least of residual stock and thus sustaining the least possible cost [Ogbo *et al.*, 2014].

Effective inventory management can help guide against storage cost, spoilage of stocks, pilferage and obsolescence of materials. When a firm runs short of essential stock items, the manufacturing process is brought to a standstill. One might conclude that effective inventory management makes momentous contributions to a firm's earnings including adding to the entirety of assets of a firm [Adeyemi & Salami, 2010]. In the light of the above, considering the importance of inventory management in relations to efficient management, avoidance of work stoppage (downtime) and profitability of firms, it becomes imperative to embark on this research study with particular reference to oil drilling firms in the oil and gas sector of the Nigerian economy through scientific analysis of the generated hypotheses. The research aims at solving the problem of poor inventory control in oil drilling firms through creating the awareness of what poor inventory management portends to this subsector of the oil industry in Nigeria. It is of great importance to establish the relationship between effective inventory control management, downtime (halt in operation), loss of contract and loss of fund in this study in order to suggest the ways forward. Therefore, in specific terms, this study has the following objectives as stated below.

1.1. Objectives of the study

- a. To determine the relationship between effective inventory control and downtime in the operations of oil and gas drilling firms.
- b. To ascertain if downtime in operation of oil and gas drilling firms does not have any significant relationship with income (profit) level of oil and gas drilling firms.
- c. To find out whether incessant downtime in operation have any significant difference with termination of contract of oil and gas drilling firms.

1.2. Research questions

- a. Does effective inventory control have any significant relationship with downtime in the operations of oil and gas drilling firms?



Issue 4/2019

- b. What is the relationship between downtime in operation of oil and gas drilling firms and income (profit) level of oil drilling firms?
- c. Is there any significant difference between incessant downtime in operation of oil and gas drilling firms and the termination of contract of oil drilling firms?

1.3. Hypotheses

- a. There is no relationship between effective inventory control and downtime in the operations of oil and gas drilling firms.
- b. There is no existence significant relationship between downtime in operation of oil and gas drilling firms and their income (profit) level.
- c. Incessant downtime in operations and termination of contracts of oil and gas drilling firms makes no significant difference.

2. Literature Review

2.1. Conceptual issues

Inventory management. Definitions and concepts

Inventory is defined based on the systems or establishment where they are found. For instance, the definition of inventory in an oil drilling company is different from the definition of inventory in a firm that deals in automobiles. Whereas in a drilling company, inventory is defined as collection of spare parts and other consumables which are used in repairing, maintenance and servicing of machines for operation, inventories in an automobile firms include vehicles (cars of different brands) available for sale and so the definition of inventory in a manufacturing firms is slightly different from the two mentioned above. According to Kotler (2000) in Adeyemi and Salami (2010), inventory management entails all actions and strategies applied in building up and overseeing the stock levels of unprocessed materials, partly-finished products and finished commodities to ensure that sufficient materials are obtainable and reduced the costs of over-stocking or under-stocking guaranteed. Microsoft Encarta (2009) sees 'inventory as the amount of commodities and stocks at the disposal of a producer which shows those produce that are set and on ground for sale'. As opined by Drury (1996), in expectancy of some prospective purchases, the quantity of merchandise that is preserved by a business enterprise is called inventory. This implies that inventories are kept in order to meet prospective demand and manufacturing and/or transaction. Stocks can be seen as unused reserves in terms of stocks which have economic worth. As observed by Ghosh and Kumar (2003),



Issue 4/2019

improved and effective control of stocks would free resources for other productive uses in a company.

Therefore inventory control includes the bringing together of materials, ease of access, controlling, consumption and acquisition of stocks. All processes involved in getting sufficient quantity of stocks where needed and on time by an establishment are known as inventory management. Miller (2010) states that effective inventory can determine the profit-making capacity of an establishment directly or indirectly. Also inventory management connotes a scientific technique of making sure that sufficient stock is maintained by a business to meet up subsequent demand [Coleman, 2000; Jay & Barry, 2006]. From the foregoing, effective and efficient control of material in a firm makes it possible for materials needed to be available in the sufficient quantity and on time to ensure that storage cost is reduced to bare minimum as well as maintain continuity of operations.

Reasons for inventory management: Morris (1995) [Adeyemi & Salami, 2010], buttress that inventory management in its widest view is to maintain cost effective quantity of one type of asset to aid a boost in the entire worth of all assets. In this case, human and material assets are considered. Keth *et al.* (1994) [Adeyemi & Salami, 2010] emphasized that feeding management with information as regards the quantity of re-order level, lead time, how often to re-order, the right amount of safety stocks needed and to reduce incidence of stock-out are some reasons for inventory management. Schroeder (2000) [Adeyemi & Salami, 2010] states the objectives for keeping inventories could be transactional, precautionary and speculative motives. It has financial, marketing and accounting effects. The transactional objective for holding stocks ensures that enough materials are maintained in stock to meet manufacturing and sales needs. Precautionary motive means that a business holds extra quantity stocks in case of under-estimation of future production and uncertainties of demand/sales. The speculative motive for holding inventory is expectation of upsurge in profit-making capacity of a firm. Purchase of stocks or raw materials in case of inflation in future is speculative in nature.

The **four types of inventory control systems** as observed by Lyson (2001), Encartar (2009), Kenneth (2002), Hamlett (2006), Sande (2003) are “(i) Manual inventory management system; (ii) Barcode technology; (iii) Radio Frequency Identification (RFID); (iv) Warehouse Management System”.

(i) *Manual inventory management system:* “Spreadsheets are used manually by owners of small scale businesses, to keep track record of inventory depending on the



Issue 4/2019

quantity of their product. Normally, small quantities of products are recorded manually with spreadsheets. To take stock when orders for new stocks are placed/re-ordered, spreadsheets are set up. Weekly or monthly, the entrepreneur makes the manual inventory in order to determine the quantity of stocks that enters and that are available in the warehouse. The objective is to determine whether the quantity of stocks on hand is enough to continue operations or to purchase more. Good side of this method is its cost effectiveness in relation to training of personnel. A piece of unprocessed information imputed or procedure mistake can bring about major imprecision in the data result, hence maintaining data reliability is one of the major drawbacks of manual inventory management [Lysons, 2001]. Again, the technique is labour intensive, costly, prone to error, and not easily up-dated.

(ii) *Barcode technology*: Barcodes comprises series of straight perpendicular lines, or bars, applied in allotting single distinctive identification code to a material. Barcode identification system is used to trace inventories electronically. A barcode stick together many series to make a distinctive group of numbers or alphabets to identify the materials [Encarta, 2009]. Key vendor employ barcode technology as fraction of general stock management coordination given that it strengthens the correctness and effectiveness of managing inventory. When a barcode is interpreted at the place of sale, stock sales records is instantaneously interpreted and transmitted to a larger structure that keeps statistics. Barcodes control inventory in stockroom level to enhance tracking of inventory inside the boundaries of the stockroom [Kenneth, 2002].

(iii) *Radio frequency identification (RFID)*: It is comparatively fresh and it employs a mark that transfers records assembled by a reader from a set spaced out position. RFID applies two forms of technology to direct stocks movement and they are (1) active and (2) passive technology. Active RFID technology utilizes fastened tag readers allocated all through a stockroom such that anytime a stock with an RFID mark gets across the reader, the motion of the stock is captured in the inventory management software. Active systems operate most excellent in structures that need real time stock tracing or anywhere inventory safety setbacks are present. Passive RFID technology involves the application of manual readers that can be handled with hand to inspect inventory movement. Owing to the fact that RFID technology has a reading distance coverage of up to 40 feet when using passive technology and 300 feet when using active technology, it greatly enhances the accurateness of transferring stocks within a stockroom [Hamlett, 2006].



Issue 4/2019

(iv) *Warehouse management system*: Sande (2003) sees it as a chief fraction of the supply sequence and principally with the intent to manage the transfers and conservation of stocks inside a stockroom and bring about the related business deals together with shipping, receiving, keep the stocks in the right place and selecting the items. Warehouse management systems assist to capably supervise the movement of inventories. There is either batch harmonization with or a real time wireless transmission to a centralized database immediately data has been gathered. Useful information about the positions of products in the storehouse is made available by the database. Warehouse Management System is incorporated with Enterprise Systems (ES) and Electronic Data Interchange (EDI) which are complicated and are now in use in many companies. At present, the majority material tracking systems make use of two facets barcodes should be near to and within the “line of sight” of the barcode reader. Manual or conveyor with barcode or scanner is needed in this case. The barcodes stand the risk of not working well which may result in inaccurate reading when not used well or when in contact with wet surroundings or peeled off.

Automated inventory control system software: As observed before, the automated inventory control system software is a computerized platform for keeping an eye on stocks levels, movements, orders placement, sales and deliveries. This software package can generate bills/records for stocks, job orders and relevant transaction papers in production outfits. The software is used to avoid merchandise overstock and outages. Such vital information can be kept in hardcopy in case of any eventuality. The software is made up of mechanism working together to generate a unified inventory control system which include: (i) *Asset tracking*: This brings about tracking stock through its barcodes and other tracking criteria such as serial number when they are in a stockroom or store; (ii) *Order management*: As soon as stocks get to a definite low point, the software as programmed sends information to inventory manager to re-order for stocks. This assists businesses in preventing running out of stocks or making redundant huge capital tied to stocks; (iii) *Service management*: Service-oriented firms may apply this software in the estimation of cost of materials they put into use in order services. By so doing, they evaluate or quantify their services monetarily. This inventory control systems are proficient, effectual and have assisted to advance producing firms thereby offering more security to storehouses while enhancing customer services. As already observed, the automated system assists in: (i) the determination of inventory status, (ii) registration of new stock, (iii) registration of new customers, (iv) supply of goods to registered customers, (v)



Issue 4/2019

printing of transaction invoices for customers for transactions that have taken place as well as viewing the available transactions that were carried out at a particular time.

Just-in-time model (JIT): This is a well-built viewpoint for managing inventories. A Just-In-Time (JIT) inventory system stresses the need to reduce inventory levels to the smallest amount, and at the same time provide sufficient items just-in-time as they are required and/or needed. The significant increase in Japanese productivity in Toyota Company in the late 20th century is attributed to this philosophy-Just-In-Time inventory model. In recent years, other parts of the world, the United States inclusive, have well accepted this philosophy hence it was well-liked there. Though the just-in-time point of view, at times is misconstrued as being mismatched with using EOQ model (Economic Order Quantity) because EOQ holds large stock with the attendant setup costs, they are in fact supporting each other. JIT inventory model places emphasis on how to significantly bring down the set-up costs so that the most favourable order quantity will be little. It also looks for ways to trim down the lead-time for the delivery of an order, since this cuts down the improbability about the quantity of materials that will be required when the delivery takes place. Just-In-Time aims at enhancing preventive maintenance so that the needed manufacturing facilities are on hand to produce the quantity of materials needed on time. Again, improvement in quality, timely delivery of orders, and avoidance of waste in the cause of production are among the objectives of this inventory model. Others benefits are avoidance of unreasonably large setup costs, needlessly long lead times, construction facilities that are not functioning when they are needed, and substandard items. Reduction of these kinds of waste is a key attribute of superior inventory [Adeyemi & Salami, 2010].

Drilling operations in oil drilling company: Drilling operations in the oil industry involves making a hole from earth surface or topsoil to beneath the earth crust usually at locations where there is oil deposits, targeting either crude oil deposits or gas reserves. Drilling operations can be explained as the piercing of an oil and gas well and the production and completion operations resulting from the drilling which requires entry upon the surface estate (Control of oil and Gas Resources, North Dakota Century Code, Title 38, Chapter 8, February 2013 Legislation). Alaska Oil and Gas Conservation Commission (2012) describes drilling operation as using a drilling rig able to carry out the officially recognized oil well and work together with other reasons other than putting in place platform



Issue 4/2019

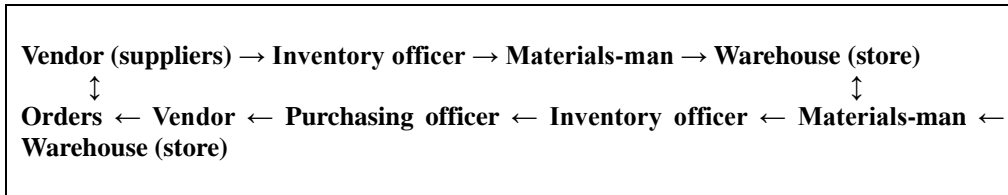
or conductor casing to penetrate the ground below the setting depth of structural or conductor casing is termed drilling operations. Drilling operations consist of the running of casing, plastering, and other down-hole work carried out additional to formation estimation, and operations essential to complete and furnish the well so that crude deposits can safely be brought to the surface. It must be noted here that at drilling site, operation is expected to run without incessant stoppages and it is only through effective inventory management that materials or spare parts both consumables and non-consumables can be available on time. Any deficiency in terms of timely delivery of materials, in this case spare parts, results in 'shutdown of operations with its attendant income losses' (Alaska Oil and Gas Conservation Commission, 2012).

Loss of income in oil drilling company: Most oil drilling firms charge oil and gas production companies on hourly basis usually in US dollars. The implication here is that, should there be any shutdown in operations of a given oil drilling firm hired at any point in time, the resultant effect is loss of income because the income that should have accrued to the hired company would not be paid. Eventually this halt in operation lingers for a long period; it means that the oil drilling firm in question would source for money elsewhere to take care of its working capital thereby depleting its reserves or even incurring debt.

Downtime (halt) in operation of oil drilling firms: This describes a situation where there is work stoppage or halt in the drilling operations at the drilling site. This could indicate the breakdown of a machine or non-availability of spare parts. For whatever reason, operation stop at drilling site is termed downtime. Considering the fact that payment is made for input on hourly basis in most cases, income of the company involved is negatively affected, i.e. reduction in income.

Termination of contract in oil drilling firms: Oil and gas production companies works within time frame for any project. Take for instance, in the contract terms and conditions, an oil drilling company may be given say six months to deliver (finish) an oil well among conditions. Eventually, there is a breach of these conditions, owing to inefficiencies in relation to poor inventory management which of course would result in breakdown of machines and untimely and poor maintenance of these machines, oil production companies are normally forced to terminate their contract with such an inefficient oil drilling company.

Chain of Flow of Inventories, Procedure and Control in Oil Drilling Firms



Source: DWC Oil Drilling Company Nig. Ltd Inventory control Chart, 2017

Using DWC Drilling Nig. Ltd. as a case study regarding inventory inflow, inventory control and inventory management gives one an insight of practical inventory control management with particular emphasis on drilling firms in Port Harcourt that adopt both manual and automated inventory control management system. Materials (inventories) are supplied by vendors (suppliers). Those materials are received by the inventory control officer who does the verification of materials supplied using waybills and invoice to ensure that what is supplied corresponds with materials specifications in terms of quantity, quality and price as specified in the invoice, waybill and material requisition form. With the arrival of the inventories, the inventory officer updates his general inventory list in computer system. The inventory officer acts as the watch dog between the vendors and the materials-men as well as the user departments. It is important to note that the user department initiates the request for an inventory item needed with the material requisition form which, of course are normally signed by the drilling manager and drilling superintendent respectively. The inventories so received are handed over to the materials-man either at the base or rig site for necessary documentation and safe keeps. The materials-man is very close to the warehouse and so he monitors the consumption of materials and whenever a particular item reaches its re-order level, he alerts the inventory officer who confirms that the re-order level has been reached in the general inventory list. Having ascertained this, the inventory officer informs the purchasing officer of the need for order placement. The purchasing officer at this point calls for a quote from vendors. The vendor who wins the bid does the supply. The following records are always kept and updated on daily basis.



Issue 4/2019

a. Materials or inventory received log book; where inflow of inventories from vendors are recorded on daily basis. **b.** Materials or inventory issue log book; where materials issued out to user departments are recorded on daily basis. Again there is usually weekly reconciliation of inventory list maintained by inventory officer and materials-man at the rig site to actually ascertain the exact quantity in the warehouse. With the above procedure effective inventory control management and internal control of the inventories are ensured. However, this system of inventory control management has not been as effective as a fully automated system because of human errors such as recording a particular item twice in the list, using wrong part numbers, cumbersome nature of the system and most times discrepancies between inventory list maintained by the inventory officer and materials-man at the rig site. Sometimes, the officers may not know that a particular item that has not been used for a long time is out of stock. This has on several occasions led to down-time, loss of manpower with its attendant loss of income and possible loss of contracts because halts in operation persisted for a long time. The advantages semi-automated inventory control system has over automated inventory control system are easy identification of obsolescent items and damaged items. The reason being that materials-man is always in close contact with the materials because he does his physical inventory almost on daily basis.

2.2. Theoretical Framework

Heyman and Sobel (1990), Lau and Lau (1996), Silver, Pyke and Peterson (1998), Axsater (2000) and Erlenkotter (1990) opine that arithmetical inventory models used under methodical inventory management are classified into two-*deterministic* and *stochastic models*; based on the forecast nature of demand.

Deterministic inventory theory: Demand for a merchandise in inventory reveals the frequency a material is issued out from inventory for utilization (e.g., sales) at a point in time. If the demand in prospect can be determined accurately, it is rational to adopt an inventory policy that presumes that all forecasts will always be completely accurate and in this case, where demand is known, a deterministic inventory model would be adopted. Conversely, when demand cannot be estimated with accuracy, it becomes essential to apply a stochastic inventory platform where the demand at a point in time is not steady but rather fluctuates.

Stochastic inventory theory: This inventory structure is adopted where there is significant improbability about future demands. Continuous-review inventory system



Issue 4/2019

is looked into here. In this case, the inventory level is reviewed continuously to ensure timely placement of new order as soon as the stock level drops to the re-order point. The use of two-bin system to put into practice a continuous-review inventory system is a conventional method. All the units of particular products are captured in two bins. The capacity of one bin would equal the re-order point. The units are taken from the first other bin. Once the stocks in the second bin are depleted, a new order is placed. In the lead-time while waiting for this order to be received, materials would be collected from the first bin. In recent times, two-bin systems have been to a great extent replaced by automated inventory systems. In this case, withdrawal or addition of stocks is electronically recorded. Therefore, the computer places a new order as soon as the inventory level has reduced to the reorder point using the second as a yardstick. Science and technology have made available excellent software packages to help companies implement such a system.

2.3. Empirical Review

Research has been conducted between effective stock control and organizational performance by Adeyemi and Salami (2010), in their learning on Coca-Cola Bottling Company, Ilorin Plant from 2000 to 2004, and disclosed that stock management has greatly advanced to address the growing difficulty in numerous business outfits. This is in reaction to the reality that stock is an asset of unique quality. The stock management condition of the Nigeria Bottling Company, Ilorin Plant has been disclosed with the adoption of the EOQ model. Through a dependable strategy, the company is capably handling its unused stocks without sustaining avoidable charges.

The study recommended as follows: Economic Order Quantity model should be given serious consideration because it is considered aptly most excellent for the interest of production outfits to sustain best possible level of stocks in stockroom; the size that trims down total cost of outlay in stock. The research equally stipulated that to achieve this, diverse costs related to inventory should be kept apart and added up for easy determination of Economic Order Quantity (EOQ). So, stock control is a *sine qua non* ingredient for the continuance as well as continued existence of any going concern with vision.

Also in a similar study conducted by Ogbo, Onekanma and Ukpere (2014) to look into the connection between effectual system of stock management and business in the Seven-Up bottling company, Nile Mile Enugu. Eighty-three (83) respondents made up the sample for the research. Having generated four research questions and four hypotheses and examined at 10 percent (%) (that is, 0.10) significant level with



Issue 4/2019

descriptive statistics and non-parametric test. The outcome of the investigation confirms that proficiency in stock control is a key strategy for the accomplishment of dependable business objectives.

The study came to a conclusion that through effective inventory management, a firm's profit from uncomplicated storage and withdrawal of stocks enhanced sales efficiency and reduced running cost. Again, cost reduction tactics are put into serious consideration to enhance benefits accruable from a going concern investment opposed to stock control. Business outfits should develop techniques to efficiently and effectively handle their inventories. It is recommended that organizations should ensure the implementations of the inventory keeping technique that most excellent suits their operations.

3. *Research Methodology*

This research work is a descriptive field study, and the design is analytic; for this reason it depends on survey analysis of the views of individuals on the relationship between effective inventory control management, revenue generating capability, and smooth operations of oil and gas drilling firms in Nigeria using oil drilling firms in Port Harcourt, Rivers State as samples. The study adopted the simple random sampling technique in gathering primary data from the sample drawn from the population. ANOVA test and Percentage and Spearman's Rank correlation coefficient are statistical tools used in the analysis and testing of the hypotheses. SPSS is used to show the outputs of the tests.

4. *Presentation and Analyses of the Results of the Test*

The analyses of the data obtained from respondents give more concentration to these questions relevant to three null hypotheses for the study. These research hypotheses with the empirical data were tested using Spearman's Ranks Correlation Coefficient. Based on the experiences of the respondents on the subject matter, a total of 24 copies of questionnaire were share out to each of the 26 sample companies. The researchers were able to retrieve 21 copies, representing 87.5%. Among the 21, 3 sets, representing 12.5%, were found unusable due to their improper completion. In view of this, 18 sets, representing 75%, were used for the purpose of the analyses. Using SPSS output, Spearman's Ranks Correlations Coefficient result as shown below, the hypotheses are tested for acceptance or rejection.

H₀₁: There is no significant relationship between ineffective inventory control and downtime in the operations of oil and gas drilling firms.

Table 1. Correlation Coefficient between Ineffective Inventory Management and Downtime in Drilling Operations

	Downtime in drilling	Ineffective management
Downtime drilling	1	0.682 (.001)
Ineffective management	0.682 (.001)	1

Source: Field Survey, 2018

The analysis of the result shows a correlation value of 0.682 with p-value = 0.001 < 0.05, which implies that there is 68% relationship between ineffective management and downtime drilling. We therefore reject the null hypothesis and accept the alternate hypothesis, which states that there is a positive significant relationship between ineffective management and downtime in the operations of oil drilling firms. This implies that the more ineffective inventory control system, the more downtime increases in the operations of oil and gas drilling firms. Therefore, oil and gas drilling firms should put in place effective inventory management policies to avert downtime in their operations with its attendant consequences.

H₀₂: There exists no significant relationship between downtime in the operation of oil and gas drilling firms and their income (profit) level.

Table 2. Correlation Coefficient between Income (Profit) and Downtime in Drilling Operations

	Downtime drilling	Loss of income (profit)
Downtime drilling	1	0.788 (.000)
Loss of income (profit)	0.788 (.000)	1

Source: Field Survey, 2018

Issue 4/2019

The analysis of the result shows a correlation coefficient value of 0.788 with p-value = $0.000 < 0.05$, which implies that there is 79% relationship between income (profit) level and downtime in drilling operations. We therefore reject the null hypothesis and accept otherwise, which states that downtime resulting from ineffective inventory management does have strong positive relationship income (profit) of oil and gas drilling firms. This implies that increase in downtime in operations will lead to 79% increase in loss of income (profit). Therefore, effective and responsive inventory control mechanism should be adopted by oil and gas drilling firms to enhance timely acquisition and control of inventories during operations to ensure continuous running of the rig as well as acquisition of these inventories at the lowest possible cost to maximize profit.

H₀₃: Incessant downtime in operations and termination of contracts of oil and gas drilling firms do not have significant difference on their revenue generating capability.

Table 3. ANOVA Test on Downtime Drilling and Termination of Contract. Coefficient Table

Model	Sum of square	d.f	Mean square	f. cal	f- tabs	Remark
Regression	5.1013	1	1.5058	344.632	3.901	Reject
Residual	8.5229	24	0.4611			
Total	13.6242	25				

Source: Field Survey, 2018

Table above shows the ANOVA result of downtime in drilling operations and termination of contract of oil and gas drilling firms. The test of significance of the R-square was done by use of the analysis of variance (ANOVA) technique. We accept the alternate hypothesis that the regressed equation is significant; the F-cal value was 344.632, while F tabulated value was 3.901. This means that F-cal was greater than F-Tab. So, the null hypothesis is rejected and the alternate accepted thus, this states that incessant downtime in drilling operations of oil and gas firms as a result of poor inventory control management does have significant difference with termination of contract of oil drilling firms.

Note: If $F_{cal} > F_{tab}$, reject the null hypothesis otherwise accept the alternate hypothesis.

4. *Result and Discussion*

From SPSS table 1, the study concludes that there is a significant correlation between poor inventory control management and downtime (work stoppage) in the operations of oil and gas drilling firms. **Table 1** shows a correlation coefficient of 0.682 which indicates a strong positive correlation between ineffective inventory control management and downtime (work stoppage) in the operations of drilling firms, and a p-value of 0.001 which is also far less than the conventional 0.01 and 0.05 levels of significance.

In a similar study carried out by Ogbo, Onekanma and Ukpere, (2014) to look into the correlation between effectual system of inventory management and business status in the Seven-Up Bottling Company, Nile Mile Enugu. The study revealed that business derives advantages from stock control through safe keeps and withdrawal of stocks, enhances sales efficiency and minimal running cost. It equally discloses that effective stock management is recognized as one of the aspects any concerned management should acquire as a potential for enhanced performance.

From Table 2 SPSS, the study shows that there is a significant correlation between downtime in the operations of oil and gas drilling firms and their income (profit) levels. It shows a correlation coefficient of 0.788 which indicates a very strong positive correlation between downtime in the operations of drilling firms and loss of income (profit), and a p-value of 0.000 which is also far less than the conventional 0.01 and 0.05 levels of significance. Therefore, the study concludes that there is a significant relationship between downtime in drilling operations of oil and gas drilling firms and their income (profit) levels.

From Table 3 SPSS, shows a significant difference between incessant downtime in drilling operations as a result of poor inventory management and termination of contract. The study shows the F_{cal} value was 344.632, while $F_{tabulated}$ value was 3.901. This means that F_{cal} was greater than F_{Tab} . Therefore we conclude that there is a significant difference between incessant downtime as a result of poor stock management and termination of contract. Adeyemi and Salami, (2010) in their similar study on Coca-Cola Bottling Company, Ilorin Plant from 2000 to 2004 revealed that stock control has become greatly enhanced to address the increasing difficulties in greater number of business outfits. It is in reaction to the veracity that



Issue 4/2019

inventory is an asset of unique nature. So, inventory management is a necessity for the firmness and continued existence of any business outfit with vision.

5. Conclusion and Recommendation

The primary objective of this study is to look into inventory control management and revenue generating capabilities of oil and gas drilling firms in Nigeria with the intent to establish their possible dependable interrelationship.

The conclusions in line with the results of the hypotheses testing were as follows:

Poor inventory control management would result in downtime (work stoppage) in operations of oil and gas drilling firms. Therefore, the study confirms that there is a significant relationship between downtime in the operations of oil and gas drilling firms in Nigeria and poor inventory control management.

It can be adduced that downtime (work stoppage) as a result of poor inventory system can lead to loss of income in oil and gas drilling firms, that is, the revenue generating capabilities. This is because, in oil and gas drilling firms, the terms of payment is based on work done on hourly or daily basis. Any stoppage in operations would have stopped income accruable from the period or hours when operations sized.

It can also be seen that incessant downtime caused by poor inventory control management can lead to termination of a contract of an oil and gas drilling company, reason being that delay in delivery of job could provoke a oil production company to terminate their client's contract. Therefore, the study concludes that poor inventory control can ultimately lead to loss of contracts.

This study therefore strongly recommends that oil and gas drilling firms should strengthen their inventory management system through training and retraining on regular basis, responding to technological changes in inventory managements for effective and timely delivery of jobs and operations. This would equally help to avert downtime in operation with attendant consequence of loss of income and termination of contracts.

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Issue 4/2019

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Issue 4/2019

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