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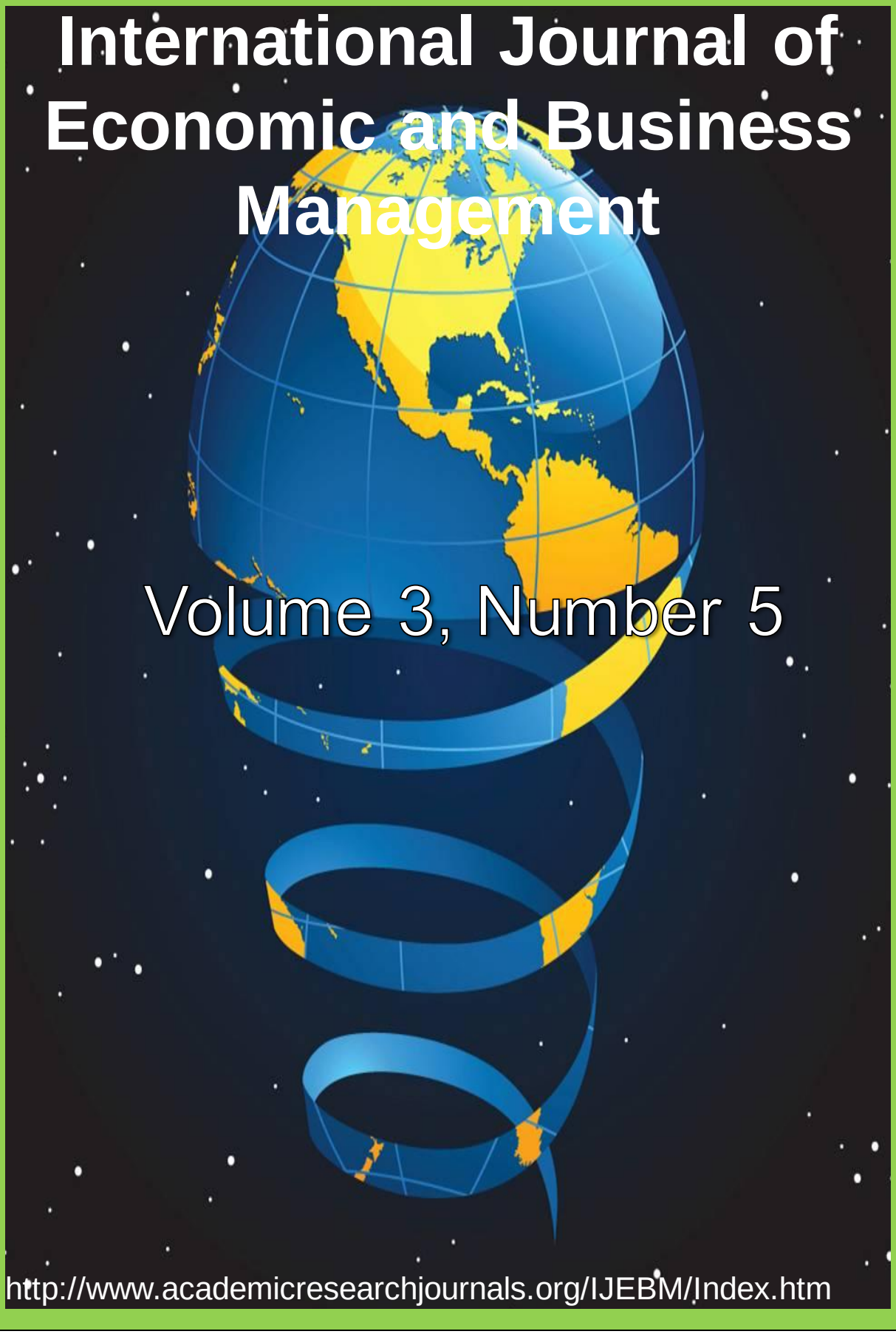

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Table of Content: October 2015; 3(5)

ARTICLES

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Full Length Research

Determinant Affecting Performance of Supply Chain Systems in the Petroleum Industries in Kenya

Anthony Osoro PhD Student, Dr. Willy M. Muturi and Dr. Patrick K.. Ngugi Supervisors

Jomo Kenyatta University of Agriculture and Technology, department of Procurement and Logistics. School of Human Resource and Developments, P.O. Box 62000-00200, Nairobi, Kenya.

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The purpose of this paper was to analyze the effect of crude oil price as a determinant on performance of supply chain systems in the petroleum industries in Kenya. Supply chain is a dynamic process and involves the constant flow of information, materials, and funds across multiple functional areas both within and between chain members. Members in the chain need to cooperate with their business partners in order to meet customer's needs and to maximize their profit by reducing cost of crude oil. However, it is a very difficult task in managing the multiple collaborations in a supply chain because there are so many firms involved in the supply chain operations with its own resources processes also requires real-time operation and decision making across different tasks, functional areas, and organizational boundaries in order to deal with problems and uncertainties. The strategic move of focus for mass customization, quick response, and high-quality service cannot be achieved without more complex cooperation and dynamic structure of supply chains.

Key Words: Cost of crude oil, performance of supply chain

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INTRODUCTION

This study explored how crude oil price can be a determinant affecting performance of supply chain systems in the petroleum industries in Kenya. Empirical studies show that most successful oil companies do not only embrace customer satisfaction but they also do proper forecasting to mitigate shortages. The petroleum industry works as a global supply chain involving exploration, material handling, domestic and international transportation, use of technology, and so on. The industry offers a strong model for implementing supply chain management (SCM) techniques (Taylor, 2014). Supply chain management involves providing maximum satisfaction to end users (consumers), in other words, delivering the right product to the right person at the right time while still maximizing profits. Today, there are many opportunities for the coordination of activities across the supply chain even in the ever complex oil and gas sector. This is largely due to the development of information systems and communication technologies within the sector (W B, 2012b).

The oil and gas industry is one of the largest and most complex industries in the world today that touches on peoples' everyday lives with services ranging from transportation, electricity, heating, lubricants and a host of chemical and petrochemical products. Globally, a whopping 30 billion barrels of oil is consumed per year. The United States Energy Information Administration (EIA) in its 2011 International Energy Outlook projects that the world's energy consumption will increases by 53% by the 2035 (Lun, 2011). In Europe and Asia, oil accounts for 32% of energy consumption, whilst in the Middle East, 53%. For South and Central America the figure is 44% whereas in North America it is 40%.

Oil Pricing

The prices of internationally traded fuels and food surged until mid-2008, fell sharply, and then began rising again, reversing much of the price fall by 2011. By one measure, the prices on the world market have nearly doubled since 2005. The fiscal breakeven price of oil needed to balance the budget in major oil exporters has risen sharply in recent years, making the prospect of prolonged periods of low prices unlikely in the future. Equally important, the marginal cost of oil production in 2011 was US$92 a barrel for the 50 largest listed oil companies and could rise further if it continues to follow the long-term trend (Wall Street Journal, 2012). Similarly, long-term growth in global demand for food and continuing U.S. ethanol demand for maize and European Union (EU) biodiesel demand for vegetable oils are expected to keep prices of maize, oilseeds, and many other crops at historically high levels (Chadha & Gagandeep, 2013).

Many governments in developing countries control petroleum product prices. In the face of mounting subsidies, a number of governments seriously explored options for pricing reform in the period leading up to mid-2008. The budgetary pressure to press on with reform subsided briefly following the price collapse in late 2008, but those governments that had done little were caught by rising prices again soon thereafter (Zhu et al, 2013). To the extent that price increases on the world market have been transmitted to the domestic market, soaring prices have led to calls on governments across the world to take action, ranging from providing greater safety nets to the poor and increasing the minimum wage to releasing oil from strategic reserves, reducing taxes, and granting outright price subsidies (Bowersor et al., 2010).

Given the high share of household expenditure on food in some low-income countries, the food share can be as high as half or more, and even in middle-income countries it is typically 20 to 30 percent (WB ,2012b) rising food prices have made fuel price reform, politically difficult under any circumstances, all the more challenging. Conversely, rising fuel prices have compounded the political difficulties of reducing food price subsidies, as households face rapidly increasing expenditures on other basic goods. As a result, some countries have seen people taking to the streets to protest both high food and energy prices (Ministry of Energy and Petroleum (2013, November).

Price transmission to the domestic market has differed markedly from country to country. In the case of petroleum products, aside from price differences due to transportation costs and differences in fuel quality, international crude oil and petroleum product prices are broadly uniform across all regions, so that differences in government pricing policies account for much of the differences in end user prices. The price differences are significant: a recent price survey showed that the retail prices of four petroleum products in 65 developing countries in January, 2012 varied by two orders of magnitude, with the lowest prices found predictably mostly in major net oil exporting countries (Kojima, 2012). Muhammed et al, 2012 & Gagandeep, (2013), as in the years immediately following rising oil prices in 2004, which saw suspension of pricing policies linked to world price movements, some governments responded to high oil prices in 2011 and 2012 by freezing prices. Many interlinked developments have affected costs, availability, and prices paid for petroleum products in recent years.

Recent high oil prices have exacerbated the poor financial states of the national oil companies in some countries with price subsidies, leading to the inability to procure petroleum products on time, acute fuel shortages, and high black market prices; Fuel price subsidies in the face of high world prices have increased incentives for diversion to black markets and smuggling to neighboring countries. Delai & Takahashi (2013) observed that smuggling and black marketing can push up domestic prices markedly above the official prices; Power shortages in a number of countries have increased demand for diesel for emergency power generation, causing diesel fuel shortages in some markets and higher diesel prices. A growing cause of power shortage is declining rainfall, leading to falling hydropower generation in East Africa and elsewhere; Piracy in the Gulf of Aden and the Indian Ocean has increased insurance costs, led to shipping delays, and at times caused fuel shortages in East Africa; The challenges to the authorities mounted by citizens across the Middle East and North Africa since 2010 have stalled and sometimes reversed petroleum price reforms in several countries against the backdrop of declining perceived state legitimacy (Bowersox et al., 2010).

Oil forms a major source of energy in Kenya and world at large for it contributes about 40% of world energy consumption. Kenya's petroleum market has 73 major players and hundreds of independents. The oil sector has become highly competitive and is being characterized by

price wars and low sales margins. Industry data shows that petroleum dealers are currently selling retail price between Sh115.55 per litre to Sh115.80 per litre for super, Kerosene 87.12 to Sh 89.15 per litre for every litre of diesel 108.50 to 109.20 respectively (Muhammad, 2013). Kenyan Oil sector was liberalized in October 1994. It is regulated by Ministry of Energy through the Energy Act of 2006 and enforcement is done by Energy Regulatory Commission (ERC). Part IV of the Act (Petroleum and Natural Gas) deals with the issuance of business licenses for importation, storage, refining, exportation, sale and resale, transportation of petroleum and natural gas (Anderson, 2013).

Price Competition

Where prices are not controlled or only price ceilings are set, the government can promote price competition by making information available. The price information needs to be broken down by company, and preferably by filling station. In addition, it is important to promulgate and enforce a rule that requires prices to be posted on display boards at readable heights that are clearly visible to drivers (Muhammad, 2013).

Taylor, (2014) observe that some governments post detailed information about fuel prices to help consumers. Some list current prices only, others post recent but not current prices, and a handful lists both current and historical prices. Among the most detailed and timely is the online price database in Chile mandated by a resolution issued in January 2012 which is also available on iPhone, BlackBerry, and Android. The database gives viewers the choice of displaying data in order of increasing or decreasing price and the address of each filling station, prices, and the date and time of the last price change (Luthra et al, 2013). The government of Guatemala highlights on its Web site the filling stations with the lowest and highest prices in the Guatemala City Metropolitan Area with their addresses and street maps every week.

STATEMENT OF THE PROBLEM

The available literatures touches only on monetary values, showing that supply chain systems has no creativity and innovatability to exploit the benefit of crude oil price from all companies towards improving performance of up to 80 percent depending on the extent of adherence to supply chain requirements needs to have clear performance strategy (Zhu et al, 2013). These problems of often oil shortages resulted to this study to disclose challenges affecting performance of supply chain systems in the petroleum industries in Kenya.

(Fugate et al., 2010 & Luthra et al., 2013) observed that the studies available have largely remained far below the expected standards which was intended to meet this expectation of the oil companies. It's noteworthy that procurement efficiency and effectiveness cannot be achieved unless they are pursuant in tandem with the goals of supply chain performance. For instance supply chain goals revolve around embracing the five rights i.e. right quality, right quantity, right source, right time and right price respectively so as to maintain stock level inventory often, with longer term strategy goal revolving around the ultimate customer satisfaction, controlling of shortages, competency in skills and timely delivery of oil products to retailers (Meyer, 2010).

Specific Objectives

Generally, the research objective was establishing the extent to which cost of crude oil affects performance of supply chain systems in the petroleum industries in Kenya.

Also, to determine the moderating effect of legal and regulatory environment in the oil companies on the, relationship between, cost of crude oil and performance of supply chain systems in the oil industries in Kenya.

Crude Oil Price

The real (inflation-adjusted) price of crude oil is a key variable in the macroeconomic projections generated by central banks, private sector forecasters, and international Monetarily Fund (IMF). The recent cutback in Libyan oil production, widespread political unrest in the Middle East, and ongoing concerns about the state of the global recovery from the financial crisis have sharpened awareness of the uncertainty about the future path of the real price of crude oil. It seems surprising that, to date, no studies have systematically investigated how best to forecast the real price of oil in real time. One reason is perhaps that there has been no readily available real-time database for the relevant economic variables (Caniato et al, 2012).

First, even preliminary data often become available only with a lag. For example, it may take months for the first estimate of this month's global oil production to be released. Second, the initial data releases are continuously revised. It takes successive data revisions until we know, to the best of our ability, the true level of oil production in the current month. Little is known about the nature of these revisions in oil market data or about how data revisions and delays in data availability affect the out-of-sample accuracy of oil price forecasts. In recent research with (Baumeister and Kilian, 2013) observed the need to address this problem. They construct a comprehensive monthly real-time data set

consisting of vintages for January, 1991 through December, 2010, each covering data extending back to January, 1973. Back casting and now casting methods are used to fill gaps in the real-time data sets (Azevedo et al., 2011).

This database allows the construction of real-time forecasts of the real price of oil from a variety of models. Perhaps surprisingly, it can be shown that suitably constructed model-based real-time forecasts of the real price of oil are more accurate than the no-change forecast at horizons up to one year. This result holds both for the US refiners' acquisition cost for crude oil imports, which may be viewed as a proxy for the price of oil in global markets, and for the West Texas Intermediate price that receives most attention in the media. (The price of Brent crude oil is not available for a long enough time span to allow a similar analysis). These results are based on a forecast evaluation window covering January, 1992 through June, 2010. This window includes recent periods of turmoil in oil markets and provides a challenging test of the forecasting ability of alternative forecasting models. The evaluation criteria are the recursive mean-squared prediction error of the forecasts and their directional accuracy (Chan et al., 2012).

Petroleum price, like prices of many commodities, coincides with law of value, but it has its own singularity, for petroleum is a kind of special commodity. Intense fluctuation of petroleum price is one of the most spectacular phenomena during the process of international trade, for there is no price rising and falling rapidly in a short term. Petroleum price's historic trace is like rolling alp and coulee rising and falling, but this kind of rising and falling presents periodical changes, because there is certain intrinsic link between petroleum price and major influencing factors (production capacity of OPEC, operating rate, world average Gross Domestic Product (GDP), price of coal, price of natural gas, demand of petroleum, expenditure coefficient, balance between supply and demand of OPEC, productivity of non-OPEC, balance between supply and demand of non-OPEC Ministry of Energy and Petroleum (2013, November).

The first problem is that the interpretation of crude oil as an intermediate input in the value added production function is questionable if we think of oil as an imported commodity. Under standard assumptions, imported oil enters the production function of domestic gross output, but it does not enter the production function of domestic value added (Chan et al, 2013). Since gross output is separable in value added and imported energy, holding capital and labor fixed, oil price shocks do not move value added. Hence, oil price shocks by definition cannot be interpreted as productivity shocks for real GDP (Dao et al, 2011). Rather they affect the domestic economy by changing domestic capital and labor inputs. The second problem is that, to the extent that oil prices affect domestic output, under standard assumptions their impact should be bounded by the cost share of oil in domestic production, which is known to be very small. For example, for the United States, the ratio of imported and domestically produced crude oil in GDP has been fluctuating between 1 and 5 percent (Giovanni & Vinzi, 2012). Thus, if oil price shocks are viewed as cost shocks for the oil-importing economy, their effect by construction cannot be very large. In their study by Delai & Takahashi (2013) have demonstrated that standard production based general equilibrium models of the transmission of oil price shocks are not capable of explaining large fluctuations in real GDP (Sople, 2012).

Some countries have embraced price control, including all five West African countries. They use different variations of an import parity structure with international spot reference prices, market marine freight rates, and the dollar-local currency exchange rates as the three key short-term adjustment parameters.

A system of price control consists of two basic elements: The price buildup structure, starting with import-parity landed costs and adding storage, transportation, margins, and other costs; The adjustment mechanism comprising short-term adjustment parameters, and the frequency of and the trigger for adjusting prices With the exception of Malawi, the countries with price control adjust prices monthly. Malawi has a price stabilization fund and has no pre-set automatic adjustment frequency. The stabilization fund ran up a large deficit in 2008. Only in Botswana, Senegal, and South Africa is the price adjustment automatic, based on pre-established administrative procedures (Lin et al, 2013).

In Burkina Faso, Côte d'Ivoire, Mali, and Niger, in spite of having pre-established procedures, ad-hoc interventions occur in each adjustment. Pan-territorial pricing by definition means that true costs are not reflected in market prices, and reduces incentives to minimize costs because offering lower prices by improving supply efficiency is not an option. In Mali, for example, prices are maintained uniform through tax differentiation. Fuels obtained in the lowest-cost manner are taxed most heavily, and conversely highest-cost fuels are taxed the least. This means that cost savings cannot be passed onto consumers, and a firm cannot lower prices in the hope of expanding its market share. Astilla and Longo (2013) observed that in West Africa, for the most part, the prices are maintained uniform throughout each country. The only minor exception is Burkina Faso which adjusts ex-depot prices at Ouagadougou (Bingo depot) and Bobo-Dioulasso, and has two sets of prices depending on the location. The countries with sector liberalization have regional price variations established by the market. One exception is Madagascar where the logistics operator Société Logistique Pétrolière S*A*, a private firm that owns and controls all terminals and depots provides a common "postage stamp" ex-depot

price from all the depots in the country. Such a setup is unlikely to lead to a strong drive to increase efficiency and reduce cost (Bulk Oil Storage and Transporation, 2013).

A recent review of developing country governments' response to the oil price volatility of the past two years showed that, against the severe price rises of 2007 and 2008, few governments were able to withstand the pressure to use or increase fiscal measures to lower prices (Yang et al, 2013). As a result, some countries that moved to automatic price adjustment mechanisms years ago suspended price adjustment and bore financial losses. In West Africa, four of the five study countries engaged in price smoothing during the run-up in international prices from 2007 through mid-2008. Only Senegal maintained a consistent automatic adjustment process (Anderson, 2013). The adjustment timing and process steps to be taken every four weeks are defined in the 1998 sector restructuring legislation and have been rigorously followed. The other four countries, Burkina Faso, Côte d'Ivoire, Mali, and Niger, suspended automatic price adjustment based on a clearly defined import parity structure. Price stabilization was achieved through large fuel tax reductions (resulting in a loss of government revenue) or making the state supply company bear the financial losses. An added positive element in Senegal's pricing regime is the provision built into the legislation for a regular review of longer-term adjustment parameters such as distributor and retail margins (Sople, 2012).

According to Ghana Exploration and Production Forum (2013), the other four countries still rely on an ad-hoc approach to such adjustments three principal price components: Landed cost including cost, insurance, and freight, which covers the FOB price at the port from which the petroleum product is imported, marine freight and all freight/cargo-related costs, evaporation and other losses en route, and port fees to land the product in the pertinent receiving port, or, in countries with price control, hypothetical import-parity price corresponding to the landed cost used to calculate retail prices; Government take (referred to as tax hereafter), which includes all taxes, duties, and government fees that are incurred in the supply chain that go to the treasury or to earmarked funds; Oil industry component, which covers all gross margins for storage, inland bulk transport, local delivery, wholesale, and retail distribution (Sople, 2012). The difference between the retail selling price and the sum of the landed cost and government take represents the gross margin component available to the downstream petroleum industry. In markets where prices are liberalized, this number is derived by difference and is the least accurate of the three components.

Transportation of oil

Nowadays, the most beneficial and environmentally friendly way to transport oil is through pipelines, which moves at very high speed under high pressure, reaching up to three meters per second. The pipeline can be ground and underground and lay according to the terrain relief. The structure of pipes for pipeline includes highly plastic steel, reinforced plastic, which ensures its high reliability, resistance to damage, temperature and corrosion. Ground and underground pipelines has its pros and cons. First of all, ground pipeline is beneficial because in the case of an emergency, the damage is easier to find and fix than if it was located on ground. Underground pipeline has its advantages. For example, it much better protected against environmental influences than the ground method (Chandan, 2014).

Main threats in the Gas and Oil supply chains

These years, the oil and gas industry see environmental accountability as a top priority, underlined by the intersection between public concern and industry efforts. Many companies are facing different challenges with every aspect of the industry. At the moment, companies struggle with governmental policies and political situations. Specifically: regulatory and legislative changes and increased cost of compliance, fickle oil and gas prices, general national or global economic concerns and overall industry competition. Additionally, some reliable source such as oilprice.com (The No. 1 source for oil and energy news) claimed that environmental issues, climate change concerns and human capital deficit are even more important risk factors than any others (Dacker,2013).

Legal and Regulatory Environment

The government policies was in the Kenyan market to moderated against the challenges affecting performance of supply chain systems in the petroleum industries in Kenya, to disclose the alternative hypotheses whether there are existing relationship among the independent variable; cost of crude oil and legal and regulatory with the oil companies. Lin & Sheu (2012) observes that over the years, the oil and gas industry has continued to face growing challenges, from stricter government regulation, political risks, competition, emergent new comers and political hostilities, which has affected price hike and shortages. Due to the scramble for resources, many oil companies have been driven to explore and produce in some of the most hostile and harsh environments, which in turn tend to be extremely costly (Liu et al, 2012).

Also, there have been concerns in the industry about

the growing scarcity of natural resources, which underlies fears of not being able to meet production levels and goals. However, in reality, the resources are not the cause of supply restrictions with vast potential still available due to continuous discoveries of oil reservoirs around the world (Liu et al., 2012). The main challenge facing the oil and gas industry is not the availability of oil and gas resources, but putting these reserves into production and delivering the final products to consumers at the minimum cost possible. Thus, a solid supply chain management competency program will enhance this goal, Tax analysis and revenue forecasting are of critical importance for a government in ensuring adequacy and stability in tax and expenditures policies (Lun ,2011).The broad function of tax policy units are: (a) Monitoring of Revenue Collection. (b) Evaluation of the Economic, Structural and Revenue Aspects of the Tax Policy. Tax policies have to be weighed against the following criteria: economic efficiency; economic growth; revenue adequacy; revenue stability; simplicity; and low administrative and compliance costs. (c) Tax Expenditure Analysis. (d) Evaluation of the Impact of Non-Tax Economic Policies. (e) Forecasting of Future Tax Revenues. The several steps involved in the preparation of revenue forecasts are: evaluation of tax elasticity, evaluation of changes in economic conditions, and evaluation of the effect of inflation and price changes (Liu,et al, 2012).

Olugu & Wong (2012) observes that the policies, laws and institutions that presently govern the mineral sector in Kenya need significant reform if the sector is to grow sustainably and contribute to economic development and poverty reduction in the counties. The highest priority must be given to finalizing the Geology, Mining and Mineral Bill (2013), which has remained in draft form for some years. Kenyans need a shared vision of how the development of mining will take place at the counties, building on experiences gained from Titanium mining in Kwale (Olugu & Wong, 2012). The Bill must define the role and mandate of the state and its public mining institutions, and make very clear what public institutions at the county level will exercise; what the regulatory roles are and the relationships between them; how, if at all, decentralization might apply to governance of the mineral sector; specify the environmental obligations of operators consistent with internationally recognized safeguard standards; define arrangements governing provision for community development and benefits sharing, including the roles to be played by different stakeholders; and address the rights of vulnerable groups that might be impacted adversely by mineral sector development and measures for their protection (Schrettle et al, 2013).

Oil and natural gas development faces political and environmental issues. Political issues stem from the overlapping and disputed claims of economic sovereignty. Environmental issues pertain to the preservation of animal and plant species unique to the areas where oil, gas or other minerals have been discovered, particularly Turkana and Kwale. The environmental impact of oil exploitation is a dominant driver for most technology development in the industry today. Although much of this effort is focused on waste treatment and disposal, a significant amount of waste prevention will be crucial. Development of technologies to displace less material during mining will result in reduced environmental impact (Zhu et al, 2013).

Botswana in East and Southern Africa can be said to have reasonable to good systems. It is too early to draw conclusions about Kenya or Malawi where new regulators have very recently been established. The tables also show the results from Doing Business 2010, which tracks regulatory reforms aimed at improving the ease of doing business British Petroleum (2013). Doing Business ranks economies based on 10 indicators of business regulation that record the time and cost to meet government requirements in starting and operating a business, trading across borders, paying taxes, and closing a business; the rankings do not reflect such areas as macroeconomic policy, security, labor skills of the population, or the strength of the financial system or financial market regulations and (Fugate et al, 2010). While Burkina Faso, Côte d'Ivoire, Mali, and Niger need to update and strengthen their legal and regulatory frameworks. With the exception of Botswana and South Africa, the study countries suffer from weak enforcement and policing, even in those countries where a strong legal and institutional framework has been established. Inadequate regulations and weak enforcement allow too many oil marketing companies to operate in Kenya, Tanzania, and Uganda. This overwhelms limited enforcement capacity, making commercial malpractice an attractive way of making profits (Lin, 2013).

The remedy, in a liberalized market, is not to limit these companies by number but to ensure that the licensing criteria for operators are stringent and that compliance with rules to obtain and retain a license is enforced (Taylor, 2014, and Longo, 2013). One approach is to establish a separate body for inspection and enforcement, as in other developing regions such as South America, where strong, specialized, independent inspection institutions have been developed. These institutions have encouraged the formation of a cadre of private, certified inspectors, to which the enforcement institutions outsource work, minimizing their requirements for permanent staff. Senegal has already identified the need to update the legal texts developed as part of the 1998 reform, particularly in the areas of product specifications, open access, security stocks, and regulatory institution building. Lin (2013), Senegal plans to convert the Comité National des Hydrocarbures into a regulatory body, the Regulatory Body for Downstream Hydrocarbon Sub-Sector Activities.

An assessment of the cost-effectiveness of Kenya's Open Tender System managed by the ministry of energy, given that the volume of imports can easily justify more than one tender a month, may be useful. The Open Tender System for crude oil is linked to the requirement that all oil marketing companies process crude oil at KPRL. Consideration may be given to applying modest duty protection, for example on the order of 5 percent, to the refinery as a temporary measure and liberalize product imports, allowing competition between domestic refining and imports (Sople, 2012).

RESEARCH METHODOLOGY

The main objective of this study was to investigate cost of crude oil as a determinant of Oil Company's performamne.t hinder sustainability of small and medium family enterprises after the exit of the founders in Kenya. There were both quantitative and qualitative variables. Social scientists routinely collect data that is both qualitative and quantitative and carefully examine the patterns that emerge in an attempt to interpret, understand and explain social life (Kothari, 2011).

Research Design

The design enabled the study to combine both qualitative and quantitative research approaches. Qualitative approaches enables collection of data form of words rather than numbers. It provides verbal descriptions rather than numerical (Kothari, 2011).Qualitative methods can be used to gain more in depth information that may be difficult to convey quantitatively. Quantitative approach strives for precision by focusing on items that can be counted into predetermined categories and subjected to statistical analysis (Taylor,2013).The use of these two approaches reinforces each other (Zhu et al,2013). The research used this approach because the data collected used the main questionnaire was quantitative and was analyzed using statistics. Qualitative on the other hand involve interpretation of phenomena without depending on numerical measurement or statistical methods (Styles et al, 2012). The study explored the actual position of fuel shortages and supply chain systems on the challenges affecting performance in Kenya on poor forecasting from the industry. In trying to investigate the effect of the independent variables on the dependent variable, the study did not manipulate, cost of crude oil and performance of supply chain systems; the independent and dependent variables. They had already occurred. The challenge thus, was in how to control variance, when one has no control over the variables Johnson & Christensen (2012). The study did not control variance by direct manipulation or by random assignment. The concern here was on the performance due to fuel shortages, the dependent variable, which was influenced by one independent variable. These were some of the reasons why the study adopted this research design.

Sampling Frame

There are 73 registered oil companies in Kenya and this formed the sampling frame. The list of oil companies was obtained from Energy Regulatory Commission of Kenya (ERC) or registrar of companies in Kenya. The study employed a censuring sampling frame due to the fact that the targeted populations of entire stakeholders about 73 companies who are involved in day to daily in the oil industry management and other users were drawn from various stakeholders specified in the targeted population. (Meyer, 2010) states that this method was suitable because/ since it randomly select the required representative in the course of the study. This method of sampling frame enabled the researcher to draw a reasonable adequate sample size, where all the members of the population of interest had an equal chance of being addressed in the sampling frame (Zhu et al., 2013).

Instruments

The main research instrument that was used in this study was the set of questionnaires .In developing the questionnaire items, both closed-ended and open-ended formats of the item were used. This format was used in all categories of the questionnaires. However, in the fixed choice item, it involved 'putting words' in the respondents' mouth, especially when providing acceptable answers, there was temptation to avoid serious thinking on the part of the respondent. The respondent ended up choosing the easiest alternative and provided fewer opportunities for self-expression. It is because of these reasons that it was necessary to combine this format of items with open–ended response items to attract qualitative responses which gave the study in-depth feelings and perceptions of the respondents. The interviewer used survey questions to deeply probe the relationship between the variables under study. Meyer (2010), note that, survey questions address each research question satisfactorily and meet each objective.

The questionnaire was divided into six parts as follows: Part 1: General information of respondents; This section sought to find out the general information of the respondents such as Age, marital status, level of education, work experience, type of business, number of employees, etc. It also served the purpose of the preliminary study. Part II: Cost of Crude Oil; this section had items on the cost of crude oil and its effects on the

supply chain performance of the petroleum industries towards proper forecasting to mitigate fuel shortages. Part III: Dependent Variable; Performance; This section sought to find out whether the respondents had poor performance in their companies which resulted to often fuel shortages and how it influenced crucial fuel decisions and the effect of the same on the performance of fuel companies.

Qualitative data: Data frequency distribution and cross tabulation was used in describing and explaining the situation as it is in the enterprises. Data was coded and analyzed simultaneously as collected. Through content coding, a list of key ideas and themes for each variable was generated and this guided the nature of integration needed for both qualitative and quantitative data collected. Views and ideas that were frequently expressed were noted. This formed the basis for crosschecking and comparing the two sets of data and drawing of conclusions. Data was then operationalized through scoring for crosschecking with the quantitative data (Delai,and Takahashi, 2013).Quantitative data: Data was analyzed using descriptive statistics; measures of central tendency, measures of dispersion and measures of symmetry and inferential statistics. Scatter plots were used to show if the relationships wear linear. SPSS software version 20 was used as a statistical tool for analysis.

Linear regression analysis showed the correlation and strength of the relationship between variables both independent and dependent and the effect of the intervening variables on each relationship. Multiple regression analysis was thereafter conducted to test the overall effect on the study model. Analysis of Variance (ANOVA) was also to test the goodness of fit of the regression models and finally to test the hypothesis of the multiple regression models.

Data Presentation: The information was presented using a combination of statistical techniques and graphical techniques. Statistical techniques include: frequency distribution for grouped and ungrouped data, measures of central tendency; mean, median and mode to present characteristics that determine performance of supply chain systems; measures of dispersion these include range, variance, deviation ,coefficient of variability and percentiles. Graphical representations: This is presenting grouped data diagrammatically, the most common from being histograms, and polygon. At a glance once is able to make conclusions about the study (Yang et al., 2013).

Gender of the Respondents

The survey results indicated in table 1 shows that 60 (84.51%) of the respondents were men while the remaining 11 (15%) were women. The above results may be attributed to the strong male domineering culture in Kenya where until recently women were relegated to domestic chores. This culture is dying off and a large population of women population is now strongly competing with their male counterparts in most jobs (Luthra et al, 2013). The cultural, customary and religious beliefs governing performance and forecasting may also have contributed to the same.

Market Price at which you set your Crude Oil Price

Table 2 indicates, an average of three respondents who respondent to the written questionnaire, they indicated the minimum and maximum market price set by crude oil as ksh.10.00 and ksh.45.00 respectively, with mean of ksh.31.67 and standard deviation of 18.930.

Hypothesis 3

H_o: Cost of crude oil does not significantly affect performance of supply chain systems in the petroleum industries in Kenya.

Regression

The linear regression analysis shows a relationship, R = 0.643 and R2 = .414 which means that 41.1% of the corresponding change in cost of crude oil after the f the founder can be explained by a unit change in performance . A further test on the beta coefficient of the resulting model, the constant α = -0.168 is not significantly different from 0, and since the p value p = 0.004 is greater than p= 0.05, the constant is not significant. However, the coefficient β = 0.534 is significantly different from 0, model analysis of regression is shown in table 4. Regression indicates the strength of the relationship between the independent variables and the dependent variable (performance). The R square value in this case is 0.414 which clearly suggests that there is a strong relationship between the independent variables and the dependent variable. This indicates that the independent variables share a variation of 41.4 % of performance. This implies that if all the oil companies can enhance cost of crude oil, skills, ICT and tendering systems challenges affecting performance of supply chain systems in the petroleum industries in Kenya will minimize fuel shortages.

Testing Hypothesis: This explains α that if were held constant then performance will be -0.168 (low) and therefore the gradient (β) and the performance would be very low. The Anova test in Table 3 shows that the significance of the F-statistic is less than zero. This implies that the null hypothesis $\beta 1=0$ is rejected and the

Table 1. Gender of the respondents

	Frequency	Valid Percent
Male	60	85
Female	11	15
Total	**71**	**100**

Table 2. Market Price Percentage

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
what % of market price at which you set your Crude Oil Price	3	10	45	31.67	18.930
Valid N (list wise)	3				

Table 3. Correlations on Cost of Crude Oil

		Performance	Cost
Performance	Pearson Correlation	1	.643**
	Sig. (2-tailed)		.000
	N	58	58
Cost	Pearson Correlation	.643**	1
	Sig. (2-tailed)	.000	
	N	58	58

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

alternative hypothesis β1≠0 is taken to hold implying that the model Y= β0 + β1X1 + e, is significantly fit.

The model performance = α + β (cost) holds for as suggested by the test above. This confirms that there is a positive linear relationship between cost and on performance of supply chain systems in the oil industries. The model performance = β (cost) holds as suggested by the test above. This confirms that there is a positive linear relationship between cost of crude oil and performance of supply chain systems.

The histogram in figure 1 indicates, that there is normality. The residual describes the error in the fit of the model to the *ith* observation $y_{i\ and}$ are used to provide information about the adequacy of the fitted model .Analysis of the residual is frequently helpful in checking the assumption that errors are normally distributed with constant variance, and in determining whether additional terms in the model would be useful. From figure 1 indicates the dispersion of the distribution of a histograms showing the mean, median, and mode give us some measure of the central tendency in a list of numerical data, and the upper and lower figures for the range tells us the high and low scores and the same was observed (Meyer (2010). But in order to understand a set of statistical data more clearly we obviously require a sense of the way in which the measured values are spread out from the central tendency. For example, are the values almost all clustered around the middle, or are there some very low and very high vales. The range and various "averages" tell us something, but they do not describe accurately the distribution of the values.

This objective was assessed using correlation and regression analysis on the local and international registered oil companies' basis and general analysis for

Table 4. Regression Model Summary on Cost of Crude Oil

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.643[a]	.414	.403	.68080

a. Predictors: (Constant), ICT

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18.316	1	18.316	39.518	.000[b]
	Residual	25.955	56	.463		
	Total	44.271	57			

a. Dependent Variable: performance
b. Predictors: (Constant), ICT

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.168	.083		-2.027	.004
	Cost	.534	.085	.643	6.286	.000

a. Dependent Variable: performance = -0.168 + 0.534 xCost

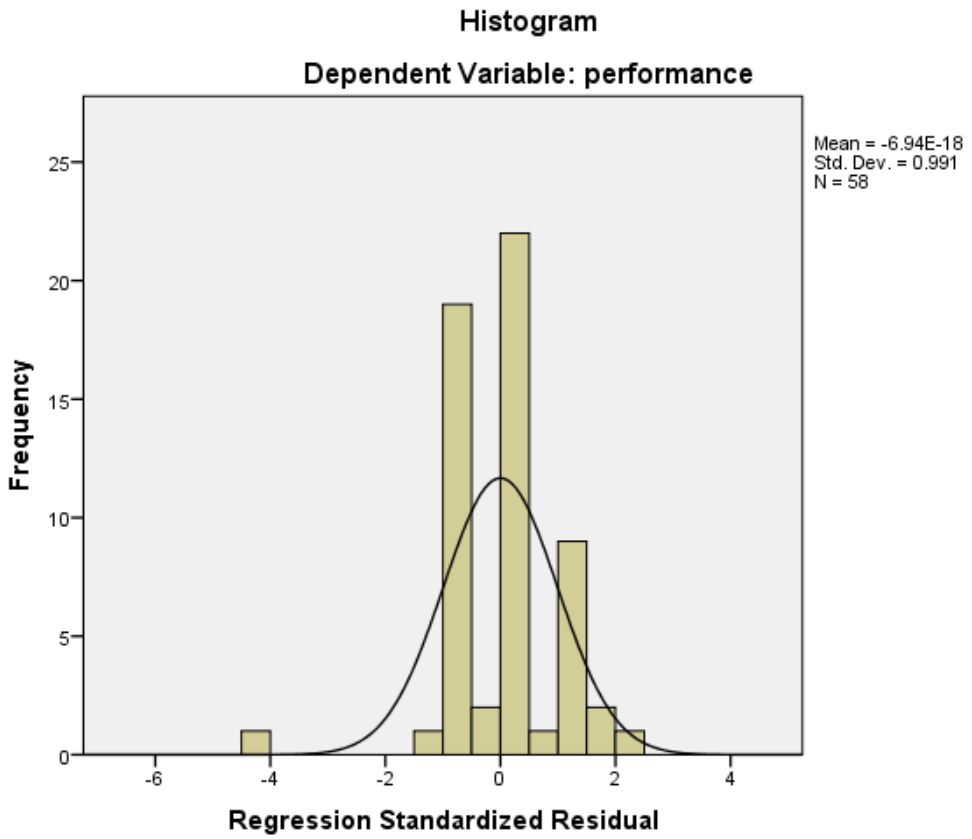

Figure1. Histogram Dependent Variable on Cost of Crude Oil

all the oil companies. At the local level the correlation result indicate that crude oil price is positively and significantly related with level of skills information communication and technology, except at the locally registered oil companies where information communication and technology are not significantly related. The R square value in this case is 0.197 which clearly suggests that there is a strong relationship between the independent variables and the dependent variable. This indicates that the independent variables share a variation of 19.7 % of performance. Comparing with medium unpredictable price.

Table 3 indicates, high unpredictable price compared with medium unpredictable has a significant regression coefficient of (-0.234) with a t-value of -3.557 (p-value =0.001). Low unpredictable price compared with medium unpredictable has a significant regression coefficient of (-0.192) with a t-value of -3.132 (p-value =0.003). Regression analysis result at the local levels indicate that crude oil price contributed to supply chain performance at local registered oil companies (-0.234) with a t-value of -3.557 (p-value =0.001 and also international registered oil companies' ((-0.192) with a t-value of -3.132 (p-value =0.003 but not for the rest of the industry. Further, crude oil price was a stronger predictor of supply chain performance at local registered oil companies. In establishing the influence/performance of crude oil price in the supply chain, a comparison of the local and international registered oil companies revealed different findings. The explanation could be found in the practices which varied per each group. For instance, most of the locally registered oil companies were not ready realize their staff to go for further studies to enhance their understanding in the crude oil pricing. However, in the general analysis, it was established that the effect of crude oil price on performance was not significant (-0.234) with a t-value of -3.557 (p-value =0.001). Significant level in the presence of level of skills, ICT and tendering systems, crude oil price does not affect supply chain performance in the petroleum industry.

In finding based on the general analysis were unexpected because there are many studies indicate that pricing is a predictor of performance of supply chain and they were the hypothesized relationship. The explanation could be because the registered oil companies' are supportive of the crude oil price, as they adjust their prices either up/down wards depending on the crude oil price adjustment. The ultimate customers are the sufferer in this case. This is evident in the findings on descriptive analysis where majority agreed that they were satisfied with the crude oil price for their current job in their respective companies. The interview confirmed that the staffs were supported in their crude oil price terms of supply chain performance. This argument is supported by (Anderson, 2013), who established that while crude oil price may have an impact on staff performance mobility, crude oil price that is wholly paid by an entity is likely to prelude to staff search. In contrast, when supply chain performance for crude oil price the negative relationship to staff mobility is observed as supply chain are more likely to perform. This is in the petroleum industry where the crude oil cost is factored in the retail price to cover the investment cost plus the accrued interest. The relationship between tendering and crude oil price which is in this study is positive and significant provides another explanation is. One cannot acquire crude oil without following the process of tendering systems unless they want to avoid competitive bidding. Therefore, indirectly in away, crude oil price is covered through tendering which has been found to be a predictor of supply chain performance in this study. The hypothesized relationship was not supported, however the unfavourable aspects related to crude oil price that came outing the interview and written responses are a pointer that there are crude oil price aspects that need to be addressed since they cause of non-performance in the supply chain.

SUMMARY

The study established that cost of crude oil affects performance of supply chain systems in the petroleum industries. The null hypothesis was tested through F-test and results indicated that there is a relationship between cost of crude oil and performance of supply chain systems. Pricing is important for any product as it can affect its demand in the market. Many of the world's best business organization would endeavor to sale more at higher price to sustain their trade. That the theory of any affirms when in business. They price products at a reasonable rate to enable them to compete with other sister companies. From the crude oil perspective, pricing products need proper forecasting as customers are always sensitive to any adjustment of price. The study sought to establish the extent to which cost of crude oil affects performance of supply chain systems in the petroleum industries in Kenya.

From the qualitative analysis the respondents were satisfied with crude oil price. This argument is supported by (Anderson, 2013), who established that while crude oil price changes affect supply chain performance throughout transit within the chain, hence crude oil price that is wholly paid by an entity is likely to prelude to customers complaints. In contrast, when supply chain performance for crude oil price the negative relationship to staff mobility is observed as supply chain are more likely to perform.

In the oil companies' regression analysis, crude oil price was found to be a predictor of performance to deliver and shortages in the oil industry. In general multiple regression analysis, the relationship between supply chain systems and crude oil price was significant.

This means that, in the absence of appropriate conducive environment, crude oil can affect performance of the supply chain and they are challenges of performance. The findings, therefore shows that the study which sought to establish determinant effect of cost of crude oil on performance of supply chain systems in the petroleum industries. Further, although crude oil price was a significant predictor in the general analysis for all petroleum companies and hence a challenge to supply chain systems, interview and written response gave a high in depth information on aspects to crude oil that were favourable for the registered oil companies' management performance.

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Full Length Research

Optimization of Stock Levels Using Inventory Models

[1]Chukwuma E. Iwuagwu and [2]Moses O. Nwosu

[1]Department of Statistics, Abia State Polytechnic, Aba. Email: iwuagwuchuks@gmail.com
[2]Department of Statistics, Abia State Polytechnic, Aba. Email: abinnogoes@gmail.com

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For a successful conduct of a day to day operation, manufacturers and sellers of goods must obtain a variety of goods. This paper looked at inventory control system which protect the assets of companies and at the same time, maintain an optimal level of inventory investment. A practical illustration was used to show how the models worked, which will ensure effective and efficient handling of stocks.

Keywords: Inventory, Optimization, Stock Levels, Inventory Models

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INTRODUCTION

The optimization of stock levels is clearly a very important component of the management function. Modern business, whether manufacturing firms, wholesalers or retailers, must obtain variety of stocks, for the successful conduct of their day-to-day operations.

In general, the manufacturing firms will have three categories of stocks:

Raw materials: Work-in-process or semi-finished goods and indirect items, such as consumable stores and tools which will depend upon the nature of production.

Wholesalers and retailers on the other hand, concentrate upon finished goods and these will obviously be dependent on demand.

The objective of this paper is to:

Determine the inventory control systems which protect the asset from loss due to deterioration, pilferage, etc.
Identify and maintain an optimum level of inventory investment.

METHODOLOGY

Model one: Instantaneous Receipt

This model assumes that, there is a constant consumption and a zero delivery time for items of stock. The objectives of the model is to minimize the total cost of acquiring and holding stock and so to decide the most economical quantity that should be ordered and the optimum number of orders that should be placed in any given time period. We would expect that ordering and stock-out cost will tend to increase the more frequently

orders are made while on the other hand, holding cost will tends to fall. Thus, we seek the optimum trade-off between these costs and benefits.

Let
D = Annual Demand for the item
Q = Size of the batch quantity
P = Cost price per item
H = Holding cost
K = Ordering cost

$$\text{Number of order per Annum} = \frac{\text{Annual Demand}}{\text{Batch Quantity}} = \frac{\text{D}}{\text{Q}}$$

$$\text{The Annual Ordering Cost} = \frac{\text{KD}}{\text{Q}}$$

$$\text{The Annual Carrying Cost} = \text{h}\frac{\text{Q}}{2}$$

Therefore, the Total Inventory Cost (Tc) is sum of the ordering and carrying cost, that is, $\text{Tc} = \frac{\text{KD}}{\text{Q}} + \text{h}\frac{\text{Q}}{2}$

Thus, the optimal value of Q can be determine by differentiating the total cost (Tc) function, which is given as

$$\frac{d\text{Tc}}{\text{dQ}} = \text{KDQ}^{-1} + \text{h}\frac{\text{Q}}{2}$$

$$= -\text{KDQ}^{-2} + \frac{\text{h}}{2} = 0$$

$$= \frac{\text{KD}}{\text{Q}^2} + \frac{\text{h}}{2} = 0$$

$$= 2\text{KD} = h\text{Q}^2$$

$$= \frac{2\text{KD}}{\text{h}} = \text{Q}^2$$

$$\text{Q}^2 = \frac{2\text{KD}}{\text{h}}$$

$$\text{Q} = \sqrt{\frac{2\text{KD}}{\text{h}}}$$

The total minimum cost is obtained by substituting the value for the optimal order size (Q) in the total cost (Tc) equation above.

Model two: Non-Instantaneous Receipt

Most stock control problems are caused by the combination of a varying usage rate and a reorder period which is not instantaneous. Most firms in such circumstances will hold a buffer or safety stock in order to avoid possible interruptions to production or distribution. In this case, we have a trade-off between losses caused by shortage of stocks and the extra holding cost of the extra items stocked.
Let,

P = Daily rate at which the order is received over-time also known as the production rate.
D = The daily rate at which inventory is demanded
The maximum inventory level is given by

$$Q - \frac{Qd}{P} = Q\left(1 - \frac{d}{P}\right)$$

The average inventory level

$$\frac{1}{2}\left[Q\left(1 - \frac{d}{P}\right)\right] = \frac{Q}{2}\left[1 - \frac{d}{P}\right]$$

$$\text{The total carrying cost is} = h\frac{Q}{2}\left[1 - \frac{d}{P}\right]$$

Therefore, the total annual inventory cost is given as

$$\text{Tc} = \frac{\text{KD}}{\text{Q}} + h\frac{Q}{2}\left[1 - \frac{d}{P}\right]$$

Thus, to find the optimal order quantity, we equate total carrying cost with total ordering cost.

$$= h\frac{Q}{2}\left[1 - \frac{d}{P}\right] = \frac{\text{KD}}{\text{Q}}$$

$$= hQ^2\left[1 - \frac{d}{P}\right] = 2\text{KD}$$

$$Q^2 = \frac{2\text{KD}}{h\left[1 - \frac{d}{P}\right]}$$

$$Q = \sqrt{\frac{2\text{KD}}{h\left[1 - \frac{d}{P}\right]}}$$

DATA ANALYSIS

Model one

Divine trading company has a monthly demand for a certain fast food of 5000 packages. The cost of placing an order is ₦200 while the monthly cost of maintaining a package in store is ₦50. What should be his optimum order quantity and how often should it be placed and the total cost?

The optimum order quantity (Q),

$$Q = \sqrt{\frac{2KD}{h}}$$

$$= = \sqrt{\frac{(200)(5000)}{50}} = 141 \text{packages}$$

$$\text{How often to place order} = \frac{D}{Q} = \frac{500}{141} = 35$$

Total cost (Tc),

$$Tc = \frac{KD}{Q} + h\frac{Q}{2}$$

$$Tc = \frac{(200)(500)}{141} + 50\frac{141}{2}$$

$$Tc = 7092.20 + 3532$$
$$Tc = 7092.20 + 3532$$
$$Tc = N10,617.20$$

MODEL TWO

Divine company has its own manufacturing facility in which it produces cloth. The annual carrying cost of ₦0.90 per yard and ordering cost of ₦200 and an estimated annual demand of 20000 yards. The manufacturing facility operates for 311 days and produces 250 yards of cloths per day.
Compute the optimal order size, total inventory cost and the number of orders per years.

The optimum order quantity (q) is given as

$$Q = \sqrt{\frac{2KD}{h\left[1 - \frac{d}{P}\right]}}$$

Where,

$$d = \frac{20000}{311} = 64.31$$

$$\text{and } P = 250 \text{ yards per day}$$

Therefore,

$$Q = \sqrt{\frac{2(200)(20000)}{0.90\left[1 - \frac{64.31}{250}\right]}}$$

$$Q = \sqrt{\frac{8,000,000}{0.90[0.74276]}} = 3459.39 \, yards$$

Total annual inventory cost (Tc)

$$Tc = \frac{KD}{Q} + h\frac{Q}{2}\left[1 - \frac{d}{P}\right]$$

$$Tc = 200\frac{(20000)}{3459.39} + 0.90\left[\frac{3459.39}{2}\right]\left[1 - \frac{64.31}{250}\right]$$

$$Tc = 1156.27 + 1156.28 = N2312.55$$

$$\text{Number of production runs} = \frac{D}{Q}$$

$$\frac{20000}{3459.39} = 5.78 \, runs$$

DISCUSSION OF RESULTS

From the analysis on the Instantaneous Receipt, for company to be in business and maintain profit, should have an Economic Order Quantity (Qptimum Order Quantity) of 141 packages on a monthly basis, place order 35 times and make a budget of ₦10, 617.20

On Non-instantaneous Receipt, the company has its own manufacturing facility should be able to produce 3459.37 yards annually at a total cost of ₦2312.55 with the number of production runs as 5.78.

FINDINGS

(1) From the analysis with model one instantaneous receipt, the optimum order quantity is 141 packages
(2) The number of times to place order is 35
(3) The total cost of placing order is ₦10, 617.20
(4) For non-instantaneous receipt, the optimum production quantity is 3459.37 yards
(5) The number of production runs is 5.78
(6) The total annual inventory is ₦2312.55

CONCLUSION

A good system of inventory management includes a determination of economic order quantity, the total cost and number of order in order to avoid stockout. Stockout cost is in reality not one cost, but a group of costs which are the result of being out of stock in a given inventory item. A practical approach to inventory control should take the nature of stock out into consideration and thereby get more accurate estimate of economic order quantity. In a manufacturing situation, a shortage of one unit of raw material might cause disruption in production, resulting in down-time and the costs of starting production up again. In the same company, the shortages of several hundred units would result in the same down-time and related costs, as well as possibly an increase in the loss of sales and bad customer relations which would impact on the future sales. The use of economic order quantity model may prove to be a more practical and useful tool for estimating relevant inventory costs for many companies.

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The Practice, Challenges and Benefits of Total Quality Management (TQM) In Manufacturing Firms in Nigeria

[1]Isaac A. Ayandele and [2]Anietie P. Akpan

[1]Department Of Business Management, University Of Uyo, Uyo, Nigeria
[2]Department Of Business Management, University Of Uyo, Uyo, Nigeria.
Corresponding author's E-mail: shalomdivyne@yahoo.com

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Though the definitions of Total Quality Management (TQM) across the globe seem similar, there is still confusion as to what sort of practices, policies and activities needed to be implemented to fit into TQM model. Recent experiences been shown that any business improvement programmes were quick to be termed TQM, thus watering down the content and intention of the term. This study examines the practice, challenges and benefits of TQM in Nigerian manufacturing firms and discovered among others that while a significant reduction in operating expenses and manufacturing costs were recorded, workers were also found addressing different issues in the name of TQM. The study concludes that careful and objective implementation of TQM will enhance the innovative and technological capability of the firm thereby boosting her goodwill. The study recommends that for any manufacturing firm in Nigeria to succeed and enjoy the benefits of TQM, it must carefully scrutinize itself to ensure that it has the necessary financial resources, moral will power and top management support.

Keywords: Quality control, innovation, kaizen, Bye-Product, Teamwork, Customer-Centered.

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INTRODUCTION

Background to the Study

The need for an organisation to adopt the practice of continuous improvement in the face of increasing competition and challenging operations cannot be over-emphasized. The global economic meltdown, over increasing competition among firms and greater enlightenment of consumers have continued to intensify the demand for high quality goods and services and the creation of quality culture beyond the relatively unclear managerial statements about the need for leadership education and recognition. It is therefore, very clear and pertinent that quality has become a universally defined term of customer perception and expectation rather than in terms of production specialization and relative increase in customer requirements and perception.

Nowadays, it is extremely difficult to tune on the television set, listen to radio or read through the pages of newspapers without finding the word "Quality". This emphasizes the relevance of quality to both the manufacturer or provider of services and the general public. In view of this trend, it follows that for

organizations to stay in operation, they must adopt quality control and qualitative managerial principles. This is why the relevance of Total Quality Management cannot be over-emphasized in this dynamic, complex, highly competitive and perilous business environment.

However, quality management has been defined differently by different authorities and practitioners. Kaynak (2003) defines it as the attainment of operational control and superior quality through a pervasive and enterprise – wide commitment to quality. Oakland (2005) calls it "Continuous customer driven improvement". In like manner, Besterfield et al (2008) define it as the application of qualitative methods and human resources to improve all the processes within an organization and exceed customers' needs now and in the future. Generally, it is a management philosophy that seeks to integrate all organizational functions to focus on meeting customers' needs objectively. It attempts to move the focus of quality away from being a purely operations' activity into a major concern for the whole organization; through total quality management quality becomes the responsibility of all units, departments and sections in the organization.

However, in spite of all the aforementioned, there seems to be many persons and organizations that are not well informed of the concept, theories, practices, challenges and benefits of total quality management in Nigeria, hence this study.

STATEMENT OF PROBLEM

Studies on the subject of Total Quality Management and other related subjects globally have indicated that there exist considerable potential benefits in implementing Total Quality Management**.** However, in contrast to this there are several organizations in Nigeria (banks and manufacturing firms) that have in the recent past publicly professed TQM and are moribund or have gone underground today. The questions that agitate the mind now are "Do the practitioners of TQM in Nigeria focus mainly on meeting and exceeding customers' needs? How is TQM practiced in Nigerian Manufacturing firms? Is the practice of TQM in Nigeria different from the way it is in other countries? What are the peculiar challenges and prospects in implementing TQM as a Management technique in Nigeria? Is Nigerian economic environment conducive for the practice of TQM? This study provides answers to these and several other related questions.

OBJECTIVES OF THE STUDY

The main objective of this study is to examine the practice, challenges and prospects (benefits) of TQM in Nigerian Manufacturing firms using Nigerian Breweries Plc, as a case study. Other objectives include to:

i. determine the effect of TQM on the products of Nigerian Breweries Plc;
ii. ascertain the effects of TQM on the operational costs of Nigerian Breweries Plc;
iii. establish the effects of TQM on the corporate image of Nigerian Breweries Plc, and
iv. find out if there exist any significant problem(s) militating against the effective implementation of TQM in Nigerian Breweries Plc.

Research Questions

The following research questions were formulated in line with the objectives of the study. They are:

1. Does TQM impact significantly on the quality of products of Nigerian Breweries Plc?
2. Does TQM significantly reduce the operating cost of Nigerian Breweries Plc?
3. Has TQM impacted on the corporate image of Nigerian Breweries Plc?
4. Are there any significant impediment(s) militating against the effective implementation of TQM in Nigerian Breweries Plc?

Research Hypotheses

The underlisted hypotheses were formulated to guide the conduct of this study. They are in their null (Ho:) form.

Ho_1: TQM has no significant impact on the quality of products of Nigerian Breweries, Plc.

Ho_2: TQM has not significantly reduced the operating cost of Nigerian Breweries, Plc.

Ho_3: TQM has not impacted positively on the corporate image of Nigerian Breweries, Plc.

Ho_4: There are no significant problems militating against the effective implementation of TQM in Nigerian Breweries, Plc.

REVIEW OF RELATED LITERATURE

To have an understanding of the concepts, and theories of Total Quality Management and to develop the building blocks upon which the discussion of the findings in this study were based, the review of related literature was done under the following sub-headings – conceptual, theoretical and empirical frameworks.

Conceptual Framework

Nature and Evolution of Total Quality Management

The American Federal Office of Management Budget Circular (cited in Arawati (2005 p.209) defines Total Quality Management (TQM) as a total organizational approach for meeting customer's needs and expectations that involve all managers and employees in using quantitative methods to improve continuously the organization's processes, products and services. According to this definition, TQM is not merely a technical system. It is associated and linked with the organization itself which is also a social system. In the opinion of Oakland (2000), TQM is an attempt to improve the whole organisation's competitiveness, effectiveness and structure. According to Dale (1996), TQM is the mutual cooperation of everyone in an organization and associated business processes to produce products and services, which meet and hopefully, exceed the needs and expectations of customers. Accordingly, TQM is both a philosophy and a set of management guiding principles for managing an organization. Esin and Hilal (2014) define Total Quality Management as a firm-wide management Philosophy of continuously improving the quality of the products/services/processes by focusing on the customers' needs and expectations to enhance customer satisfaction and firm performance. Davood et al (2013) see TQM as a systematic quality improvement approach for firm-wide management for the purpose of improving performance in terms of quality, productivity, customers satisfaction and profitability. For a more elaborate definition, Soltani (2005) says that TQM is a strategy that affects everyone in an organisation and embraces all aspects of operating system. It includes "hard system" to which the quality of flows or the results of operations can be assured through the aid of statistical quality control techniques and "people focused" systems and approaches that help individuals and teams "do the correct things" or "do things right".

From the above definitions, it can be seen that TQM is made up of management tools and techniques as well as management concept and principles. TQM is a continuous activity that must be entrenched in the work culture of any organization embracing it. It is not just a one-shot, here-today-gone-tomorrow programme.

Evolution of TQM

Historical Development of Total Quality Management

The history of quality management, from mere inspection to total quality management, has led to the development of essential processes, ideas, theories and tools which are central to organizational development, change management and the performance improvements that are generally desired for individuals and organizations.

During the early years of manufacturing, inspection was used to decide whether a worker's job or product met the requirements. It was not done in a systematic way, but worked well when the volume of production was reasonably low. But as organizations grew, the need for more effective operations became apparent. However, in 1911, Frederick W. Taylor helped to satisfy this need. He published "The Principles of Scientific Management", which provided the framework for the effective use of people in industrial and manufacturing organizations (Imaga, 2000). One of his concepts was "clearly defined tasks performed under standard conditions". Inspection was one of those tasks intended to ensure that no faulty product left the factory or workshop. By this time the quality inspection system focused on the product and the detection of problems in the product, it involved testing every item to ensure that it complied with the product specifications and was carried out at the end of the production process by skilled, trained inspectors. This movement led to the emergence of a separate inspection development and the birth of quality control/management.

Quality control was introduced to detect and mend problems along the production line, to prevent the production of faulty items. Statistical theory played a key role in quality control. In the 1920s, Dr. W. Sherwhart developed the application of statistical methods to the management of quality. He made the first modern control charts and demonstrated the variation in the production process that resulted in variation in the product. Logically, eliminating variation in the process made for a high standard end product.

In the 1940s, Japanese products were perceived as cheap, shoddy imitations and substandard as compared with products from Europe and America. Japanese Industrial Leaders recognized this problem and aimed at producing innovative high quality products. They invited some quality experts which included Edward Deeming, Juran and Feigenbaum to teach their organizations how to achieve their goals in five (5) years. Not many Japanese believed them.

However, some Japanese trusted and followed Deming's and other experts' advice and emerged leaders in technology with a strong reputation for high quality (Kaynak, 2003). In the 1950's quality control and management developed quickly and became a main theme of Japanese management. The idea of quality did not stop at the management level but quickly spread throughout the entire organization as Water Shewart's statistical sampling techniques and the creation of specification standards became the core of quality system (Mark, 2014). Quality circles (the Japanese version of continuous improvement team) according to Ishikawa (1985) started in the 1960's. A bye-product of

quality circles was employee motivation. Workers felt that they are involved, valued and listened to. Another bye-product was the idea of improving not only the quality of the products but also every aspect of organizational life. This consciousness probably marked the genesis of total quality management.

The term total quality management was first used in a paper presented by Armand Feigenbaum at the first international conference on quality control in Tokyo, Japan in 1969. The term referred to wider issues within an organization. In Total Quality Control, Robins and Judge (2007:106) define TQM as follows:

> *A quality system is the agreed on, company wide and plant wide operating work structure, documented in effective, integrated technical and managerial procedures, for guiding the coordinated actions of the people, the machines, and the information of the company and plant in the best and most practical ways to assure customer quality satisfaction and economical costs of quality.*

Accordingly, new phase of quality control and management began, known as Total Quality Management (TQM) in the 1980s and 1990s. Having observed Japan's success of employing sound quality techniques, Western companies started introducing their own quality initiatives. Though the definitions of Total Quality Management across the globe seem similar, there is still confusion as to what sort of practices, policies and activities needed to be implemented to fit into the TQM model. This was because any business improvement programme was quick to be termed Total Quality Management, thus watering down the term (Isaac, 2004).

With quality management initially tied to and associated with manufacturing industries, one might assume that the importance and relevance of quality management might decrease with the emergence of the service economy. Quite the contrary, the emergence of the service economy has only served to strengthen the importance of quality issues (Su mi and Jens, 2015).

Principles of Total Quality Management

Successful total quality management is anchored on the following four broad principles:

a. Do it right the first time: This is anchored on the saying of Schonberger (1980) who studied many Japanese and US factories firsthand. He contends that "errors, if any, should be caught and corrected at the source, i.e. where the job is performed".

b. Be Customer-Centered: Everyone has one or more customers in a total quality management organization. They may be internal or external customers. Internal customers are the members of the organization who rely on your work to get their job done. Regarding external customers, total quality management requires all employees who deal directly with outsiders to be customer-centred. Being customer-centred means:

a. Anticipating the customers' needs
b. Listening to the customer
c. Learning how to satisfy the customer and
d. Responding appropriately to the customer and viewing him as a "god"

c. Make continuous improvement a way of life. The Japanese word for continuous improvement is KAIZEN, which means improving the overall system by constantly improving the little details. TQM managers dedicated to KAIZEN are never totally happy with things in their organizations. Kaizen practitioners view quality as an endless journey, not a final destination. They are always experimenting, measuring, adjusting and improving. Rather than naively assuming that zero defects mean perfection has been achieved, they search for potential and actual trouble spots. (Hendricks and Singhal, 1997)

Below are the four (4) general avenues for continuous improvement:

- Improved and more consistent product and service quality.
- Fast cycle times (in cycles ranging from product development to order and to payroll processing)
- Greater flexibility (for example, faster response to changing customers' demands and new technology)
- Lower costs and less waste (e.g. elimination) needless steps scrap, rework and non-values adding activities.

d. Build Teamwork and Empowerment: Total Quality Management empowers employees at all levels in order to tap their full creativity, innovativeness and commitment. Empowerment occurs when employees are adequately trained and provided with necessary working tools and facilities.

Quality Control Versus Total Quality Management

While other quality assurance or control measures make

room for defective products, Total Quality Management (TQM) emphasizes total elimination of defects through making items right, first time, every time (Kannan , 2005). In contrast to the traditional quality control procedures, total quality management places much more responsibility on the workers to monitor their own output of products rather than entrust that function to a separate quality control department (Besterfield et al, 2008). Total Quality Management involves everyone in the organization including those who might judge that their moral line of duty does not involve quality. Total Quality Management seeks to identify the true and total costs related to a quality e.g. the cost of reworking the material or product that has been rejected.

The contrast between the previous state of an organization without TQM and the TQM state is demonstrated by Besterfield, et al (2008) in table 1.

(The Ten Conditions Necessary for Successful Implement of Total Quality Management Programme

Total Quality Management (TQM) is viewed as virtually a new organizational culture and way of thinking. It is specifically built around intense focus on customer satisfaction, on accurate measurement of every critical variable in a business operation, on continuous improvement of products, services and processes, and on work relationship based on trust and team work. Oakland (2005), suggests ten (10) essentials of implementing total quality management. These are:

1. Define Quality and Customer Value: Rather than leaving these to individual interpretation, company personnel should have a clear definition of what quality means in the job department and throughout the company. It should be developed from your customer's perspective and communicated as written policy.
2. Develop a customer orientation: Quality is best viewed and appreciated from the perspective of the customer, much as beauty is in the eye of the beholder. The firm should not only rely on secondary information in trying to guage customer perception or rating of the quality of its goods and services – rather it should attempt to do so by placing suggestion boxes, notebooks and score sheets and inviting opinion from the customers of the organization. It is also pertinent to recognize internal customers. Usually less than 20% of the company's employees come into contact with external customers, while the other 80% serve internal customers – other units with real performance expectations. The value chain in figure 1 provides an important way to think about the customer orientation, particularly to recognize internal as well also external (ultimate) customers.
3. Focus on the Company's Business Processes: This entails breaking down every minute step in the process of providing the company's product or service and looking at ways to improve it rather than focusing simply on the finished product or service.
4. Develop Customer and Supplier Partnership: Organisations have a destructive tendency to view suppliers and even customers adversarily. It is better to understand the horizontal flow of business from outside suppliers to internal suppliers/customers (a company's various departments) to external customers.
5. Take a preventive approach: Many organizations reward "fire fighters" not "fire averters", and identify errors after the harm has been done. Management instead, should be rewarded for being prevention-oriented and seeking to eliminate non-value-added work.
6. Adopt an error free altitude: Instill an attitude that "good enough" is not good enough anymore. "Error free" should become each and individual's performance standard with managers taking every opportunity to communicate the importance of this directive.
7. Get the facts: Continuous improvement – oriented companies make decisions based on facts, not on opinions.
8. Encourage every manager and employee to participate: Employee participation, empowerment, and extensive training in quality and statistical techniques, and in measurement tools are the main ingredients required to ensure continuous improvements.
9. Create an atmosphere of total involvement: Quality management cannot be the job of a few managers or of one department. Everybody must be involved.
10. Strive for continuous improvement:

Empirical Analysis

Robins and Judge (2007) carried out a ten (10) year study on Total Quality Management by selecting a group of 600 publicly traded organizations that had won awards for effectively implementing TQM. A control group similar in size and industry to the award winners was also used for the study. The performance of both groups was compared during the five (5) years prior to the award and five years after winning the award. No difference was noticeable between the two groups prior to winning the award. However, as shown in Table 2, the award group far outstripped the control group during the five year

Table 1: New and Old Culture of Quality Control

S/N	Quality Element	Previous Non-TQM State	TQM State
1.	Definition	Product-oriented	Customer-oriented
2.	Priorities	Second to service and cost	First among equals of service and cost
3.	Decisions	Short-term	Long term
4.	Emphasis	Detection	Prevention
5.	Errors	Operations	Systems
6.	Responsibility	Quality Control	Everyone
7.	Problem-solving	Managers	Teams
8.	Procurement	Price	Life-cycle costs, partnership
9.	Manager's role	Plan, assign, control and enforce	Delegates, coach, facilitators and mentors

Source: Total Quality Management, Besterfield et al (2008)

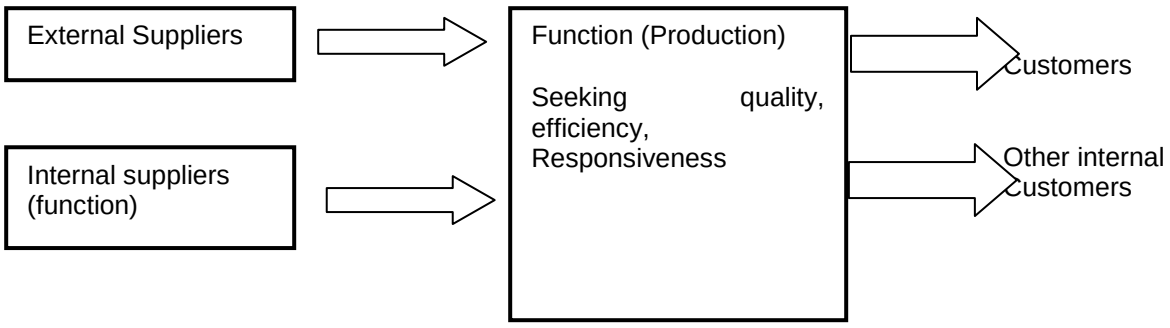

Figure 1: Customer Orientation Value Chain
Source: Oakland – Total Quality Management (16(8), p 1054

Table 2: Comparison of Performance of TQM Award Winning Companies with Non-TQM Companies

S/N	Description of Index	Control Group	Award Group
1.	Growth in operating income	43%	91%
2.	Increase in Sales	32%	69%
3.	Increase in Total Assets	37%	79%

Source: Dale et al (2008:13)

period after the award (Robins and Judge, 2007).

The study also showed that the stock price performance for the award winners was 114% while those of the control group were 80%. In addition, the study showed that small organization out-performed larger organizations. Further, recent studies have shown that only 30% of manufacturing companies have successfully implemented TQM where over 50% of service-based organizations have successfully implemented the programme. In another survey of manufacturing firms in Georgia, United states, the benefits of TQM were discovered to be, improved quality, employee participation, teamwork, better inter-personal relationships, customer satisfaction, employee satisfaction, improved productivity, communication, profitability and market share (Hendricks and Singhal, 1997).

Similarly, recent studies have examined the relationship between total quality management and various levels of business performance (Kaynak, 2003).

Although many results of prior studies supported the positive effect of TQM on organizational performance (Hendricks & Sighal, 1997; Kaynak, 2003), there were several researches which found out that the implementation of TQM might lead to ineffectiveness of firm performance (Dale et al., 1998).

According to Kaynak (2003), the reason for the differences in the outcome of results of these aforementioned studies is probably because of the nature of the research designs (such as using TQM practices of business performance as a single construct).

Theoretical Perspective

In this study, we reviewed the combination systems Theory and Synergy in explaining the practice, challenges and prospects of Total Quality Management. It should be noted also that for the purpose of this study a new term was coined to describe UNITY as embodied in the system theory and the multiplier effect of synergy-energy.

The systems development life cycle is analogous to the system theory widely used in the social science (Imaga, 1993). The phases of the systems development life-cycle include activities that must be completed for any systems development project. In this vein a total quality management programme is conceived of a 'project' which has specific starting point, duration, end point and activities essential to its success. The systems development life cycle (SDLC) activities according to Aluko et al (1997) involve project planning, analysis, design, implementation and support.

RESEARCH METHODOLOGY

This segment of the study concerns itself with the description of the methods and procedures used in carrying out this study. it covers the research design, research area, instrument of data collection, population, sample and sampling techniques, methods of data collection, reliability of instrument, instrument validation, operational measures of variables and method of data analysis.

Research Design

This study adopted the survey research design, where the opinion of the management and staff of Nigeria Breweries were sought on the concepts, theories, benefits and challenges of TQM. The survey design was considered suitable because of its cross-sectional approach that ensures seeking the views of individual employees, supervisors, managers and others who provided relevant statistics. The method used both exploratory and explanatory designs.

Research Area

This study was designed to examine the practice, challenges and benefits of TQM in Nigeria Breweries PLC. Thus, the research is limited to the operational activities of Nigerian Breweries Plc at the headquarters.

Instrument for Data Collection

The primary instrument for the collection of data for this study was a structured questionnaire. The questionnaire was divided into two parts (A and B) while part A was designed to extract the personal data of respondents, part B contained the research statements concerning operational variables that describe the practice, benefits and challenges encountered while implementing TQM. In addition to the use of the questionnaire, textbooks, journals, periodicals, magazines, manuals, reports, circulars, rules and regulations, bulletins and information from the internets were used as secondary sources of data.

Population of the Study

The population of this study comprises of all the staff of Nigerian Breweries Plc.

Sample Size of the Study

The sample size of the study was restricted to the one hundred and thirty-seven (137) staff of Nigerian Breweries, Plc at the headquarters. The sample size was considered adequate because of the heterogeneous nature of respondents who represent various categories of staff in all the departments, cutting through the entire hierarchy in the organization.

Research Variables

The dependent variable according to the theoretical framework for this study is the performance of Nigerian Breweries PLC as affected by the following variables:

i. TQM implementation strategy
ii. TQM success factors
iii. Optimum Quality Efforts
iv. TQM Benefits
v. TQM Barriers

These variables which affect the performance of Nigerian Breweries Plc, are independent variables.

Method of Data Analysis

In analyzing the data obtained in this study, the simple percentage statistical analysis was done. While the formulated hypotheses were validated with the Pearson Product Moment Correlation Co-efficient Analysis.

DATA PRESENTATION AND ANALYSIS

In this segment of the study, all the data that were collected were presented and analyzed.

Data Presentation

The respondents of this study were made up of the supervisors, managers, senior managers and other management staff of Nigerian Breweries Plc at the headquarters. They were one hundred and thirty-seven in number. Accordingly, a total of one hundred and thirty-seven (137) questionnaires were administered, but only one hundred and twenty-five were returned in useable form. The other twelve copies were not properly filled. The distribution of these questionnaires (copies) is shown in table 3.

Respondents' Biometrics

From the total number of one hundred and twenty-five respondents, seventy-six (76 or 60.8%) of them were male, while forty-nine (49 or 39.2%) were female. Of this number, ninety-six (96 or 76.8%) are married, while twenty-nine (29 or 23.2%) were single. We also enquired to know the educational background of the respondents. Our findings revealed that six (6 or 4.8%) of them hold first school leaving certificate as their maximum academic qualification, forty-eight (48 or 38.4%) hold between SSCE and NCE, fifty-five (55 or 44%) are HND/B.Sc. graduates, sixteen (16 or 12%) have M.Sc, MBA and Ph.D degrees.

The respondents were also asked to give information on their length of service and designation in the firm. Our findings showed that sixty-two (62 or 49.6%) of the respondents have worked for between one to ten years in Nigerian Breweries. Forty-five (45 or 36%) have put in between eleven and twenty years, while eighteen have worked between twenty-one and thirty-five years in the Nigerian Breweries. This is an indication that majority of our respondents are highly experienced and are not new to the system. The information we gathered on the designations of our respondents shows that fifty-two (52 or 41.6%) of them are supervisors, fifty-three (53 or 42.4%) are middle level managers while twenty (20 or 16%) of them are in the rank of Senior Manager and Assistant General Manager (AGM).

Practice of Total Quality Management in Nigerian Breweries

We enquired to know whether there exist any significant difference in performance between the pre-total Quality Management and Post Total Quality Management in Nigerian Breweries, Plc. Our findings revealed that ninety-six (96 or 76.8%) of the respondents agreed that there has been significant improvement in the operations of Nigerian Breweries since the introduction of TQM. Twenty-two (22 or 17.6%) disagreed while seven (7 or 5.6%) were indifferent.

In the same vein, respondents were asked to state if TQM has significantly impacted the operational costs of Nigerian Breweries. Seventy-one (71 or 56.8%) stated that the application of TQM has drastically reduced the overall operational cost of Nigerian Breweries. Forty-nine (49 or 39.3%) had contrary opinion, while five (5 or 4%) had no idea. Also, the overall impact of TQM on quality was assessed. One hundred and thirteen of the respondents (113 or 90.4%) agreed that continuous improvement and innovation from TQM practices positively correlate with quality performance, while only twelve (12 or 9.6%) had no idea. No one claimed to disagree absolutely with this claim.

To back up the above claim, seventy-five (75 or 60%) of the respondents said that Nigerian Breweries Management do measure and review the effectiveness of organizational change and share the knowledge that is being obtained. Twenty-one (21 or 16.8%) held contrary view while twenty-nine (29 or 23.2%) had no idea of what role the management was playing in this regard.

Test of Hypotheses

To facilitate the conduct of this study, four hypotheses were formulated in line with the objectives of the study. These hypotheses were tested using the Pearson Product Moment Correlation Coefficient in this segment of the research.

Test of Hypothesis One:

The first hypothesis was stated in its null form as shown below:

Ho: There is no significant impact of TQM on the quality of products of Nigerian Breweries PLC.

Using the Pearson Product Moment Correlation Coefficient Process, Table 4 was developed.

Where r = coefficient of Relationship

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{n(\sum xy^2) - (\sum x)^2\, n(\sum y^2) - (\sum y)^2}}$$

Table 3: Distribution of Questionnaire to Respondents

Department	No. of Respondents
Production	31
Quality Control	17
Reservation/Customer Care	14
Marketing and Sales	15
Purchasing	16
Administration	32
Total	125

Source: Filed Survey, 2014

Table 4.: Statistical Analysis

X	Y	X^2	Y^2	XY
3	96	9	9,216	288
2	22	4	484	44
1	7	1	49	7
∑6	125	14	9,749	339

Source: Statistical Analysis

$$r = \frac{3(339) - 6(125)}{\sqrt{3(14) - (6)^2\ 3(9{,}949) - (125)^2}}$$

$$r = \frac{1017 - 750}{\sqrt{(42 - 36).\ 29{,}247 - 15{,}625}}$$

$$r = \frac{267}{\sqrt{267}\ \sqrt{6 \times 1362^2}}$$

$$r = \frac{267}{81.73^2}$$

$$r = \frac{267}{\sqrt{267}\ \sqrt{286}}$$

$$r = 0.934$$

The value of r (0.934) indicates that the introduction of TQM to the operations of Nigerian Breweries has impacted positively on the quality of its products. This is because 'r' has a strong positive number.

Test of Hypotheses Two

Ho: TQM has not significantly reduced the operating cost of Nigerian Breweries, PLC. (Table 5&6)

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{n(\sum xy^2) - (\sum x)^2\ n(\sum y^2) - (\sum y)^2}}$$

$$r = \frac{3(316) - 6(125)}{\sqrt{3(14) - (6)^2\ 3(7{,}467) - (125)^2}}$$

$$r = \frac{948 - 750}{\sqrt{(42 - 36).\ 22{,}401 - 15{,}625}}$$

$$r = \frac{198}{\sqrt{6 \times 6{,}776}}$$

$$r = \frac{198}{\sqrt{202}}$$

$$r = 0.98$$

A correlation co-efficient of 0.98 shows that there is a positive relationship between TQM principles and the operational expenses of Nigerian Breweries. TQM has drastically reduced the operational expenses of Nigerian Breweries

Test of Hypothesis Three

To further investigate the specific area where TQM has influenced the operations of Nigerian Breweries Plc, the third hypothesis was stated in its Null form thus:

Ho: TQM has no positive relationship with the

Table 5: Total Quality Management (TQM) and Operating Expenses of Nigerian Breweries PLC

Category	Distribution	Percentage
Yes	71	56.8%
No	49	39.2%
No Idea	5	4
	125	100

Source: 2015 Field Study

Table 6: Statistical Analysis

X	Y	X^2	Y^2	XY
3	71	9	5,041	288
2	49	4	2,401	44
1	5	1	25	7
∑6	125	14	7,467	316

Table 7: Statistical Analysis

X	Y	X2	Y2	XY
3	76	9	5,776	228
2	40	4	1,660	80
1	9	1	81	9
∑6	125	14	7,517	317

corporate image of Nigerian Breweries Plc. (Table 7)

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{n(\sum xy^2) - (\sum x)^2\, n(\sum y^2) - (\sum y)^2}}$$

$$r = \frac{3(317) - 6(125)}{\sqrt{3(14) - (6)^2\, 3(7{,}517) - (125)^2}}$$

$$r = \frac{951 - 750}{\sqrt{(42 - 36).\ 22{,}551 - 15{,}625}}$$

$$r = \frac{201}{\sqrt{6 \times 6{,}926}}$$

$$r = \frac{201}{\sqrt{204}}$$

$$r = 0.985$$

Given the result of the correlation co-efficient of 0.985, it clearly shows that there is a significant positive impact of TQM on the corporate image of the organization (Nigerian Breweries PLC).

Test of Hypothesis Four

Hypothesis four relates to the peculiar problems encountered by the Nigerian Breweries Plc in the course of implementing and practicing TQM. The null hypothesis was thus stated as:

Ho: There are no significant problems militating against the effective implementation of TQM in Nigerian Breweries Plc.

The observed responses of respondents on this issue was presented in Table 8&9. While the input for the statistical analysis (Pearson Product Moment Correlation) was extracted from the same table.

Table 8: Observed Frequency

Category	Distribution	Percentage
Yes	96	76.8
No	22	17.6
No Idea	7	7
Total	125	339

Source: Field Survey, 2015

Table 9: Statistical Analysis

X	Y	X^2	Y^2	XY
3	96	9	9,216	288
2	22	4	484	44
1	7	1	49	7
∑6	125	14	9,749	339

Source: Statistical Analysis

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{n(\sum xy^2) - (\sum x)^2\, n(\sum y^2) - (\sum y)^2}}$$

$$r = \frac{3(339) - 6(125)}{\sqrt{3(14) - (6)^2\, 3(9{,}749) - (125)^2}}$$

$$r = \frac{267}{\sqrt{286}}$$

$$r = 0.934$$

The Pearson product Moment Correlation Coefficient of 0.934 indicates the existence of problems and challenges at the inception and at the later part of implementing TQM in Nigerian Breweries. When the researcher probes further on the nature of the challenges, the following were mentioned.

- TQM is very expensive and difficult to implement.
- It requires the support of the senior management staff in terms of monitoring, mentoring, and encouraging the new culture
- Lack of companywide definition of TQM often makes workers to address different issues in the name of TQM

DISCUSSION OF FINDINGS

In the course of this study, we discovered that the successful implementation of TQM in Nigerian Breweries had significantly reduced their operating manufacturing costs. The study reveals that waste was significantly reduced in Nigerian Breweries Plc. This is in line with the findings of Oakland (2005), who said that the application of TQM in Japanese firms has almost eliminated all forms of wastes thereby making organizational processes and other activities less costly to manage.

His conclusion was that "you do not need many inspectors before waste goes down, inventory goes down, (Hendricks and Singha, 1997). The main implication of this is that when everyone in an organization works harmoniously toward satisfying the needs of the customers, the goals and objectives of the entire organization are achieved at the least possible costs. It was also discovered that there exist a significant relationship between TQM and improved quality of products. This is in line with the postulations of Esin and Halah (2014) who states that TQM is always associated with improved quality. This according to him, is because TQM is always practiced with total commitment, resilience, patience and perseverance. It is also associated to the fact that always Stakeholders are encouraged to give feedback on the quality/performance of products of the company and inputs are acted upon.

The study reveals also that TQM is a booster of corporate image. This implies that when a high quality product or service is associated with a firm its image or goodwill is enhanced. This agrees with the findings of Mark (2014) who suggests that a near perfect correlation exist between quality culture and the goodwill of a firm.

Significance of Findings

The reasons for the TQM implantations may guide managers on how to motivate employees in the practice of this application. It will also improve the image of the firm and its overall performance. Discovering the barriers to TQM can be used by the forms who are in the planning

or early stages of TQM practices to improve the awareness and understanding of its principles. They can also be used by the forms who have already used TQM for some time to assess the progress and to improve their organisation.

SUMMARY, CONCLUSION AND RECOMMENDATIONS

The study was designed to examine the impact of TQM on the performance of manufacturing firms in Nigeria; with particular reference to Nigerian Breweries Plc. The findings of the study clearly shows that TQM has positive correlation with the overall performance of Nigerian Breweries Plc and specifically in terms of cost reduction, customer services delivery, employees satisfaction; quality of products, and its corporate image. We therefore conclude that a careful implementation of TQM in Nigerian manufacturing firms will drastically reduce waste and promote innovation and creativity.

In line with the objectives and findings of this study, we suggest the under-listed recommendations:

1. The principles of total quality management enunciated by Sherwhart, Juran, Deming, Feigenbaum, and others should be internalized and practicalized by Nigerian manufacturing firms who are pursuing innovation, the TQM way. This is because there is no shortcut to success. Indigenous manufacturing firms are encouraged to embrace TQM principles if they must succeed and thrive in this era of global recession.
2. Total quality management is neither a one-line antidote to organization's quality or customer satisfaction problems nor a fad that is here today, gone tomorrow. Organizations opting for TQM should carefully scrutinize themselves to ensure that they have the financial resources, moral will power and the top management support that are key ingredients for the success of TQM programme.
3. Total Quality Management should not be viewed as an end in itself but rather a means to an end. Management should bear in mind that the bottom line of their organization's existence is profit and unless quality improvement programme are economical and beneficial to both internal and external stakeholders, such venture might amount to "drain pipes" on organizational resources. The company must satisfy customers today and survive to satisfy them in the future.
4. Government should make regulations that will promote, sustain and uphold quality practice in Nigerian manufacturing firms.
5. Top management should serve as role models to their employees in issues relating to quality. Quality culture should cascade down from the senior management team. Part of the supportive role of senior management in the practice of TQM should be monitoring, mentoring and encouraging the quality culture.

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