T.C.

ISTANBUL AYDIN UNIVERSITY

INSTITUTE OF SOCIAL SCIENCES

MARKET ANALYSIS AND FORECASTING OF OIL AND GAS (LUBRICANT) MANAGEMENT IN NIGERIA: A CASE STUDY OF GRAND PETROLEUM

Thesis

Helix Osabuohien AIDEYAN

DEPARTMENT OF BUSINESS

BUSINESS MANAGEMENT PROGRAM

THESIS ADVISOR: Yrd. Doç. Dr. NIMA MIRZAEI

APRIL, 2015.

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İSTANBUL AYDIN ÜNİVERSİTESİ
SOSYAL BİLİMLER ENSTİTÜSÜ MÜDÜRLÜĞÜ

Yüksek Lisans Tez Onay Belgesi

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Not: Öğrencinin Tez savunmasında **Başarılı** olması halinde bu form **imzalanacaktır**. Aksi halde geçersizdir.

To my late mother

FOREWARD

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NİJERYA PAZAR ANALİZİ VE PETROL VE GAZ (YAĞ) YÖNETİMİ ANALİZİ :

ZEMİN PETROL ÇALIŞMASI

ÖZET

Bu tez iki ana bölümden oluşur; İlk bölüm yağlayıcı ürünleri üretim analizi ve ikincisi gelecekte üretim hızını tahmin etmek güncel verileri kullanmaktır.

İlk bölümde, Zemin Nijerya Petrölünün farklı ürünleri tanıtıldı. Bundan başkada, üretim süreçleri, ürün özellikleri ve kalite kontrol teknikleri tartışıldı.

Tahmin bölümünde, SPSS yazılımı seçilen beş ürünlerin üretim oranını tahmin etmek için kullanılır . Mümkün sonuçlara baktığımızda üretim ve ürün talebinde bir artış var.

Anahtar Kelimeler: Öngörü; yağ; üretim

MARKET ANALYSIS AND FORECASTING OF OIL AND GAS (LUBRICANT) MANAGEMENT IN NIGERIA:

A CASE STUDY OF GROUND PETROLEUM LIMITED

ABSTRACT

This thesis has two main parts; the first part is the production market analysis of lubricant products and the second one is to use actual data to forecast the future production rate.

In the first section, different products of Ground Petroleum Nigeria Limited are introduced. In addition, production processes, product characteristics and quality control techniques are discussed.

In the forecasting part, SPSS software is used to predict the production rate of selected five products for 2014. Based on the results it is possible to conclude that, there is an increase in production and product demand.

Keywords: Forecasting; lubricant; production.

1. INTRODUCTION

Grand Petroleum Limited is the sole manufacturer of Hi-Speed range of lubricants. These serve automotive, industrial, marine, machinery, and specialty uses. The Hi-Speed range has being approved by the Nigeria Standards Organization as part of the Mandatory Conformity Assessment (MANCAP). The Company is aggressively engaged in the manufacturing and Sale of Lubricating Oils, sole manufacturing and marketing of the Hi-Speed range of lubricants, toll blending arrangements, engine oils, hydraulic oils, automobile fuels and lubrication, industrial fuel and lubrication and other specialty oils. The Company is involved in different energy trading and it is audaciously registering its influence on the downstream sector of the economy of Nigeria and West Africa as well. It has strong international alliances with some of the world's recognized names in the business of petroleum and state of the art facilities like a 30,000 metric tons (MT) tank farm in the Calabar. Export Processing Zone and a 25,000 metric tons (MT) lubricant plant in Lagos Nigeria and among others.

The future market of lubricants in Nigeria look promising especially for the five products considered in this thesis. There will be increase in demand for these products as long as the standard and necessary evolving changes in technologies are kept and adhered to. There seems to be some newly introduced additives like polytetrafluoroethylene (PTFE), which has being scientifically proven to remarkably increase the load bearing of lubricant oils and also has the ability to reduce wear friction. The continuous damage in the advances of technology equipment and increase in demands are the major reasons for the advancement of different additive to meet the present and future needs and also the utilization of their efficiencies.

The production of lubricants oils begins by the formulation of products by the Chemist in order for it's to meet the specific needs of the engines or the machines it's made to serve. These formulations are sent to the production manager who will finally carry out the production according to the specified formulation by the

Chemist. The main consideration during products formulations are the viscosity, pour point, flash point, foam test, total base number , the relative density and the cost of the mineral oils to be use for the productions. The products samples are taken for test in the laboratory by the Chemist and quality assurance officer to make sure it complied with the specified standard of the regulatory bodies before passing the products finally for packaging and distribution to the consumers through their distributives outlet. Most lubricants Companies are managed most at times by professionals' lubricant managers who oversee the entire production processes and also make sure that the products are of standards by reducing cost of production without reducing products qualities.

One of the main goal of this study is forecasting. Forecasting demand which is the process of obtaining correct picture of how the future demand will look like. Survey method can also be used for products that have no historical records but products with historical records, statistical method are used to project the future. Forecasting is directly proportional to mean absolute percentage error because an increase in mean absolute percentage error, will leads to the inaccuracy of any forecasting value. Forecasting methods are determined by the nature of product data, if the data to be forecasted is used to plot graph, the nature of the graph will determines the method to be used. Another determining factor of forecasting method is the used of expert modeler. When the data are computed into SPSS Statistical Software, it automatically shows the forecasting methods that will be more appropriate for it. The accuracy of the forecasted values can be evaluated by using different forecasting error evaluation. The one with the lowest values of error are more appropriate. Forecasting can also be used to evaluate the market analysis of products by using autocorrelation functions and partial autocorrelation functions which gives details of the product production rate, whether it is increasing or decreasing. Because production is directly proportional to demand, an increase in production will signify an increase in demand and decrease in production will also indicates a decrease in demand.

At the beginning of this thesis in Chapter two, we focus on the literature review of different aspects of lubricants production like functional fluids and additives, how to

improve lubricants by the use of polytetrafluoroethylene, oil preparation of suspension with polytetrafluoroethylene, purification of lube oil, new sampling lubricants meet new challenges, synthetics role, oil-based emusions and neat oils for coated steels, prevention of puddling by tight nestling and others and forecasting techniques. The third chapter is market analysis, which help us to choose the most demandable products for future forecasting. In the fourth chapter, it will focus on the detail production process of the selected products and how its functions, its market application, chemical and physical characteristics, level of performance, and quality control. Chapter five will focus on the competitive advantage through product differentiation, cost and response, involving strategy in management through environmental scanning, strategy formulation and implementation and control and evaluation. Chapter six will focus on forecasting and using forecasting to analyze the rate of production of the selected products and market demand. Finally Chapter seven is about results discussion and concluding remarks.

2. LITERATURE REVIEW

2.1 Functional Fluids and Additives

Because of the vapour pressure marginal and the immflammability nature of ionic liquids which are substances of interest in technology for the lubricant. Furthermore, many ionic liquids have very good tribological and rheological characteristics, very good heat and chemical reliability and very good surface tension. The rate of cavitations occurrence in ionic liquids is very low compare to other substances. Corrosion can be inhibited by many ionic liquids. An ionic liquid has the ability to reduce friction between two or more surface in contact and also to reduce the wearing of the surfaces (Dr. Maria T., 2012)

The performance of lubricants oils can be estimated by its viscosity and the rate of sliding. The cation and anion of ionic liquids determines it efficiency. The tribological efficiency of ionic liquids is increase by the based-phosphorium and substituent's of alky group with long chain. But many substituents of long alkyl group reduce the heat resistant of the ionic liquids .For general comparism, hydrophobic ionic liquids have better performance of tribology than hydrophilic ionic liquids. Extreme temperature applications or high vacuum are better usage for ionic liquids. Wear and friction is reduce by lubricating an engine piston ring with a flat in comparism with diesel engine oil (15W40) (Dr. Maria T., 2012).

2.2 Polytetrafluoroethylene

This is a solid lubricant and a good working polymer of engineering. PTFE can remarkably increase the load bearing of lubricant oil and also has the ability to reduce wear and friction. Their performance is directly proportional to their size and concentration, that is, the smaller and the more concentrated it is, the better the performance. Lubricant can be improved in different ways by the addition of different additives like anti-wear, anti-friction, anti-oxidant, anti-corrosion, extreme pressure, detergent and so many others. Continuous damage in the advances of technology equipment and increase in demand are the main reasons for the advancement of different additive to meet the present need and also the utilization of their efficiencies. PTFE substance is considered as the more appropriate to provide these qualities listed above. The nature of PTFE reveals the consequence it has on properties of tribological, especially at the distance of 2-120nanometers (nm) (Elsevier B.V. 2013).

From survey of literature, it was revealed that despite the knowledge that PTFE is very useful solid lubricant, it usefulness has not being fully utilized as lubricant oil additive. It is difficult for some studies of comparative between micro-lubricants and nano-lubricant to reveal the effect of different size of same particles of additive. The important of this comparism become notable if this is done on good composites polymer performance. (Elsevier B.V. 2013)

2.3 Oil Preparation of Suspension with Polytetrafluoroethylene

Polytetrafluoroethylene is of very low energy and it sediment whenever it is mixed with base oil mineral. Stability suspension can be improve through diverse ways such as coagulation prevention by mixtures through repulsion of substance particle; constantly increasing the viscosity of the different phases of sedimentation; solidifying the substance by structure network; using the stirrer for different phase mixture; the disruptor and bath of ultrasonic and the splitting of particles by high-pressure. (Kumar.M. Dubey et al. /Wear 306, 2013, 80-88).

2.4 Purification of Lube Oil

Improper management of waste lubricants oil posed a severe problem to the environment. Nearly all kinds of used oils have the capability to be recycle without any harm, minimizing waste of non-renewable supply and also reduce pollution of the environment. Most often, nearly all the used oil are not properly handled. Many are being emptied directly into waste water, which directly affect the plants that get their treat from waste water. Most at times, it is dumped in the open field which can easily find their way into the aquatic water body , thereby affecting aquatic life and also affect weeds growth , while some dumped theirs directly on the road. Improper disposed of lubricant waste into the eco system can cause hazards to the environment. There is serious law being promulgated worldwide for petroleum waste disposal and sincere effort should be put in place for this practice to be adhered to. Most often, this used lubricants oil can be reused without the addition of additive which can result in conservation and saving of cost. This recycle of used lubricants oil has become a very useful industrial process, using different techniques for the purification of oil (Everest .T, 2005).

The reused of lubricants products are as a result of the fact that petroleum products cannot be destroyed. Lubricants products can only be affected temporally because of contaminants accumulation during use which find their way in as a result of adulteration, and deterioration, which can be remove by reconditioning the products. This product from the waste oil can be made equivalent to the new one after treatment (Everest .T, 2005).

Waste lubricant oil can be treated by use of acid clay method which is being filtered after collection before it is being dehydrated. Polymers, degraded additives, degradation products and asphalts are removed by treating the waste oil with concentrated sulphuric acid. Elevated temperature is used to neutralize the oil formed after removing the sludge formed. Certain impurities are removed by the clay and also bleach the oils. Clay and other solids are removed by the clay slurry. Further processing may be required if the lube oil product contains more than one grade of oil lubricant product. Lubricants oils which have not deteriorated to greater extent are

often treated with adsorbent without using acid. Spent oils, which have not deteriorated to great extent, are often treated with adsorbents without the use of acid. The final products are often subjected to centrifuging, filtering and settling. Transformer and insulating oils are most treated in this way. (Everest .T, 2005).

2.4.1 New stamping lubricants meet new challenges

Galvanic corrosion occurs when zinc coated steels is stamped with water-based lubricants. Suppliers have being enhancing the anticorrosion, lubricity characteristics and residue properties of synthetics lubricants as the demand for synthetics increased. There are many standardized stampers on lubricants synthetics. Remarkable overall savings can be achieved through decreased housekeeping, improvement of quality weld, weld-life tip increased, and safety improvement which can either be achieved through direct or indirect method in the pressroom. The increased use of coated steels, aluminum alloys and use of advanced high-strength steels have being posing serious challenges to stampers in the recent years especially those in the industry of automotive. The strength of some lubricants can be altered beyond limits when these materials are stamped. The uses of water-based lubricants are frequently restricted in Europe and Asia whenever their components are being stamped (Lenick, A., & Raymond E., 1989).

Spring back properties and the hardening work of high-strength steels can make the stampers to increase ram dwell time and advance press tonnage. The consequential increase in heat in combination with friction increase can lead to lubricants stamping break down, decrease in protection boundary and make them non efficient. Additives with extreme pressure like sulfur, chlorine and phosphorus can salvage these situations. These additives react with metal to produce metallic salts with low strength shear when it is being activated by heat (Lenick, A., & Raymond E., 1989).

Large quantity of sulfur and chlorine are most often found in fats, olefin and paraffin. These carriers do not mix well in water-based synthetics as additives and are soluble in oil. Synthetic lubricants can combine with either sulfur or chlorine at low level in the form of sulfurized ester or chlorinated or fatty acids which are made soluble in water and are neutralized. Sulfur and chlorine are degraded to produce trace acid in the presence of humidity and heat, which are metal corrosive. A water insoluble

acids scavenger often added to the based-oil formulas to consume the acid and also act as inhibitors. If the sulfurized or chlorinated lubricants synthetic are not removed, the residue can becomes corrosive on parts subsequently leads to staining and corrosion. Stamping zinc-coated steels with water-based stamping can lead to galvanic corrosion. Phosphate esters water-soluble usually contains extreme pressure additive in lubricants additive. In advance high-strength steels metal forming operations, protection and galling may not be provided by phosphorous (Lenick, A., & Raymond E., 1989).

More effective or emulsifiable based-oil lubricants are being sort for by stampers faced with the challenges of carrying out severe forming operations on higher-strength steels. Significantly enhanced protection levels are provided by these products which contain high levels of phosphorus, sulfur or chlorine compare to the more often used traditional synthetics. There are new technologies that help to reduce problems associated with emulsifying agents of petroleum which are used in combination with neat and emulsifiable oils to increase cleaning properties in the wash operations after process. Quality issues related to welding operations or smoke reduction are some of the principal function of some water emulsifier's lubricants which contains minimal quantity of petroleum. Renewable oils that are derived from seed plants and vegetables can be replaced by some lubricants. Many of the benefits of both synthetic and oil lubricants are provided by these neo-synthetic products (Lenick, A., & Raymond E., 1989).

There are other benefits provided that are useful when forming high-strength steels by oils apart from the high levels of effective extreme pressure additives that can be blended into them. Oils can provide superior strength of firm in addition to the neo-synthetic lubricants designed for this type of work. All these quality helps the lubricants to withstand the thinning effect which is due to excess heat resulting from forming or operations of ironing tight-tolerance. Consistent boundary protection that can minimized the need for extreme pressure additives forming stages are provided by the added strength of film (Lenick, A., & Raymond E., 1989).

2.5 Synthetics Role

The cleanest choice is still being represented by synthetics, which formed significant lubricant alternative for several applications. Synthetics either wet or sheet are preferred on steel oiled than emulsions. Water-based synthetic lubricants may need further application within multistation dies to compensate for their decreased strength film and carry –through when compare to oils and emulsions. Recently formulated synthetics contain phosphorous as an additive of extreme pressure and additives of polymer to increase their ability throughout the process of forming. These abilities increase their performance in the press and also to resist corrosion on the products of uncoated steel (Nadkarni, R. A., 1991).

2.6 Oil-Based Emulsions and Neat Oils for Coated Steels

Different method of lubricant stamping are needed for zinc-coated steels .Steel are protected by zinc in two different ways: as a sacrificial anode to for the iron and also to physically prevent moisture and oxygen which are the basic agent of rust and corrosion. Neat oils provide the best anti-corrosive characteristics due to its impervious to moisture and also oils create low conductivity for stamping these steels. Other water-soluble with additives and emulsifiers that are also next-best of based-oil emulsions are emulsifiers with polar which has an affinity for oil and water. In practice, droplets of oil microscopic are scattered and stabilized in water. Oily films that prevent oxidation are left behind after evaporation of water as a residue on parts. It is of great significant that the lubricant does not contain high levels of additives alkaline when it is use for multi-metal substrates (Wu, Y.Y., Tsui, W.C., & Liu, T.C., 2007).

Additives that can dissolve in water are solutions formed by synthetic lubricants. Most of its residue does not create protective substrate when in vapor phase. For protection of ferrous alloys against corrosion, these products mainly rely on amine salts. Zinc oxide or white rust formation is speed up by the conductivity that promotes galvanic reaction, which is due to the alkalinity of these salts. The oxidizing effect can be exacerbated from the presence of higher coatings film if the residue is tenacious, in the case with many synthetics formulated for high-strength

steels. Severe corrosion can occur in the presence of alkaline salts and water which can create galvanic reaction where parts are in contact. Iron is present in the zinc substrate in galvanized steel. This steel can be makes vulnerable to galvanic reaction with alloy-like substrate. Finally the soap complexes in synthetics react with zinc oxide to form zinc insoluble stearate that can bonds with the substrate. When this happens, it is hard to physically remove the corrosion with pads of Scotch Brite. Pitting or staining to the base metal remains if removed (Wu, Y.Y., Tsui, W.C., & Liu, T.C., 2007). .

2.7 Prevention of Puddling by Tight Nestling, And Others

Water-miscible lubricants are used by North America according to history. This can be remarkably minimized by using water to diluting these products. Irrespective of the source of the oil, most of these emulsions provide remarkable anti-corrosion protection. These properties can be improved by stacking parts in a way that it can avoids tight nestling, or puddings of lubricants. Most lubricants synthetic have decreased alkalinity, and may be formulated with low wetting properties so that lubricants beads off the part. Conductive films exposures are reduced by these conditions and it also improve compatibility with steel zinc-coated. The primary anti-corrosion characteristics on ferrous metal are provided by alkalinity in synthetic lubricants. Low wetting properties may need excessive reapplication or may be deficient of the presence of film needed for advance stampings. Only few lubricants synthetic can provide barriers of vapor or may provide monitored zinc passivation. These products can decrease corrosion or the risk, but none of them have better characteristics than some emulsions or neat oils. (Paul Bosler, 2013).

2.8 Forecasting

The major cause of variation in economic and business time series in terms of growth rate measure either monthly or quarterly is mainly due to seasonal changes. For us to make references on the cycles of business nature and growth in long run, the normal approach is to eliminate the component of seasonal series through differencing in seasonal. Because seasonal methods convey some information on the agents of the economic behavior, there will be need for us to study the seasonal methods on their

own. Most at times, data that are adjusted seasonally are very useful; it can be recommended at times (Fildes, R., Armstrong, S.J., 2006)

Seasonal adjusted methods can cause serious data distortion, to the extent that the cycles of business and nonlinearities are also affected. This research was done to evaluate how seasonality explicitly relate to forecasting models. Series of time seasonality is made up of two models which are root unit seasonality and periodic models. They both provide solutions to the characteristic of many data of economic, that is sequential seasonal variation and the one that change over time which is refer to as seasonality trends. When seasonality is dependent on trend, this series of time describe periodic unit roots. When the lag structures are allowed to take different seasons, this can lead to seasonal variation which is also one of the assumptions in periodic models (Fildes, R., Armstrong, S.J., 2006)

Performance of forecasting is poor when applied to seasonal unit roots model. This poor performance may be as a result of lack of capacity of some unit tests roots. There is variation in seasonal factors due to frequency of the evolving seasonal models, represented by the processes of auto regression. The coefficient that is attached to the seasonal factors can be isolated by data simple transformation according to Pagan and Hylleberg. Neglected mean of seasonality shifts can remarkably affect the performance of forecasting in the processes of univariate auto regression. When there are restrictions of parameter in a bivariate vector of seasonal auto regression, better forecasts can be achieved, more remarkable performance can emerge only for longer horizons forecasting. Important information can be lost when data that is adjusted is being used (Fildes, R., Armstrong, S.J., 2006)

2.9 Techniques for Forecasting Demand

Short term demand estimation uses survey method while statistical methods are more appropriate for forecasting in the long term. Any of the two methods can be used to forecast for an existing products; but for a new products that lack historical data, only survey methods will be appropriate. Survey methods involve proper investigation about the intentions of the consumers, experts' opinions, managerial plans survey, and the markets. Forecast for demands are made by the data collected for analysis. Survey of consumers 'is done by collecting information from the potentials

consumers through direct interview to know their willingness to buy a particular product at different prices rate. Consumers' survey can either be end use method or complete enumeration sample survey. It is complete enumeration survey when the product consumers of a product are contacted to know their plans of buying the production concern for the period of forecast. The sales forecast is gotten by adding the likely demand of all the consumers. This method is free from bias because its uses direct information. This method is only applied to product that its consumers are located within certain region. It cannot be applied when the consumer of the product are scattered dispersedly. The estimation obtained through this method are not very reliable as consumers may not think out in advance what they may likely do during the survey situations. The question may not be answer correctly by the consumer as they may not be fully aware of their exact demand. The market conditions may also affect their answers and make it biased, and future unforeseen circumstances may also affect their answer to the questionnaire (Singh S.P. 2014).

Appropriate accuracy of survey cannot always forecast consumer demand even when it is properly designed. Inadequate information by the consumer can affect their decision if the product will be purchase by them. At times, respondents may give inaccurate answer because they may be short of time and may not give much time to think before providing an answer. Most at times, the answer supplied by the respondent may be affected because most of them tried to get the attention of the person administering the questions. Because of these stated reasons above, forecastings hardly depend solely on consumer's surveys results. For this, decision making must not solely depend on these data but as supplementary sources (Singh S.P. 2014)

Method of end use forecasting demand make use of both practical values and theoretical to a great extent. A survey is carried out in firms or in every industries making use of the product sales to forecast under the condition based on survey demand of the industries by using the product as a product intermediate. The final product is produced by using the demand for the final product as the end user demand. This technique of forecast demand is made up of four estimation stages: Information of the product in question potential use is obtained. Find out appropriate technique regarding the regular consumption and use of the product under study. The

output of different industries must be known and use as reference year and most likely occurrence in other activities of the economy that uses the product and their targets output. Lastly, constituent of the product forecast is to be in respect to demand (Singh S.P. 2014).

2.10 Forecasting Methods for Supply and Demand Chain Management.

Decreasing inventory is an important component of cost control in management of supply chain. There are many ways to minimize inventory, and one of the major ones is forecasting demand which is the process of obtaining correct picture of how the future demand will look like. Forecasting demand is often carried out on each stock item stock keeping unit (SKU) during inventory control operations. Customer service remains above acceptable levels for each stock keeping unit by using key performance indicators (PKIs). A good example of KPIs is order fill and case fills. Costs of inventory can increase when there is extra safety stock, which can lead to conciliations of some inventory at the future stages of the lifecycle of the product. (Skylergreene Hubpages, 2012).

Planning demand is one of the foremost ways of reducing safety stock by supply chain managers. The primary goal in the supply chain is increasing accuracy in forecasting. Correct forecast can be obtained by using Mean Absolute Percent Error (MAPE) formula. Correct forecast is a method that is indirectly proportional to MAPE, that is, as correct forecast increases, MAPE decreases. The aim of forecasting demand is to monitor inventory, hence forecasting demand are clearly seen in daily management inventory. In inventory cycle ordering policies, business is divided into two different classes: some are concern with review that is continuous while others are concern with periodic review (Skylergreene Hubpages, 2012).

Whenever a fixed quantity of stock drops below expectation known as the point of reorder, inventory is done on daily basis by using continuous reviews. A good example is a trucker: which normally uses his semi's fuel tank with certain amount of diesel whenever there is a drop in his fuel below certain level. Periodic review uses different method. Inventory is review at regular time interval and enough quantities of stock is being order in order to retained level that is predetermined. There is a change in order quantity in relation to the stock amount used since the

latest date review, which is also called points of review. . (Skylergreene Hubpages, 2012).

Inventory levels are lower in more frequent order by continuous review, while periodic review increases inventory in orders that is less frequent. There are variations across organizations and industries in respect to particular method to be used, the item ABC analysis is frequently of importance in deciding which approach to use. Continuous review will be more appropriate for fast moving items A, while periodic review will be more appropriate for slower moving items B and C (Skylergreene Hubpages, 2012).

The final point that needs control in forecasting demand is the economic order quantity. There of often a relationship between inventory level and order of frequency. When inventory is kept at a low levels and the frequency orders is made available, it will decreases obsolescence risk, waste as a result of spoilage when food items are involve. Frequent orders can increase costs of transportation, a good example is that, it's is less expensive to shipped one hundred pound bag of salt than it is to have one thousand and one pound bags shipped. Inventory levels is increase with periodic review, decrease transportation costs often outweighed higher inventory holding costs. (Skylergreene Hubpages, 2012).

2.11 Synopsis on Decomposition and Combination

The accuracy of forecasting can be remarkably improved through the use of different and combination of multiple individual forecasts (Clemen 1989). This conclusion has being maintained in many survey and papers that followed after. It has been found in different competitions of forecasting that single forecasting method cannot consistently perform well across forecasting horizons and all time series (Fildes, Hibon. Makridakis, & Meade, 1998). Misspecification bias in the individual models can be reduced and accuracy prediction can be increase through forecasts combination. The strengths and limitations of the different forecasting methods are always the source of the increase in accuracy. Values are added to forecast combinations when the different forecasting methods are misspecified differently (Diebold and Lopez 1996).

The worst forecasting method should be avoided by practitioner when combining different forecasting method for that specific point in time, and therefore makes the evaluations across all forecasting horizons (Armstrong et al., 1983 & Hyndman 2006). Individual models respond differently to changes in structural data, and due to this reason, forecasts combinations from different models with different degrees of adaptability to changes in structure will perform better than forecasts from individual models (Timmermann, 2006).

2. 12 Overview of Decomposition

Trend seasonality and cyclical patterns were isolated and identified by the use of decomposition techniques which was initiated by Persons in 1919. This method has been used since then by different institutions and governments to analyzed data of economic in order to produce official statistics. The most effective methods in the literature are moving average techniques based, like X-11 ARIMA/88 (Dagum, 1988), Seasonal Adjustment at Bell Laboratories (SABL) (Cleveland, Devlin, & Terpenning, 1981), and Seasonal –Trend decomposition based on Loess smoothing (STL) (Cleveland, Cleveland, McRae, & Terpenning, 1990), multiple regressions based techniques, and methods based on time series ARIMA modeling (Bell & Hillmer, 1984). There are also different ways of extracting the component of the trend from seasonally adjusted series, which includes the parametric methods that uses the work of pivotal of Kalman, which has space of state representations in addition, and models based on the Wiener-kolmogorov theory (West & Harrison, 1989; Kitagawa & Gersch, 1996). There also exist in addition to the two stated models above, semiparametric methods based on smoothing spine and models that is mixed, nonparametric methods that uses filters of band-pass and methods of wavelet, kernel estimation methods and local polynomial modeling (Fan & Gijbels, 1996)

Decomposition methods were not initially developed to serve as tools for prediction, the brain behind their application to forecasting is very interesting. Isolating is the process of disaggregating the different components in the data and predicting each one individually, strong and persistent element are used to governed the smaller parts of the overall process, thus removing from them any noise and variability that is not consistent. Due to their more deterministic nature, these processes are easily extrapolated. There is likelihood to obtain more accurate forecasts for the individual

components than one is likely to obtain in the global series. This becomes significant in the case of time series due to it high degrees of noise forecasting (International Journal of Forecasting 27, 2011).

Classical decomposition techniques is the extrapolation of the components of the individual, obtained by the averaging techniques application (Damrongkulkamjorn &Churueang, 2005). The remaining component after the elimination of any cyclical, seasonal variations and trend is always assumed to be variable of randomness with a variance that is constant, and is thereby removed from the process of the forecasting (International Journal of Forecasting 27, 2011)

2. 13 The Decomposition Procedure

The additive decomposition of the global time series uses the trend and the seasonal decomposition. The STL additives decomposition performs of the data through applications of sequence of the Loess smoother, which make use of the locally weighted polynomial regressions at different point in the set of data, with the point being estimated closest to the values of the explanatory variables. The STL decomposition procedure has advantage over the other decomposition techniques due to its extensive applications to a larger number of the time series and also its strong resilience to outliers in the data, which leads to large component subseries. The results from neighboring time points are treated as independent; it does not impose a particular form on the seasonal pattern. It is also capable of handling seasonal time series with any value of season frequency greater than one. It is therefore applicable to a wide range of time series with several characteristics, and to a frequencies sampling of diverse set. It does not require any mathematical modeling for it implementation, it is purely based on numerical methods. This is the main reason why this method is very easy to implement for a large number of time series. This also suggest that a large number of time series can be applied without requiring time to be invested in modeling the properties of each of the time series that is involved in the analysis (International Journal of Forecasting 27 , 2011).

An iterated cycle of trend is used to carry out the procedure and then seasonal component are updating from the resulting sub-series. The robustness weights are

formed at every iteration based on the estimated irregular component; outlying observations in subsequent calculations are down-weight by the former. Two recursive procedures are what made up the iterated cycle, the inner and the outer loops. Seasonal smoothing in the inner loop are applies which updated the seasonal component, followed by smoothing trend that updates the component trend. Larger values are identified as extreme values, and a weight is being calculated, which includes the outer loop. The weights is used to down-weight the effect of extreme values by the further iterations of the inner loop, which is identified in the previous iteration of the outer loop (Cleveland et al. 1990).

2.14 Extrapolating the Error Component

The error component obtained from the decomposition procedure application is always removed from the procedure of the forecasting. The recent application believed that predictive information in its sub-series, are contains in the error component, discarding it totally could have a negative effect on the accuracy of the estimation. According to the literature review, error component accounts for approximately 25% of the predictability in the series. The error component information may be contained in the form of either conditional dependence on the other decomposed features of the original time series or residual autocorrelation in its series. The error component is also included in the global series of the estimation, by means of a combination technique which is based on the extraction of the error component from the deseasonalised series and detrended extrapolated. We can get these values by adding together the error component, the trend, the seasonality and error respectively (International Journal of Forecasting 27, 2011).

2.15 Sales Forecasting

This is a forecasting system that uses history of sales data to create the statistical forecast for the future purposes. The sales history to run this statistical forecast will either be demand history or shipment history. For instance, if a customer placed an order for 20,000 units, in June, but you were unable to ship the product not until October. If the Company system post the history as October, then the forecasting system use 0 units in June and 20,000 units in October to get the forecast statistically. The right procedure is to post the 20,000 units as June history for sales forecasting reasons. Demand data can still be altered by non-recurring or one-time orders that can result to inaccurate sales statistical forecasts. Demand data that get into the

demand history record include promotions sales that will not be repeated in the same season in the coming year, increase in demand as a result of special order, customer one-time orders, using specific –customer demand that are too small to be significant statistically. Demand history values that are outside of a statistical confidence interval are automatically filtered by some systems. Data scrubbing when included in the process of regular demand planning can help to eliminate bad data. In order to make adjustments to the sales forecast, the sales forecast have to travels from the forecast planner to the sales team to and the product management team. Most often, planner's base forecast adjustment on a feeling instead of exact knowledge of the activity of customer. Danger should be signified if you surpass more than 10 to 20 percent of the forecasts statistical system's (Fred Tolbert, 2012)

Forecast adjustment can be done by using the system's statistical forecast as the starting point. Statistical forecast can only be adjusted if you know something about the future that is not reflected in the demand history. Otherwise, any attempt to make it look attractive should be resisted. The unusual events that can make some sales not to be reflected in the past sales history include promotions, item substitution, new item introductions, and item replacements. There should be often review between actual sales performance and forecast to ensure that the availability of right levels of inventory to meet the special event needs. The best estimate of customer demand should be the sales forecast of the company's. It should not be adjust in an attempt to manipulate inventory levels and fill rates by the executives. Services level and inventory are best managed as part of the inventory replenishment and of the supply planning. Root cause analysis should be perform on items with high forecast errors to know the actual reasons for the error forecast (Fred Tolbert, 2012)

Whenever the actual demand is greater than the forecasted, safety stock inventory helps to cover for these periods. This is often done by using the math of the traditional calculation safety stock. This traditional safety stock calculation based on error of forecast does not differentiate between periods when the forecast is too high or when it is too low. If the result of the forecast error is greater than the actual, new statistical modeling techniques can be used to eliminate the bias for that periods or an inventory planning strategy based on safety time can also be used (Fred Tolbert, 2012).

3. MARKET ANALYSIS

The market analysis for this thesis was done based on the data made available by the Company of our case study. According to their sales and demand record, demand is directly proportional to production. This will be further analyze using autocorrelation functions and partial autocorrelation functions to further analyze the market demand whether is increasing or decreasing in relation to production rate. The market analysis done revealed the rate of demand of the different products produced by the company and also the rate of production as the Company often produced according to the proportionality of customer demand. This analysis was also responsible for the choice of five products selected for analysis and discussion because they have the highest demand when compare with other products.

The following findings were discovered by the market analysis when the Company data was used. Product 1 was having 5.2% demand and production, product 2 was having 9.4% demand and production, product 3 was having 8.3% of demand and production, product 4 was having 35% of demand and production, and product 5 was having 28.2% of demand and production. The rest products result are as follows: HI-Therm 32 was 0.06%, Turbine Oil T46 was 2.08% , Extreme Pressure 2 and 3 Grease was 1.02%, Heavy Duty Grease was 0.01%, Transformer Oil was 2.04%, Transol DX 11D was 0.9%, Moto 2T was 0.162%, Gamma XP 100, 150, 220,320,460, and 680 was 3.5%, Compol S46 was 0.012%, Compol 68 was 0.034%, Compressor ISO VG150 was 0.022%, Bearing and Circulating Oil was 1.736% and other Specialty Oil was 2.324%

This analysis was what influences the choice of the five products that was considered for both market analysis and forecasting of this thesis. From the analysis made, it was quiet clear that demand is directly proportional to rate of production. Since

market is the greatest allocation of resources, these five products are expected to gain more market shares than other products in the future market and also in production.

3.1 World Lubricant Demand-Analysis by Product

Lubricant suppliers need to keep abreast of technological advances in motor vehicle design in order to meet the evolving performance requirements of end users. Technological advances in automotive engineering have led motor vehicle manufacturers to demand better performing lubricants capable of delivering the high performance and durability demanded by consumers while simultaneously reducing the environmental impact of emissions and used lubricants. Variations in motor vehicle design throughout the world require lubricant suppliers to ensure that their products are able to perform adequately in operating conditions of wide range (Chevron Oronite, Lagos, Nigeria 2008).

For rapidly advancing economies in China and India, with combination with more subdued growth in some of the region's more developed economies, will support increases in lubricant consumption. The Asia/Pacific region's rapidly growing motor vehicle fleet, large population base and strongly expanding manufacturing sector provide significant opportunities for growth in the lubricant market. In Latin America, Eastern Europe and the Africa/ Mideast region, lubricant demand will grow slightly slower than in the Asia/Pacific region. Within Eastern Europe, lubricant demand will continue to recover from the losses suffered during the early 1990s, supported by outside investment in the region's manufacturing sector and strong increases in the number of motor vehicles in use. Lubricant demand in the Africa/Mideast region will be driven by the ongoing industrialization of many of the countries in the region, although the motor vehicle aftermarket will be somewhat restrained by a lengthening of drain intervals. In Latin America, demand advances will be aided by recovering regional economies, increasing vehicle usage and an upsurge in overall manufacturing and industrial activity(Chevron Oronite, Lagos, Nigeria 2008)..

By volume, the mature lubricant markets of Western Europe and North America are fairly stagnant. Those countries on these regions generally possess highly developed economies, large motor vehicle fleets and fairly stable populations. Despite the lack

of volume growth, significant opportunities exist for specialty lubricants for niche markets. The countries in these regions have some of the most stringent environmental and health regulations in the world, and there is a growing demand for environmentally friendly products. Additionally, these technologically advanced countries have a strong demand for high-performance, long-lasting products. Despite flat volume demand, these regions will continue to offer numerous opportunities for companies marketing high-value lubricants, particularly for niche consumer applications. Engine oils will remain the most dominant lubricant product. Process oils will be the fastest growing lubricant product through the forecast period, as their consumable nature makes them less vulnerable to factors such as fluid recycling and lengthened drain intervals. Demand for hydraulic and metalworking fluids and other lubricants will continue to expand, as these products are important in a wide variety of industrial and other applications. Lubricant consumption will be restrained somewhat by the lengthening drain intervals and fluid management efforts made possible by the increasing availability of higher quality products (Chevron Oronite, Lagos, Nigeria 2008).

4. PRODUCTION PROCESS AND PRODUCT

4.1 Products and Quality Control

Lubrication is the addition of a substance into parts of surfaces in motion that are in contact to decrease friction and heat emition. Lubricators are mechanical devices to supply lubricants. The oil reservoir supply the bearing journal which is being immersed, this oil pool helps to reduce heat that is generated as a result of surfaces in contact. A device that help to split the oil is used in gears, bearings, or any parts involved in motion inserted into the pool of oil which is splinted through different route. Reservoir, pump and tubes are usually found in the centralized oiling systems by which oil is distributed, and the viscosity of the lubricants can be change by the introduction or either heaters or coolers. Grand Petroleum is aggressively engaged in the following:

- Manufacturing and Sale of Lubricating Oils.
- Sole Manufacturing and Marketing of the Hi-Speed range of lubricants.
- Toll blending Arrangements.
- Engine Oils.
- Hydraulic Oils.
- Automobile Fuels & Lubrication.
- Industrial Fuel & Lubrication.
- Other Specialty Oils.

4.2 Professionals Management of Lubrication

Most companies around the globe is in urgent need of professionals management of lubrication. The numerous production assets that are essential in different operations and stages of industrial production are owns by these companies. The dependence and costs of operation of these machines are majorly relying on the effectiveness and the quality of lubrication and also the knowledge of the professionals' management

of lubrication. The professionals' management of lubrication is to make sure the equipment functions properly and also to reduce costs of production. The strength and profitability of the company lies majorly on the professionals' management lubrication position which is also the engine house of the company. Every company sponsors the professionals' management lubrication from the gained savings from efficiencies increased from operations maintenance and productivity asset (Machinery Lubrication, 11/2002).

4.3 Job Description

Professionals management of lubrication (PML) are charged with the duties of maintenance of lubrication functions which includes analysis of oil, selection of lubricant, practices of lubrication, storage and handling of lubricant and control of contamination. The PML give order to the engineer of plant or superintendent of maintenance and the next line reports are the technicians of lubrication and the analysts. The least experience in dependence of machinery and lubrication is five years. An analysis of lubricant with a four year engineering degree or it equivalent is more acceptable with the necessary certification. The responsibilities of the lubrication management professional is to ensured proper selection and specifications of performance of every lubricants for different machine, supported by the engineer of lubrication, managers of equipment and suppliers of lubricants, start guidelines of oil and grease, make sure lubricants are formulated to reduce costs, control wear and save energy, ensure standard quality, ensure accident is reduce to the barest minimum and also consider factors of the environment. They also make sure the lubricants can circulate well in the selected machine, work on fluids and environment, communicate standard for all products of lubricants, carry out lubricant strategy consolidation and also participates in selecting suppliers of lubricants. The lubrication management professional communicate the stages in line with set out standard for lubrication, which are as follows;

- Cleaning and flushing of tank or sump,
- Condition for Oil removal when due,
- Procedures for top-up,
- Grease and calibration of gun,
- Practices of handling and storage,

- Inspections of machine,
- Control of contamination,
- Inspection of filter used and changes, and
- Operation of grease gun (Machinery Lubrication, 11/2002).

4.4 Lubrication

Lubrication is the addition of a substance into parts of surfaces in motion that are in contact to decrease friction and heat emition. There are different types of lubricants, which can be in form of grease, oil, liquid, semisolid, brittle, or solid that allowed free motion of mechanical devices and avoid damage by rubbing seizing of other parts through inequality expansion as a result of heat .Lubricant can also performed the role of coolant in machines to prevent heat due to impaired parts Their classification is depend on their source, which can be gotten from animal, vegetable and mineral. Lubricant .Before the late 19^{th}, lubricant was gotten from animal fats and oils, and vegetable oil. Presently, most of the lubricants are obtained from mineral oils such as petroleum and shale oil which can be obtained without decomposition. Some lubricants like silicones can be synthesized, which is very useful for high temperature.

4.4.1 Lubricants application

The output of the machine is largely determined by the way application and the type of lubricant used. Before now, hands were used to apply lubricants, but advance machinery needs precise ways that can be controlled exactly. Different machinery needs different ways of lubrication, and they different from one another and different ways must be used for different parts. Different parts of an automobile needs different way of lubrication to keep it functioning at it maximum performance. The chassis needs grease to lubricate it, and the engine crankcase is being lubricated by engine oil to reduce friction and wear and tear and heat dissipation.

When stamping zinc-coated steel, stampers can chose from a number of options of lubricants to prevent corrosion. European and Asian markets are dominated by neat-oil stamping lubricants. The need to eradicate corrosion, most especially on steel coated with zinc is the driven trend toward oil. Some of the hot melts and thixotropic preludes' are now becoming more readily available. Coils or blanks migration are

prevented by these products which contain levels of micro wax. The coils do not suck oil and the coating is uniformly light. Lubricant applications at the press are not require by these high-lubricity coatings. Compatible oils also referred to as spot lubricants can be applied strategically for the protection of ancillary in more challenging operations.

4.4.2 The process of manufacturing

Fraction tower of good performance is built with good quality steels that have the ability to prevent corrosion that is present in the corrosive constituents of oils crude; which has different stages of trays that collect the condensate. The various fractions cool as the vapors rise up inside the tower, condensation take place and it return to it liquid form which is determined by their different boiling points respectively. The natural gas has the lowest boiling point, after which it is followed by gasoline, kerosene, oil fuel, based oil and tars finally. Tanker ship or pipeline is used for the transportation of crude oil to the refinery. Water and oil contaminants like rock and sand that may be retain in it are removed through sedimentation at the refinery. The oil crude is pumped into holding large tanks where oil and water are being separated and the contaminants are settled out of the oil in the process (Periodicals.B.K., 1993).

The lube oil collected in the two fractionating towers after removing the unwanted compounds is further processed by passing it through different ultrafine filters to finally take away any impurities of any kind. Six-Carbon rings like the aromatics hydrocarbons which affect the lube oils viscosity are removed by solvent extraction process. Because aromatics hydrocarbon are more soluble in the solvent more than the lube oil fraction, this simple reason made solvent extraction possible. The aromatics dissolved when lube oil is treated with the solvent and after removing the solvent, the aromatics is also removed from it. After all these processes, the based oil is mixed with specific additives to give it the required physical characteristics. The flash point, color, fire points, viscosity, and specific gravity of the lube oil are ascertain through different quality control tests. Certified oil by the laboratory scientist in accordance with set out standard are packaged for distribution and sales.

Additive like lead that enable lubricant oil to withstand high pressure surface of mating and very low temperature and way of refining are the determent factors of the specific gravity of oil. The brand or grade is being indicated by the uniformity of it color. The temperature at which the lubricant oil produces enough flammable vapors is called the flash point. The temperature at which the lubricant oil starts to burn when exposed to fire is called the fire point. The classification of engine oil is done by it viscosity and also it strength according to the set out standard by Society of Automotive Engineers (SAE). The characteristics strength of lubricant oil includes anti-wear, ability to form sludge of oil deposit and thickening of oil (Periodicals.B.K., 1993).

Because supplies of petroleum product are both nonrenewable and finite, this will make the future of lubricant oil limited. Out of the total petroleum reserves available, one third has being used. Synthetic mineral oils will be relevant in the future as the natural reserves are drastically reducing. The dwindling reduction in petroleum will not only affect lubricant oils but also other by product from crude oil refining (Periodicals.B.K., 1993).

4.4.3 Handling and storage of lubricant

Lubricants with high ability are carefully selected during products formulation with respect to additives and also the base oil used for the formulation in order to suit the equipment requirements that it is being use for. This balance is disrupted whenever a particular lubricant product is mixed with other. If this is not notice on time, it can lead to shortage of life span and mechanical damage of equipment. Recently formulated lubricants products are well formulated to meet present need of advance equipment requirement. Your business and equipment can be exposed to great danger whenever the lubricants are adulterated. We should not mixed any lubricants product when we are not sure of the resultant outcome or when there is not proper verification of the end product by the quality control officer in charge of quality. This can lead to reduction in the viscosity of the products and also have a negative effect on it chemical characteristics. When lubricants with the same grades of API

passenger synthetic motor oil of car and engine oil of mineral based-oil are mixed, this will not damage the engine but it will reduce its efficiency. Whenever hydraulic oil is added to typical turbine oil, this can lead to great damage, which can lead to deposit formation, decrease the anti-wear and blockage of the filters.

4.5 Important of Formulation

Formulation is a process of combining different mineral based-oil with the needed additives and color when necessary. In other to formulate a product, one must have knowledge of how different product functions. The based-oil are selected during lubricants formulation with respect to their oxidation stability, viscosity, resistance to fire and its ability to mixed with water in the product. Their major function is to remove debris and heat from the engine, reduce wear and tear, and also to minimize contaminants to the lowest minimum. During products formulation of lubricants, these functions are put into consideration. Their cost is also put into consideration apart from their chemical characteristics, and their ability to mixed with the additives necessary for the function of the products. Whenever synthetic mineral oil is being used, it must be made in such a way that it can produce the desired chemical properties of the final lubricants oil. Esters phosphate, polyalphasolefin, esters from organic products, and glycols are a good examples of synthetic lubricants used to meet specific needs in the lubricants industries. These are often used when their chemical or performance is more than their cost.

Proper precaution must be taken not to mixed lubricants products from synthetic with that made from mineral based oil, even when they are formulated for the same application, only polyalphasolefin (PAO) and ester based products are excepted from this limitations. If this is not adhere to the products may form deposits due incompatibility of the additives which may affect the seal. The final products performance qualities can be determine by the additives. Additives choice and balance differentiate hydraulic oil from turbine oil, because additives can change the physical characteristics of the final products of lubricants. Some can change the chemical characteristics or the smell.

4.6 Incompatibility of Lubricant

Incompatibility of Lubricant Many lubricants can be mixed together reason due to difference in chemistry of additives and its reactions. Whenever these oils are mixed together, it will form deposits on some machine parts surfaces. If this incompatibility happens in a hydraulic fluid, it can leads to shortage of supply, malfunction of the valve and wear increase. Another form of incompatibility of lubricant that is invisible that is more damaging is the one that happens without any remarkable change. The damage can only be notice after it usage and when the equipment this mixture is used for now failed to perform to it optimum capacity. A good example is when there is brake chatter and farm equipment failure due to adulteration in fluid of tractor or hydraulic. High ability needs carefully balanced anti-wear and frictional characteristics in the final product can be damage when there is a mixture of lubricant.

Rubber seals of synthetic lubricant can also be affected by lubricant incompatibility. The formulation of lubricants are done in such way that it will be neutral or made to swell slightly. Chemical degeneration can occur when there is incorrect chemical lubricants combination. Fluorocarbon seals can be attack by dispersants formulated engine oils. Ester base stocks can cause seals to inappropriately when there are contaminants of lubricants. Silicone seals good performance can be reduce by oils gear extreme pressure. Chemical problem in lubricants are mainly due to incompatibility. Two different oils made by the same manufacturer can be incompatible irrespective of the source. The chemical reaction between the basic components of one lubricant with an acidic constituent of oil can result in the formation of solids that is harmful, which can be made more severe by heat and water.

A lubricant that has inhibitors to rust of acid is not compatible with lubricants that have inhibitors to rust of base. Whenever these two are mixed together, it will result in a solid insoluble substance that is grease like in nature especially when water is present in the mixture. The effect of this will be negative impact on the demulsibility, inactive filtration of the filters and also formation of deposit which can impair the efficiency of the engine. Lubricants performance can be enhance by proper classification as acidic or basic. Lubricants manufacturers can use different

formulation with different additives of different chemical properties to achieve the same function; in this case caution must be warranted. High concentrated lubricants with dispersant or detergents must never be mixed with high performance lubricants with emulsifiers. Oil with good emulsion properties can dislodge water shedding characteristics with effective demulsible lubricant. Railroad engine oil formulated with low ash gas, non-zinc anti-wear and antioxidant additives when contaminated with zinc additives lubricant can cause engine damage.

4.7 Different Ways to Avoid Mixtures of Lubricant

Lubricant mixing can happens without any prove of carelessness. The source of diesel engine oil of heavy duty was changed by a trucking firm which was upgraded to the recent API category performance. The colour of the oil turned black after a few thousand miles, which was indicated by signs monitoring condition. Investigation by the engineer revealed that the changed oil had strong dispersant that interacted with the engine deposits which resulted from the use of the first lubricant. Solution to this problem was to change oil at a shorter distance interval until the engines is clean from this contaminant, which the trucking firm realized the new oil benefits (Machinery Lubrication, Amold Shugaman, 2001).

Lubricants oils accidental mixing can be reduced to the lowest level by good practices, labeling of different containers, monitoring of manifests for oil shipment against products to be delivered, proper monitoring of the bulk oil to be upload, and separating oils that are not compatible. Different funnels should be used for different products and different containers should be used to transfer different products. A good example is using different equipment to transfer engine oil and turbine oils, but we can use same lubricant equipment to handle different oils. About 0.2% (percent) mixture of engine oil and turbine oil can result in emulsion of oil. We must get assurance that the new product will be compatible with the one before we can change our suppliers or accept a new product. (Machinery Lubrication, Amold Shugaman, 2001)

4.8 Super Petrol Extra 20W/50 and Market Usefulness

This product can be used for different engine as lubricant oil other than as specified in the automotive technology of lubricant. It has the ability to meet the need of

different manufacturers of motor used as cars for carrying passengers and also for vehicles that operate under heavy services mode which also has the ability to reduce pollution. This product was original intended for engines that uses petrol with good ability and it can also serve in an engine that uses diesel, which was confirmed by the America Petroleum Institute (API). Military –L-2104D and United State Military M/L-L-46152D. Service classification SL-CF by America Petroleum Institute. This product is formulated from high ability based oils with high performance package additive. The end product of this formulation is a high standard of performance lubricant oil which can withstand high temperature and wide range of distance when in used before replacement. This product has the ability to secure high ability engines of car when used regularly.

4.9 Heavy Duty (HD) Special| SAE30, SAE40, SAE50 and Market Applications

Hi-Speed monograde oils for engines are heavy duty range of lubricant for aspirated engines of diesel and petrol engines majorly good for different fleet use. It has three different viscosities which serve in different category of loads, climate changes and speed of engine, different grade protect the engine in different ways. The United State military number is MIL-L-21048. America Petroleum Institute (API) Service Classifications SC-CC. Hi-Speed monogrades are high performance engine oils is produced from high ability mineral oils, with a high performance package additive which satisfy the needs of both petrol and diesel engine of vehicles under average to serious condition of service.

4.10 Deusol Super Extra| SAE 15W/40, API-CH4 and Market Applications

Deusol Super Extra grades offer the possibility of extended drain intervals in all types of automobiles, starting from diesel to petrol engine non- heavy's vans to the heaviest long distance turbo charged diesel truck and buses. Due to its long range use, Deusol super range is ideally suited to operators of civil engineering plant whose fleet employs petrol and diesel engine power units of widely differing types. Also suitable for high powered diesel generating plants. The united State military number is MIL-L 2104C and 2104D. The United State military value is MIL-L 46512C. America Petroleum Institute's (API) Service classification CH-4/SG. The European Automobile Manufacturers Association (ACEA), B2-96/E2-96.Oil in the Hi-Speed

Deusol Super Extra range of multifunctional engine lubricants are blended from high quality minerals oils and feature on advanced additive package. Deusol Super extra grades greatly exceed the generally accepted performance levels of lubricant produced to meet the requirements of the above specifications.

4.11 Gear Oil Extreme Pressure (EP) 90, 140 And Market Applications

The Hi-Speed gear oil range of multipurpose oils for gear is best for so many different usages which includes lubrication of hypoid unit final drives and manual automotive gearboxes. It has two viscosities; EP 90 and EP 10 cover a wide variety of climatic and operative conditions. The United State military number of MIL-L-2105.America Petroleum Institute classification Service GL3.The High-Speed gear oil range of mineral oil based of extreme pressure gear lubricants with anti-corrosion, anti-forming and anti-oxidant additives to present oxidation of oil, corrosion of gear tooth, and reduces the tendency to form. They also incorporate ability to withstand extreme pressure additives which secure the teeth of gear during the high temperature, locals and sliding met within hypoid speeds final drive units.

4.12 Hydrex Anti-Wear (AW) 32, 46, 68, 100 and Market Applications

Hi-Speed Hydrex AW series are suitable for use in pumps, presses including circulatory systems in gears. It meets and exceeds the requirement of DIN 51525.H-LP, BS 4231, SABS 1218, DAVID BROWN (DB 1, 2, 3, and 4) classifications. Hi-Speed Hydrex anti-wear ranges of lubricants possess superior anti-wear characteristics and fully comply with the requirements of up rated and heavily loaded vane type pumps. The heavier David Brown Approved Grades also find use in certain industrial gearboxes, especially on machine tools where cross contamination with hydraulic oil may occur. The good demulsification of these oils ensure rapid separation from any water that may contaminate the system through condensation or leaking seals, etc. They also possess excellent filterability.

4.13 Quality Control

Products are usually formulated in the laboratory by the chemist's and sent back to the production manager for production to be carried out. The base oils or minerals oils are being imported from outside the country and kept in the tank farm. Samples

are taken by the chemist to know the chemical constituents of each base oil. After the formulation, test are carried out on the samples to determine the products viscosity, Pour point, flash point, foam test, total base number and the relative density of the products.

The Standard Organization of Nigeria (SON) has a specified standard for each products, anything below the specified standard by the Standard Organization of Nigeria in line with the International Standard Organization (ISO) is termed sub-standard products. The chemist's and quality control officer make sure all the products conformed to the specified standard before passing the products for final packaging to be delivered to various distribution channels.

During production, samples are taken from different blending vessels to ascertain the level of compliance with the product formulation. After the whole process, if the products didn't meet specified standard, more additive are added to the blending vessels to improve the viscosity, flash point, foam test, total base number and the relative density of the products.

4.13.1 How to test for lubricant quality

To be sure the products are of specified standards by the regulatory bodies of lubricants products, the following methods are used to ascertain the quality of lubricants products.

4.13.2 Spectroscopy

Spectroscopy measures the amount of tiny or microscopic metal deposits in the oil. All metals show a slow degradation in the machinery or motors using the oil.

4.13.3 Index of viscosity

Viscosity is the degree of resistance to flow or "thickness" of the lubricants. The best quality products are the once with higher viscosity. The test measures the rate of change of viscosity as the lubricant is subjected to heat. This change will determine the quality of the oil, as the one with lesser colour change has a better quality. Viscosity often decreases as a result of contamination from fuel, motor cases and other operational factors. Water Titration of Karl FischerThe Water Titration of Karl

Fischer test measure the amount of water in oil. Water is a common contaminant. Lubricant degradation, metal corrosion and poor lubrication are caused by water contaminant of oil. This test determines water contamination at the microscopic level.

4.13.4 Analysis of used lubricant

Continuous used of any lubricant is determines by the analysis of used lubricant to ascertain its condition weather it is suitable for specific usage. This test that determines the usage of lubricants is encompassing, it cannot be ascertain by a single test. Application of equipment's and types of lubricant determines the test.

Other tests are also carrying out to determine the pour point, flash point, density, total base number, foam test, total viscosity index, and the relative density of the oil. Kinematic/ oil bath test which uses a constant temperature bath, by measuring the efflux time between two points to determine the viscosity of a product. The viscosity is computed by using an efflux time and calibration constant. Centistokes (CST) is used to report viscosity at a temperature of 40 degree centigrade or 100 degree centigrade. Viscosity is the single most important property of a lubricant.

5. COMPETITIVE ADVANTAGE

Continuous environmental uncertainty is the major problem facing many industries today. These problems are getting complicated and dynamic as the day goes by. Many multidomestic industries are now becoming global. Many dominant firms that have a niche in the established market are now having innovative aggressive and flexible competitors. Channels of distribution different from country to country which can change through the use of reliable systems of information. Access to new technology and good relationships with suppliers' helps to improve products quality and also reduce costs of production. Competitive advantage is very difficult to sustain by any companies that quickly start successful strategies of leading markets.

According to Porter, competitive advantage of a firm's in an industry is decided by its scope of competitive that is the target of the business unit's market. Firm or business unit must put into consideration its channels of distribution, the buyers to serve, products varieties, geographical areas to sell it products, and different industries to compete with before using one of the two strategies of competitive, that is, either to compete by lower it cost or by differentiation.

The creation of a system that give a special advantage over competitors is called competitive advantage. This is done in order to create value in sustainable and an efficient way. Grand Petroleum Limited have being able to achieve its missions and competitive advantage over its competitors through differentiation, cost leadership and response. Grand Petroleum Limited products are sold at a moderately low price which has attracted many customers to them across West Africa and the past years. They have being able to deployed a term of market specialist to attend to their customers complain and pass the messages across to the various organs of production involved in their production activities.

For a firm's to retain it competitive advantage, Grant suggested five possible ways which are as follows;

1. The firm's resources must be classified in relation to its strengths and weakness.
2. The firm's strengths must be utilized into core competencies and certain capabilities.
3. The profit potential of these competencies and capabilities must be continuous advantage of competitive and the possibilities of harvesting the gains from their used must be put in place.
4. The best strategy to exploits the competencies and capabilities in relative to opportunities externally of the firm's must be selected.
5. Efforts must be made to upgrade weakness and bridge the gaps of resources.

5.1 Competing Through Differentiation

This is done by differentiating a product in such a way that the customers will clearly see the added value of the product. This strategy also includes the company ability to provide special service after sales, unique features of the products, and improvement of quality of the product. Grand Petroleum Limited have being able to different their products in terms of packaging, quality, physical appearance and the durability of its lubricants by their users. They have also provided free transportations to deliver the products to all part of Nigeria and West Africa for their customers to increase their gain margin. They also have experienced sales personnel who offer free services to their various customers on how to keep and market their products.

The creation of a product or service perceived throughout its industry as special is the aimed of differentiation. Premium may be charge by the company or business unit for its product. Brand image, technology, features, and customer service can be associated with this specialty. Differentiation strategy has being proven to be more profitable than low cost strategy because differentiation often result to barrier entry. Market share is most likely to be increase by low cost strategy.

5.2 Competing Through Cost

Maximum value is achieved through low cost leadership as perceived by the customer. The ability of a company or business unit's to produces and market a comparable product better than its competitors is called low cost strategy. Grand Petroleum Limited has been a consistent moneymaker in Nigeria and West Africa, while some other lubricants Company have lost billions. It low-cost strategy has included use of mass production at a low cost, thereby selling its products at a more cheaper rate than its competitors with better quality.

Lower cost competitive strategy is targeted at the large market and needs hard pursuit of reduction of cost from experience, overhead control and tight cost, minimizing of customers marginal accounts and reduction of cost in the area of research and development, advertising, sales methods and so on and so forth. Cost leader charge a lower price for its products compare to its competitors and still make good profit because of its lower costs. The cost leader may not have the lowest price in the industry but its price is lower than that of its competitors. One driver of a low-cost strategy is a facility that is effectively utilized. During heavy competition, its lower price makes room for more profit for the company or its business units. Because it buys in larger quantities, it has a good bargaining power with its suppliers due to its large share of market. Only few can match its low price cost which can serve as an obstacle to new entrants. It's stand the chance of earning above average on it investment return.

Grand Petroleum Limited has tanks farms in different part of the country which is effectively utilized to reduce the cost of production. The Company has being able to examine each of the 10 Operation Management decisions in a relentless effort to reduce costs and still meeting customer expectations of quality. This does not any way affect the quality or value of its products because it charge low cost.

5.3 Competing Through Response

Reliable, flexible, and rapid performance are set of values related to response. This strategy is often used by Grand Petroleum in relation to timely delivery and development of their product as well as flexible, rapid and scheduling that is reliable in terms of performance. The company has being involved in several innovations design and sustainable volume fluctuation which enable it to match changes in the marketplace. Their products has being able to respond to the market needs by producing a multi-grade lubricants oil within a short time frame.

The Company products also compete on response by producing reliable products. The quality control officers make sure all outgoing products meet the required set standard. They also compete on response by responding to their customers complains quickly and they also deliver their products to their customers on schedule.

5.4 Involving Strategy in Management

Management by strategy is a combination of different managerial actions and decisions that determines the corporation long run performance. The four determining factors are scanning the environment, formulation of strategy, implementation of strategy and control and evaluation of the processes.

5.4.1 Environmental scanning

Scanning the environment involves the evaluating, monitoring, and circulation of information from both internal and external environments to special people in the corporation. This is done in order to spot out some factors that are strategically relevant in shaping the future of the corporation. Opportunity and threat are variables that made up the external environment which are outside the organization and are not directly under the short run control of top management. The corporation exists from this variable context. Strength and weakness are the variables that made up the internal environment within the organization and are usually within the top management control in the short run. Work is usually done within the variable

context, which include corporation culture, structure and resources. These variables form the context in which work is done.

5.4.2 Strategy formulation

The development of long-range plans that can effectively manage environmental threats and opportunities in relating to the corporate strengths and weakness is called formulation of strategy. Formulation of strategy includes specifying objectives that are achievable, stating corporate mission clearly, strategies development and policy guidelines setting. An understanding master plan that clearly defines the way a corporation will achieve its objective and mission is the corporation strategy. This helps to increase the competitive advantage and reduces the disadvantage.

5.4.3 Implementation of strategy

The process by which policies and strategy are put into practice by developing budgets, procedures and programs is referred to as implementation of strategy. There might be changes in the organization culture, structure or the system of management when strategy is being implemented. The step of activities needed to fulfill a single use plan is called a program. Strategy becomes practical when there is a program. Corporation's programs statement in term of money is called a budget. A sequential step that gives details on how a particular job or task is done is called procedures.

5.4.4 Control and evaluation

Evaluation and control involve the process of measuring corporate activities and performance by comparing it present results with that of the desired results. Activities end result is performance, which includes strategic management process real outcomes. Organization performance is improved through strategic management practice especially when measured in respect to return on investment and profits.

6. FORECASTING

6.1 Classification of Forecasts

The scientific art of foretelling future events is called forecasting. The data that was forecasted for these studies was done by using autocorrelation functions and partial autocorrelation functions, periodogram of products by frequency, spectral density of products by frequency and the actual data was also compared with forecasted data, which estimate the rate of production. For the five products analyzed, the significant point used was always far above the upper confidence limit except for one which was not below the lower control limit. Forecasting was used to project the production of these five products for 2014. A reliable result was obtained when the error was evaluated. The error calculated for the five products were all within the limit of the upper confidence limit and the lower confidence limit. Other factors used to evaluate the error also give a good level of range for all the products. The choice of seasonal method used for the forecasting was influence by the shape of the graph for the different products and also by the outcome of the expert modeler when the data was computed into SPSS Statistics software.

Future operations are planned by organizations by using any of the following types of forecast.

1. Forecast of economic foretell rates of inflation, money, supplies, starts of housing project, and other indicators of planning.
2. Forecast of technology deal with process of technology, which may leads to new products birth, and can also requires new plants and equipment.
3. Forecast of demand predict company's services or products demand.

Grand Petroleum uses demand forecasts for their lubricants products. This is done by the production department and the sales department. The sales departments take order from their distributor and pass it to the production department for planning and production in other to meet up with the demand. Forecasting is said to be qualitative when emotions, intuition and personal experiences value system is used to reach final decision. The decision makers are the general manager and the production manager, staff personnel are made up of the sales manager and sales personnel and the respondents are their major customer and distributors. The production managers normally arrived at a final decision on what to produce for the customers after going through all the suggestion from both organizational managers and the customers on how to better the products and make good sales as well. The products are produce on daily bases, except for Sundays, once there is low demands for products, products are produced and kept in the store against the season of high demands. There are usually high demands during hot weather that is between October and April. The heat usually reduces the viscosity of the lubricants. Instead of the lubricant to stay up to three months, it may stay less than that because of heat. They usually produce above request when sales are low.

6.2 Series of Time Forecasting

This method uses previous past data to make it forecast. This previous data are evenly space for like Weekly, Monthly, and quarterly.

6.3. Methodology

In this research thesis, we are not using all the methods of forecasting available, reasons is that , the data collected from Grand Petroleum was used to plot graphs for the different years using the selected products for the graphs, from the shapes of the graphs, it was seasonal. The reason for the seasonality is most likely based on the variation of the weather condition in most West Africa countries where the products are distributed to for sales and use and also due to the functionality of the equipment’s used for the production. From the data collected, the company attained their peak of sales majorly in the months of October, from experience and

investigations carried out, at that time of the year, there is relatively increase in temperature and less or no rain falls in these regions. Because heat has direct effect on the viscosities of lubricants products, hence that may account for the increase in sales for the Months of October. High temperature are experience in the Months of February but it comes with high humidity and dust , which has less negative impact on the lubricants products compare to the one experience in the Months of October.

The following methods will be used to evaluate the data collected, which are as follows;

1. Moving Average,
2. Seasonal Exponential Smoothing,
3. Adaptive Filtering,
4. Box-Jenkins,and
5. Classical Decomposition.

The errors in the above methods will also be investigated, the one with the least value of error will be the best method for this projection and it will be used eventually. The following methods will be used to evaluate the errors in the forecasting which includes;

A. Mean Absolute Percentage Error (MAPE)
B. Mean Absolute Error (MAE)
C. Maximum Absolute Percentage Error (MaxAPE)
D. Root Mean Square Error (RMSE)

6.3.1. Exponential smoothing

It is a technique of forecasting that uses moving average as its forecasting values, exponential constant and the actual values to arrive at it prediction. This can be express as follows:

$Ft = Ft\text{-}1 + \alpha (At\text{-}1 - Ft\text{-}1)$

Where Ft = new forecast

Ft-1= previous period's forecast

α = Smoothing (or weighting) constant ($0 \leq \alpha \leq 1$)

At-1 = previous periods actual demand.

6.3.2 Adaptive filtering

This forecasting method makes use of some particular algorithm which is very difficult to regularize the weights. It is only possible to use when some useful signal properties information are reachable. Opposite to the Recursive Least Squares (RLS) method, this uses the length of the adaptive filter multiply by its length with an autocorrelation matrix. It uses self-learning device to perform it operation in conformity with the expected requirement. They have the ability to adjust its response on time to increase its functionality. It can function through equalization and detection signal, filtering and analysis of spectral. It has a feature that can function in Linear Predictive Code, Adaptive Differential Pulse and Code Modulation (J.E. Wese; 2011).

6.3.3 Box-Jenkins method of forecasting

This method is more useful when you can predict a certain amount of consistency between the future and the past. It is more appropriate for forecasting of short term when it is assumed that the patterns of the future and trends will look like the trends of the present. This model can estimate trends and patterns of seasonality and it is automated. They work with time in patterns instead of seasonality and trends. The data are more reliable and less volatile. This method is one of the most reliable time series methods for some particular data analysis. This method is highly time consuming and the procedure is subjective as well. It make use of software packages like automatic algorithms and Forecast Pro (Eric Stellwagen, 2014).

6.3.4 Classical decomposition

The global time series additive decomposition is done by using trend and seasonal decomposition procedure (Cleveland et al., 1990). The seasonal and trend decomposition loess carried out data decomposition by using smoother Loess of different methods, like regression of polynomial at different stage of the set of the data, with the closest values of explanatory variables whose character is being evaluated. This methods also has the ability to analyze greater number in the time series. This method also has large series of component (Theodosiou Marina, 2011).

6.4 Interpretation of Results

6.4.1 Product 1

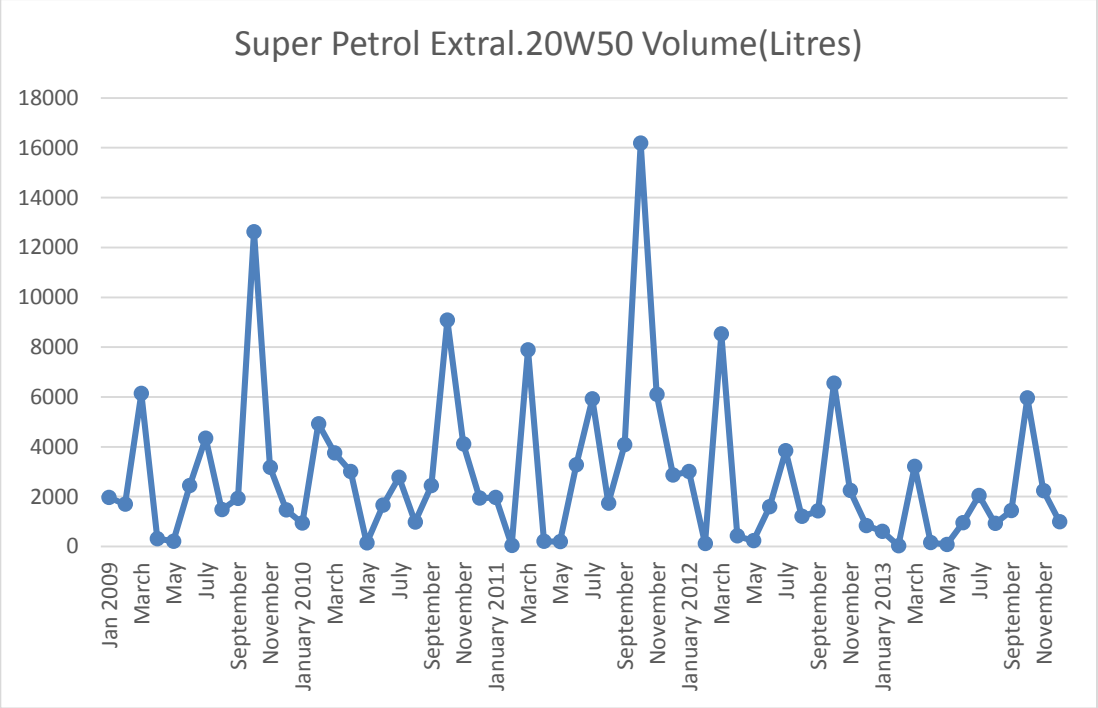

Figure 6.1: Graph representation of product 1

The choice of the forecasting method used for the above graph were determined by either the nature of the graphs or the used of expert modeler which is a software that can select the forecasting methods more appropriate after inputting the data into the system. The choice of seasonality method was also influence by the product graph. From the graph, there is a great seasonality being display by the graph and also was

finally supported by expert modeler when the data was computed by the SPSS Software. Variable view was used to analyze this product, which give name of product, numeric that is how many digits, decimals places and measure. There are three measures, which are ordinal, norminal and scale. We use scale for data but for dates and months, we use norminal on the SPSS Software for analyzing this product. The spectral analysis is a determining factors that tells if the data is seasonal or randomly. It can also give an insight into the gravity of the seasonality or periodicity of data. When the data are analyzed differently, we can see clearly whether the data is completely seasonal or partly seasonal and partly periodical. There is also a great disparity of seasonality of this product, from the beginning of the selected periods to the end.

6.4.2 Product 2

From the graph in figure 6.2, it is also observed that the best method that will best analyze this product is also seasonal method as there is remarkable seasonality from the graph. When the data was also inputted into the SPSS software, seasonal forecasting was also selected as the most appropriate method for the analysis of this product.

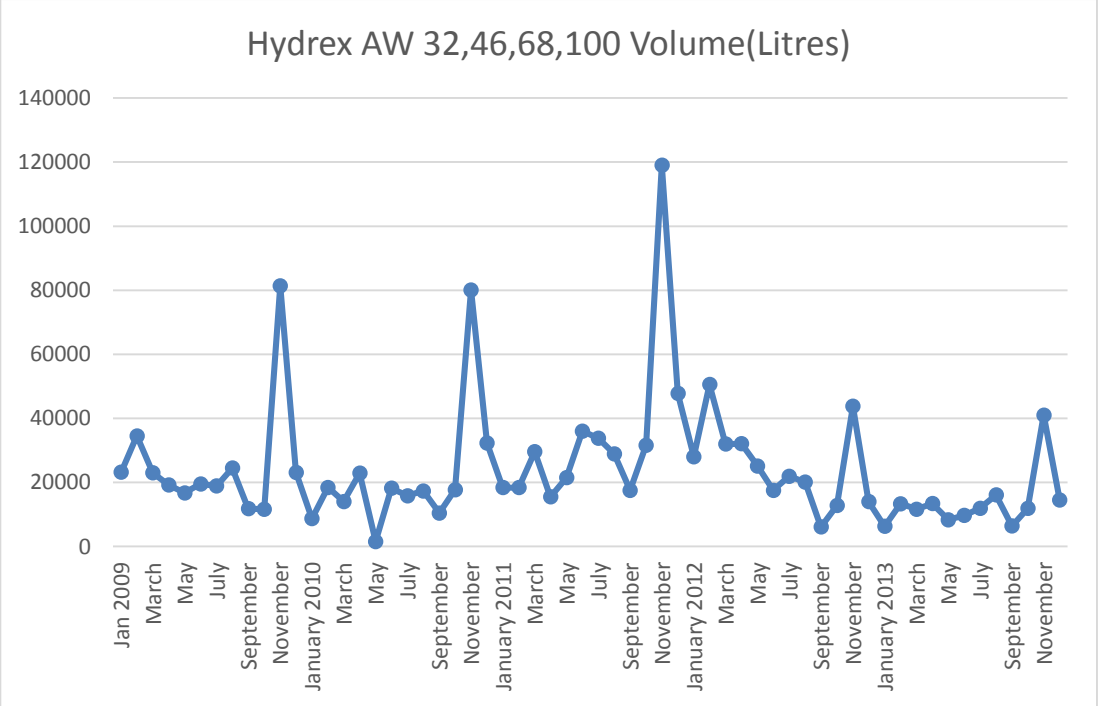

Figure 6.2: Graph representation of product 2

This product seasonality is low when compare to that of product one. This may be due to so many reasons like variation in demand and also for some purchases return due to product damage at the course of transporting them from the production plant to the different sales points.

6.4.3 Product 3

Using the graph shape in figure 6.3 and the expert modeler to determine the best fit methods to analyze this data, seasonal method was also the most appropriate. There were decreases in the seasonality as the production continues base on the data analysis. The wide disparity also happens in the early stage of the production.

Variable view was used to analyze this product, which give name of product, numeric that is how many digits, decimals places and measure. There are three measures, which are ordinal, nominal and scale. We use scale for data but for dates and months, we use norminal on the SPSS Software for analyzing this product.

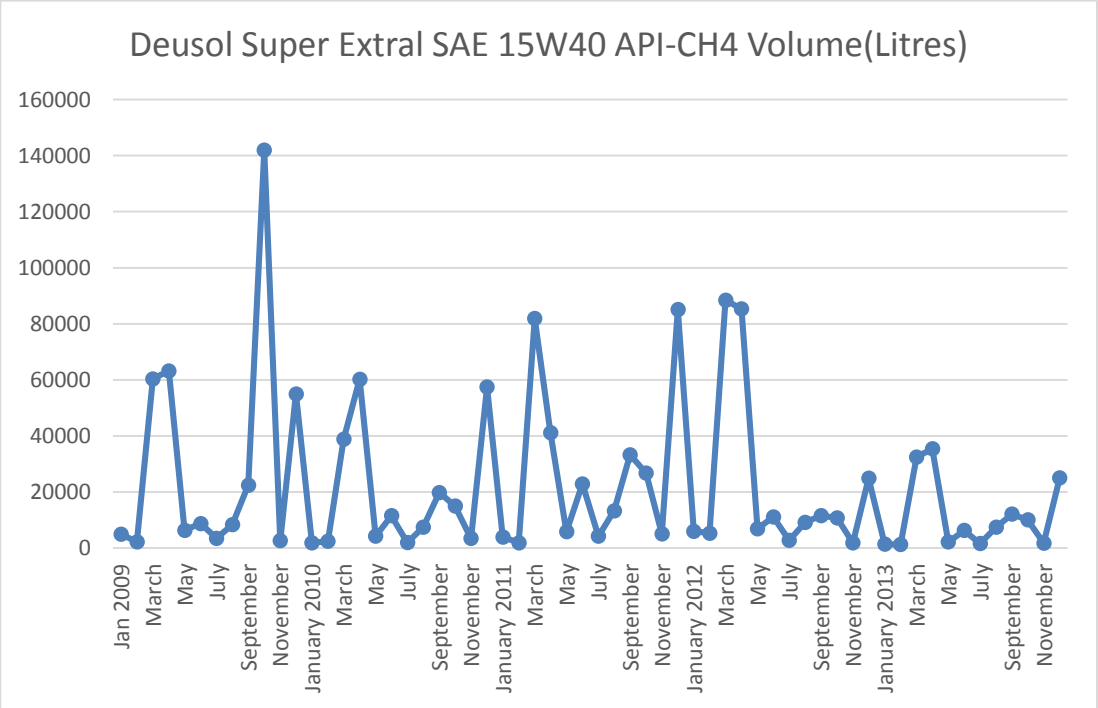

Figure 6.3: Graph representation of product 3.

To be very sure of accurate result, other method was also used to analyze this data as shown in the appendages tables. But the most accurate method with lesser errors was finally chosen apart from considering the shape of the graph.

6.4.4 Product 4.

From the shape of the graph in figure 6.4, it is clearly seen that, this product being analyzed is simple seasonal. The disparity is not much compare with the one of product 1 and 2. The low disparity may be due to adequate proper delivery and low or no purchase return.

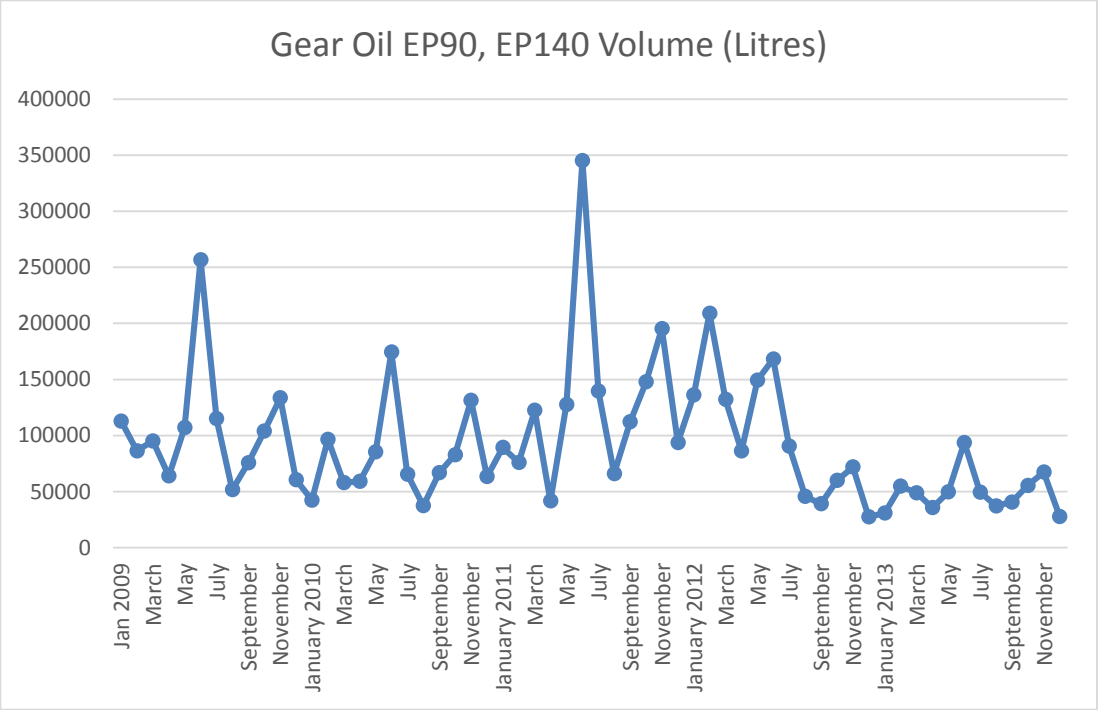

Figure 6.4: Graph representation of product 4

6.4.5 Product 5

This data analysis from the shape of the graph and also the use of expert modeler to determine the most appropriate method, seasonal forecasting was the best fit method for this data. Other methods were also used in analyzing this data. There is a simple seasonality like that of product 4. The spectral analysis which is a determining factors that tells if the data is seasonal or randomly was also used to further confirm the seasonality of this data been analyzed . It can also give an insight into the gravity of the seasonality or periodicity of data.

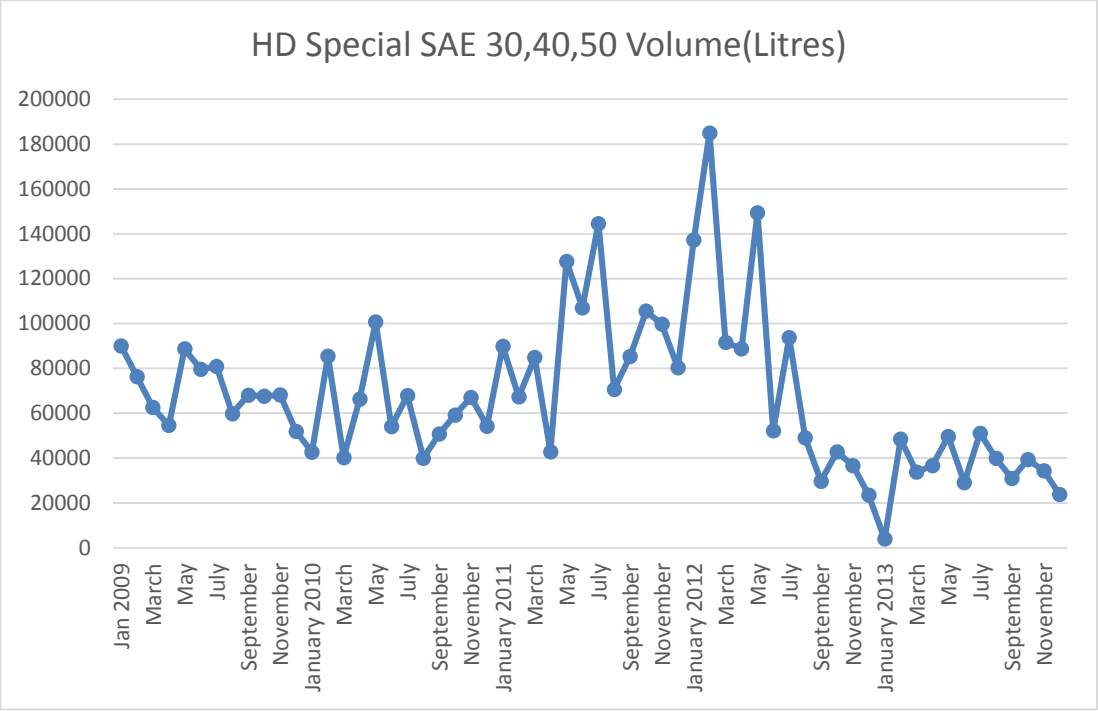

Figure 6.5: Graph representation of product 5

6.5 Autocorrelation Functions (ACF) and Partial Autocorrelation Function (PACF)

The two factors that determine whether it is seasonal are the Autocorrelation Functions which is annual consideration not monthly, and Partial Autocorrelation (Partial ACF). The autocorrelations factor (ACF) is used to determine whether there is significant decrease or increase in the data analyzed. The value at 12 (months) is very significant than any other values in the series. Each number is represent a month during a year. If there is a negative correlation at (month) 12, it means there is decrease in the annual production, but if otherwise, it means there is increase in production annually. If the increase is far above the upper control limit, it means there is great remarkable increase in production (annually), if otherwise, it means there is great remarkable decrease in production (annually). To be very certain of the interpretation, we use Partial autocorrelation, which also have 12 as it significant and determining factor.

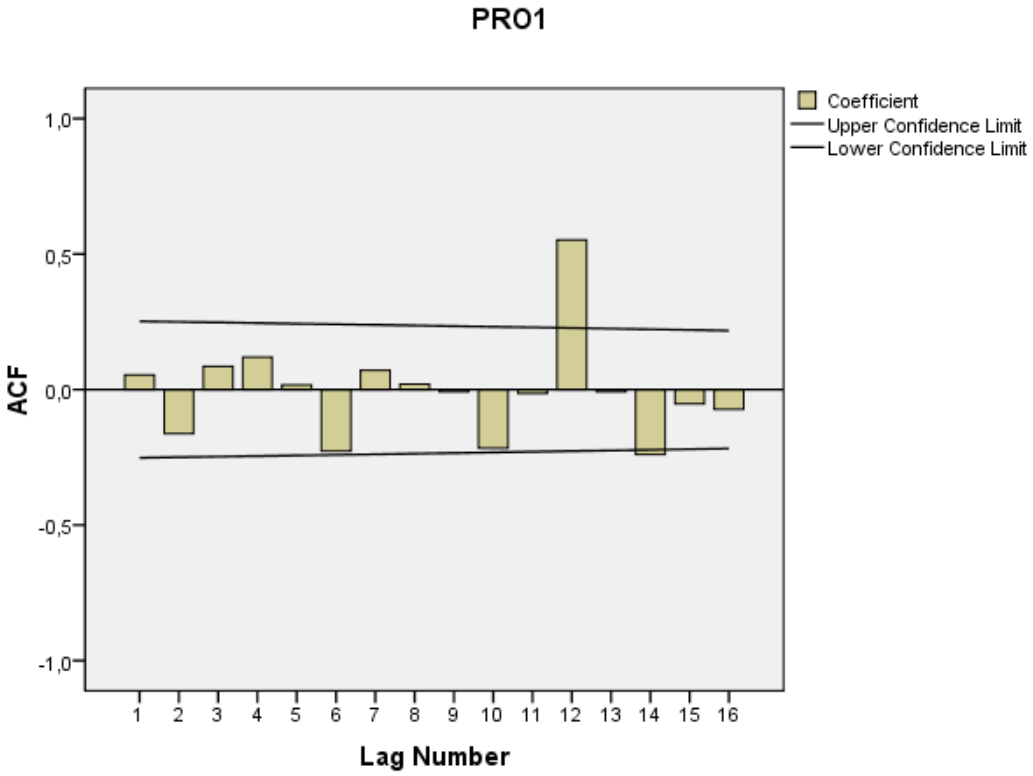

Figure 6.6: Autocorrelation Functions of Product 1

Autocorrelation functions of product 1 has its significant at 12 (twelve) because the product data was analyzed annually. From the figure above, using the correlation at 12, there appear to be a great remarkable increase in the production of this product year by year. There is also great acceptability of the product by the customers. The rejected or damaged product of product 1 is almost nil. From this analysis, I concluded that this product has gained large market shares and also the production process is above average.

The partial autocorrelation functions for product 1 which is being represented in figure 6.7., which was used to further verify the increase in production and demand, shows that there was great high demand for this product as the market is the greatest allocation of resources. This has further shows that there was great increase in production and demand for product 1

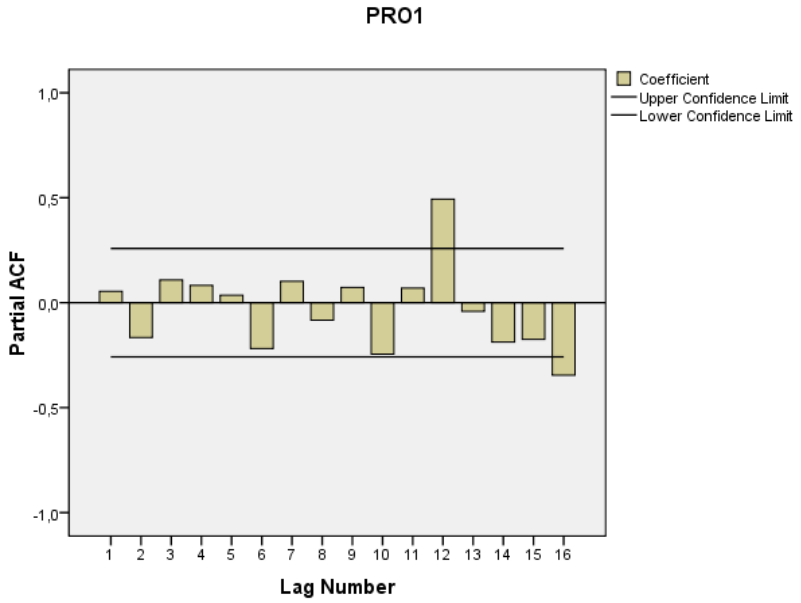

Figure 6.7: Partial Autocorrelation Functions of Product 1

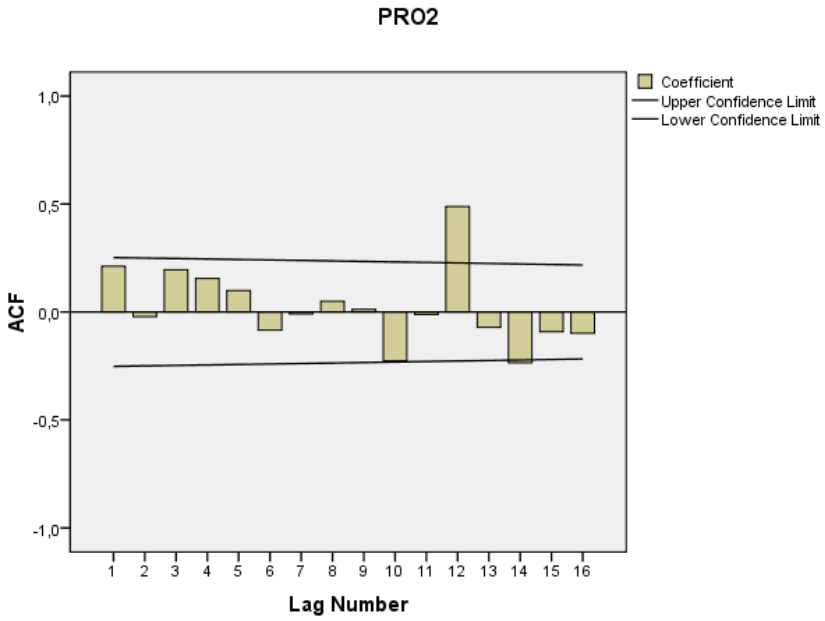

Figure 6.8: Autocorrelation Functions of Product 2

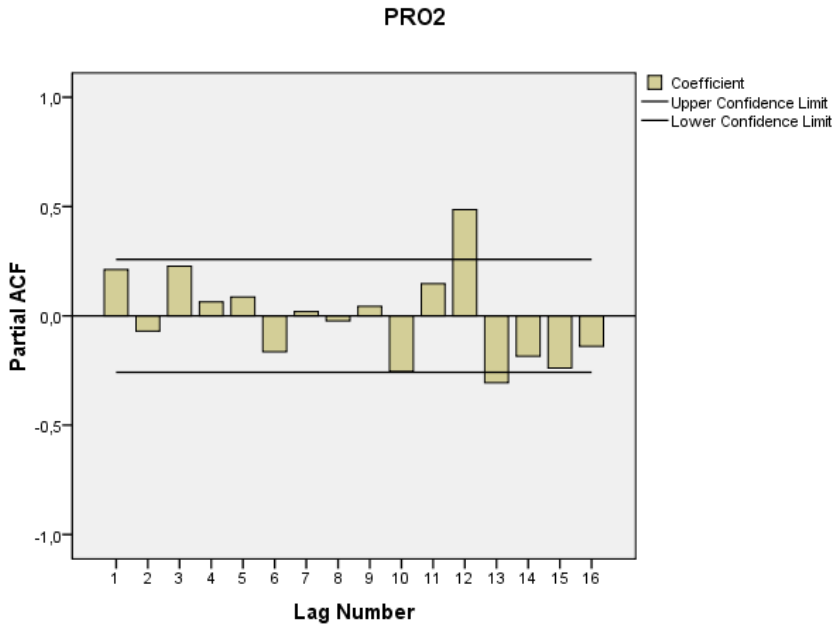

Figure 6.9: Partial Autocorrelation Functions of Product 2

The autocorrelation of product 2 which is being represented by figure 6.8 has its significant at 12. The figure shows a great remarkable increase in production and demand. The rate of producing standard product is quiet very high as well. The rate of products damaged and rejection by consumers is almost nil. This shows that product 2 has gained a larger market shares and general acceptance by the end uses.

Using the partial autocorrelation to further verify the increase in production and demand for product 2, which is being represented in figure 6.9, it shows that there were remarkable increase in production and demand but some products were either rejected or damaged during the year as there is an indication that shows below the lower confidence limit. This might be due to accidental mistake in the production floor or damaged that occurs in the cause of transporting the products from the production site to the final consumers. . With this verification, I conclude that there was remarkable increase in production and also demand for product two.

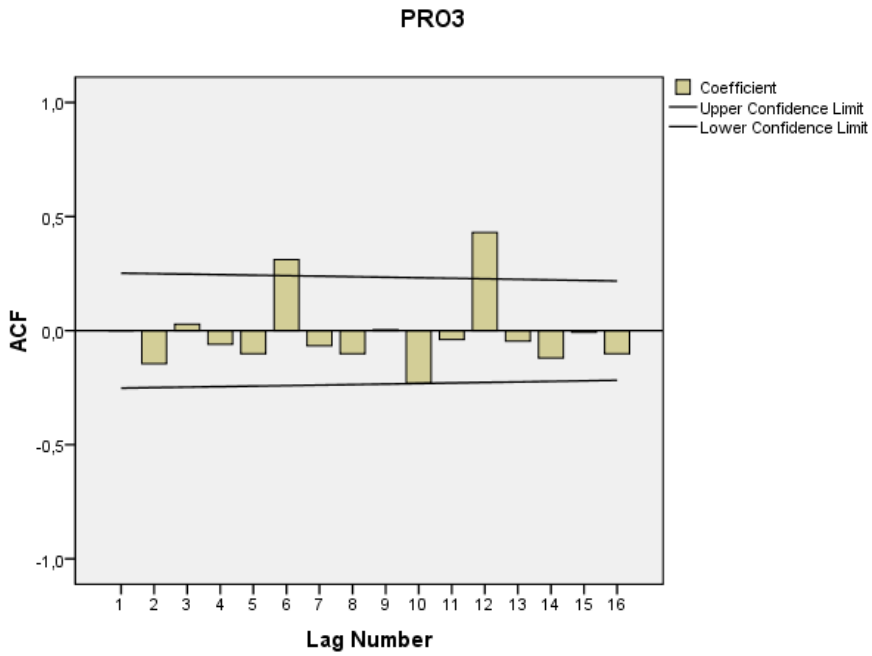

Figure 6.10: Autocorrelation Functions of Product 3

The autocorrelation functions for product 3 has it significant at 12 because it was analyzed annually. From the figure above, there is an increase in production and demand for this product. There seems not to be any damage or rejection of product by consumers, as there is no any production correlation below the lower confidence limit.

Using figure 6.11 which represent the partial autocorrelation functions for product 3 to further verify the increase in production and demand for product 3, it shows that there is increase in production and demand but lesser than that of product 1 and 2. From the correlation, is shows no damaged and no rejection of product by consumers, that means, this product is also accepted and general used by the public but not as product 1 and 2. So many factors may be responsible for this slight decrease in production and demand, which may be their durability, market price and lack of awarenesss, poor distribution network may be the retarding factors.I conclude that there may be need to improved upon this product, use more appropriate distributive channels, and also get feel back from the end users as well.

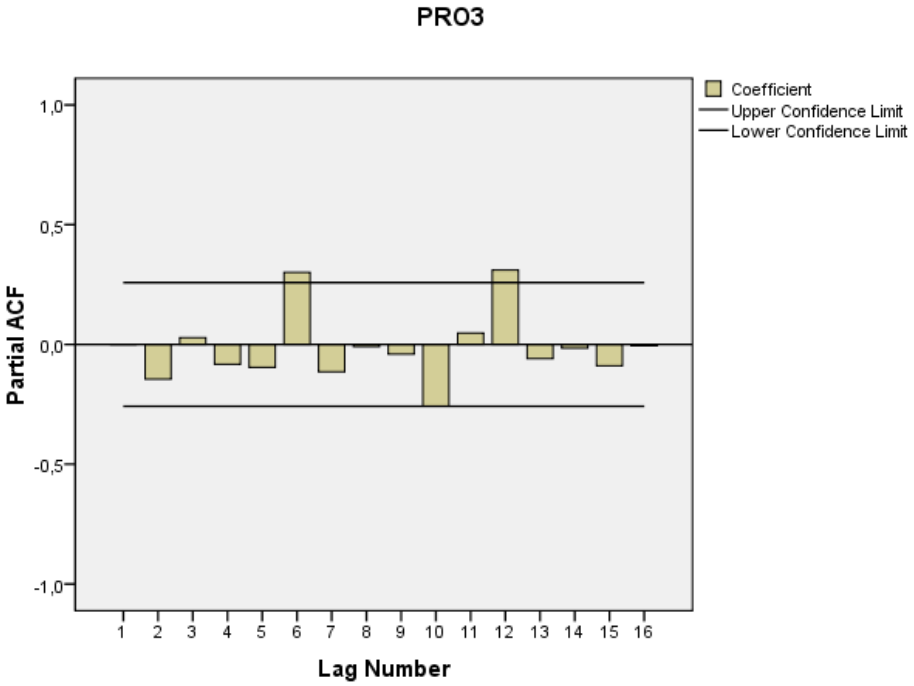

Figure 6.11: Partial Autocorrelation Functions of Product 3

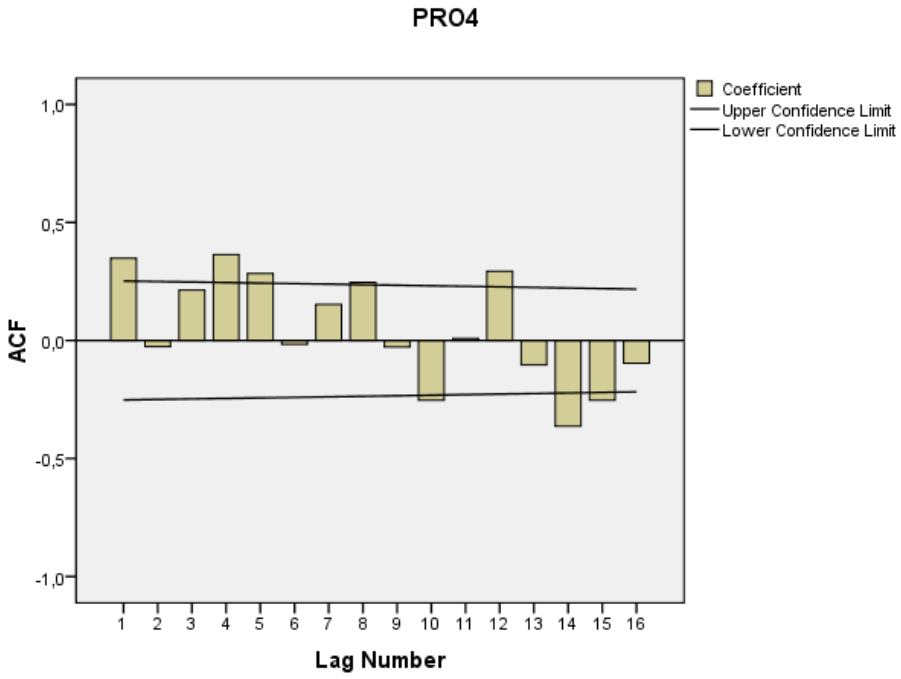

Figure 6.12: Autocorrelation Functions of Product 4

Referring to figures 6.12 which represent the autocorrelation functions for product 4, using correlation at 12 as its significant, there is little significant increase in the production and demand of the products when compared to the first three products, as

its ACF is a little bite above the upper confidence limit (UCL). That means the market demand for this product is also moderately high according to the data analyzed. So many factors may be responsible for this decrease in production and demand like lack of awareness of it market applications, its durability when in use and its market prices may be some of the reasons responsible for these reductions in their productions and demands.

The partial autocorrelation functions for product 4 is being represented by figure 6.13, which is use to further verify the nature of production and demand for product 4, has further shows that there were no remarkable increases in their production and also the market demand were not remarkably high. I conclude that there may be need to create awareness for this product and also improve its qualities if the need be and use more effective distribution channel that are more appropriate than the once that are presently used. There may also be need to get feel back from the end users of this product in other to know what and what is lacking and how to rectify it.

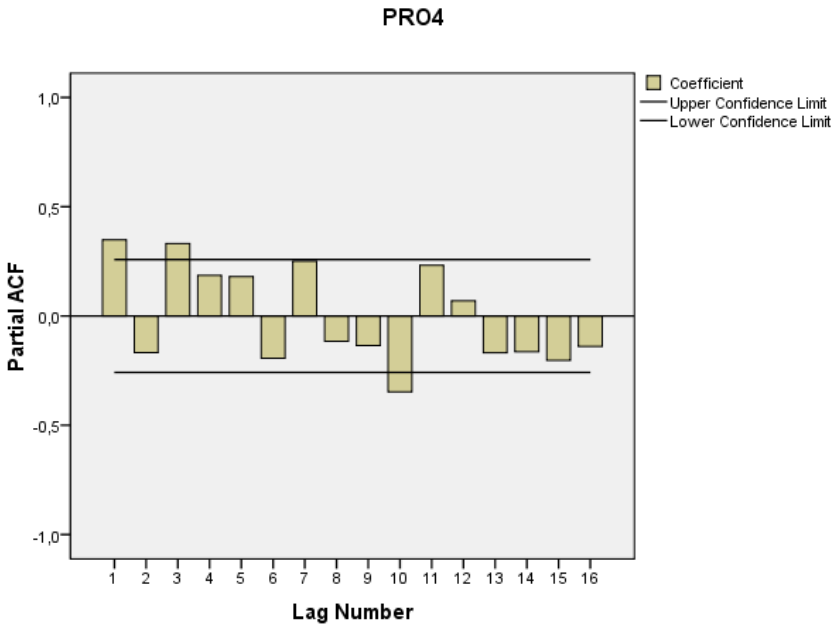

Figure 6:13: Partial Autocorrelation Functions of Product 4

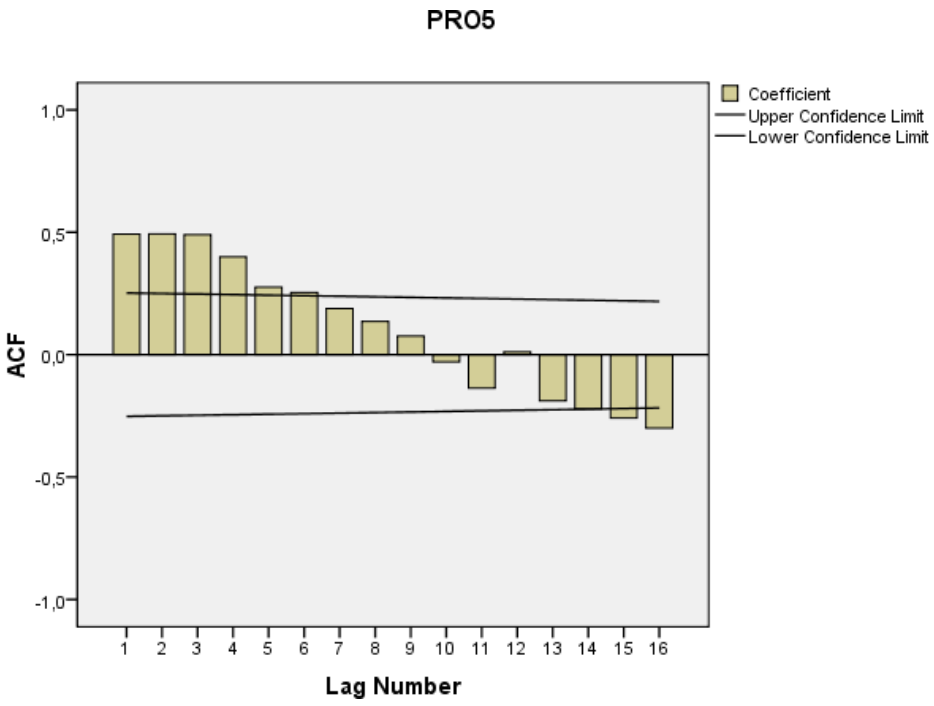

Figure 6:14: Autocorrelation Functions of Product 5

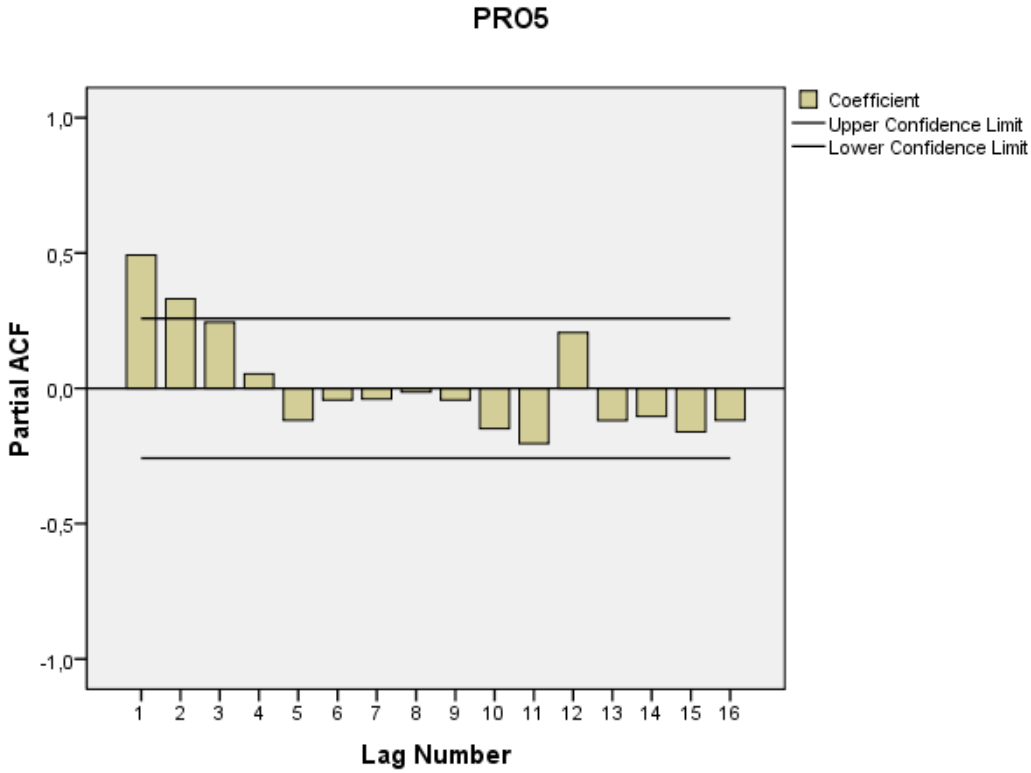

Figure 6. 15: Partial Autocorrelation Functions of Product 5

From figure 6.14 above, which represent the autocorrelation functions for product 5, it shows that this product is almost at the control limit that is, there is little or no increase in production and demand for this product. If more circumspective is not apply in managing this product, it might go below the control limit that means it might tend toward negative value which is the lower confidence limit (LCL). From this analysis, there may be purchase returned of finished product or adulteration of the product without noticing it, which may affect the market demand for this product.

Using the partial autocorrelation functions represented by figure 6.15 to further verify the data analysis of the production and demand for this product, it shows there were some increase in production and market demand for this product. This is a little deviation from the ACF prediction for this product 5. I conclude that there is need to get feel back from the end users of this product and see how to improve either on the quality or the awareness of the existence of this product

6.6 Periodogram and Spectral Density

Periodogram and Spectral Density are determining factors that tells if the data is seasonal or randomly, but Spectral density give more insight into the gravity of the seasonality or periodicity of data.

6.6.1 Periodogram and Spectral Density for Product 1

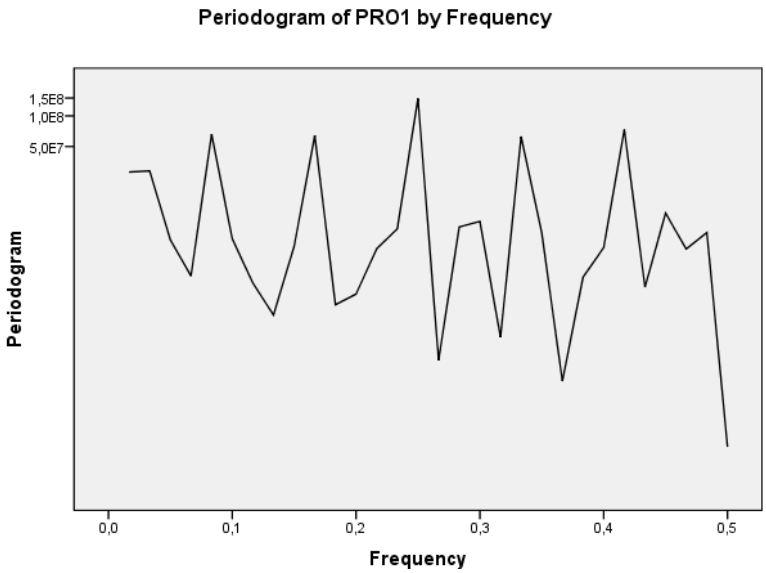

Figure 6.16: Periodogram of Product 1 by Frequency

The periodogram for product 1 by frequency shows that, it is mainly seasonal, and slightly periodical. The shape of the graph above shows the seasonality by frequency. There is only very slight periodical, if not completely absent from the graph.

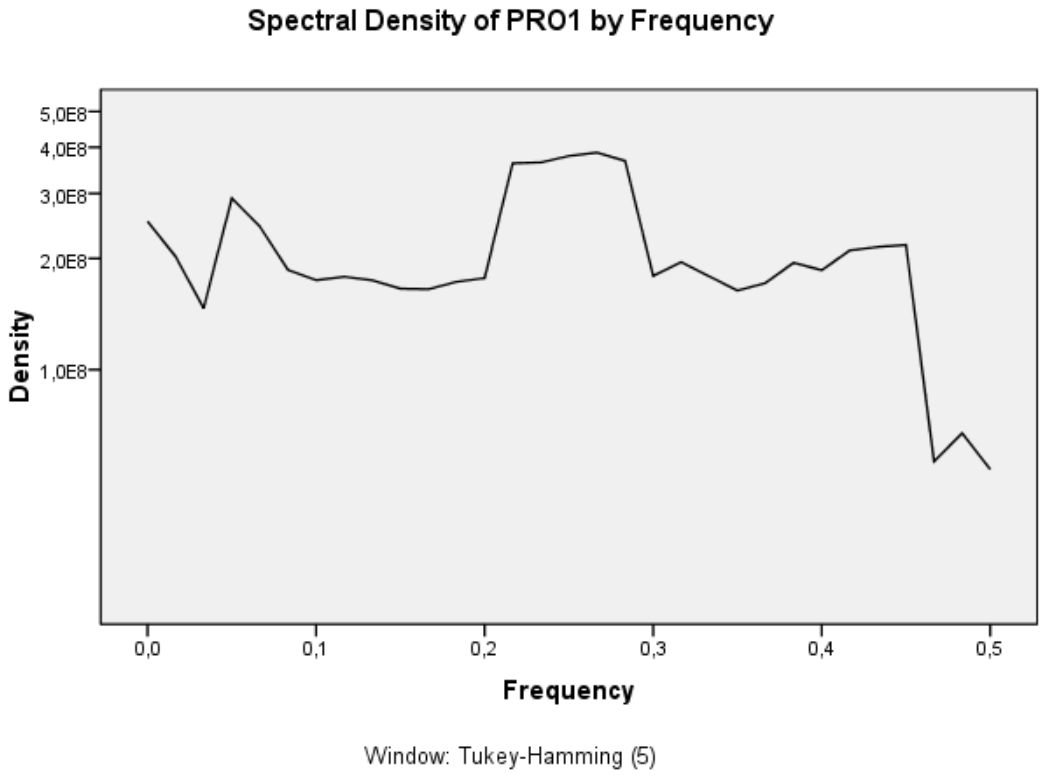

Figure 6.17: Spectral Density of Product 1 by Frequency

The spectral density of product 1 shows that it is partly seasonal and partly periodical. This spectral density has given a more details of the product analysis. If the rate of seasonality is compare with that of periodicity from the figure above, it is still more seasonal than periodic. This is in line with the graph of the product 1 when the data was used to plot the graph. There seems to be partly relationship between periodogram and product data. There is quiet deviation when the product data is compare with the spectral density of product 1 by frequency. When this comparism and the result obtained by using expert modeler, I conclude that product 1 is seasonal.

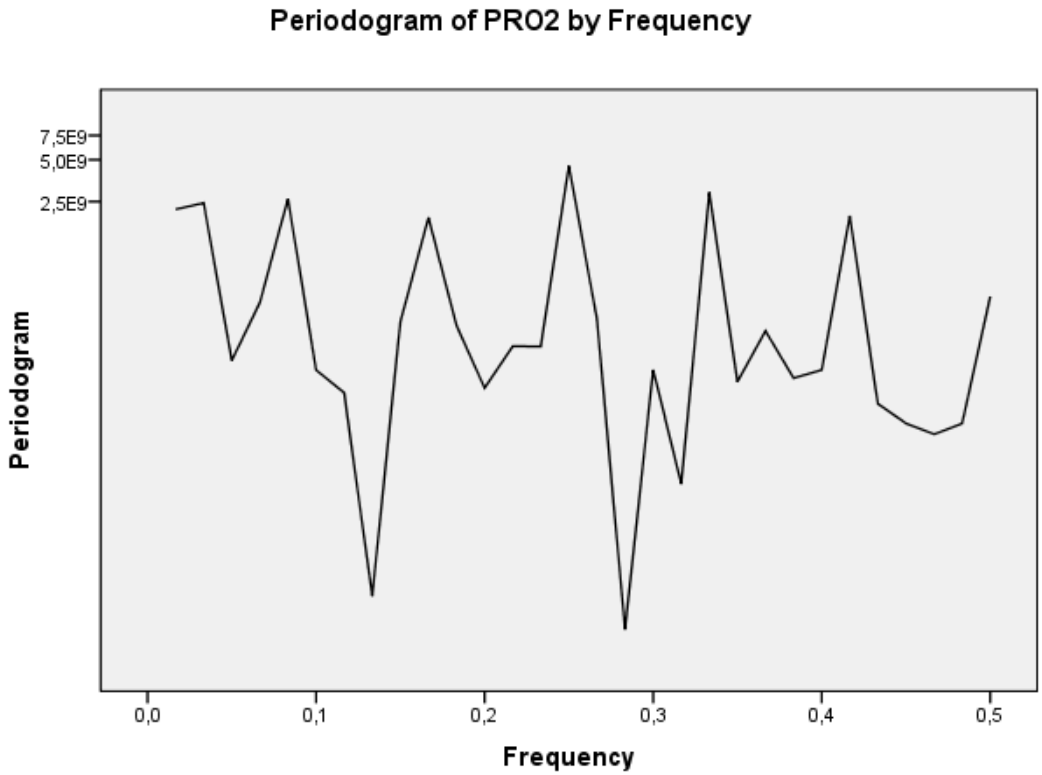

Figure 6.18: Periodogram of Product 2 by Frequency

The periodogram of product 2 by frequency shows complete seasonal. The shape of the graph above shows absolute seasonality. There is no periodicity in the graph. From the figure above when compare with the graph of product 2, the periodogram seems to give more vivid information than the graph of the product data. There appears to be a remarkable connection between the product data and the product periodogran by frequency. When compare the information obtained from the periodogram of product 2 to that obtained from the product data graph, periodogram give more definite and easy assessment than the product graph from the data. In general, they both point toward more of seasonality than periodicity.

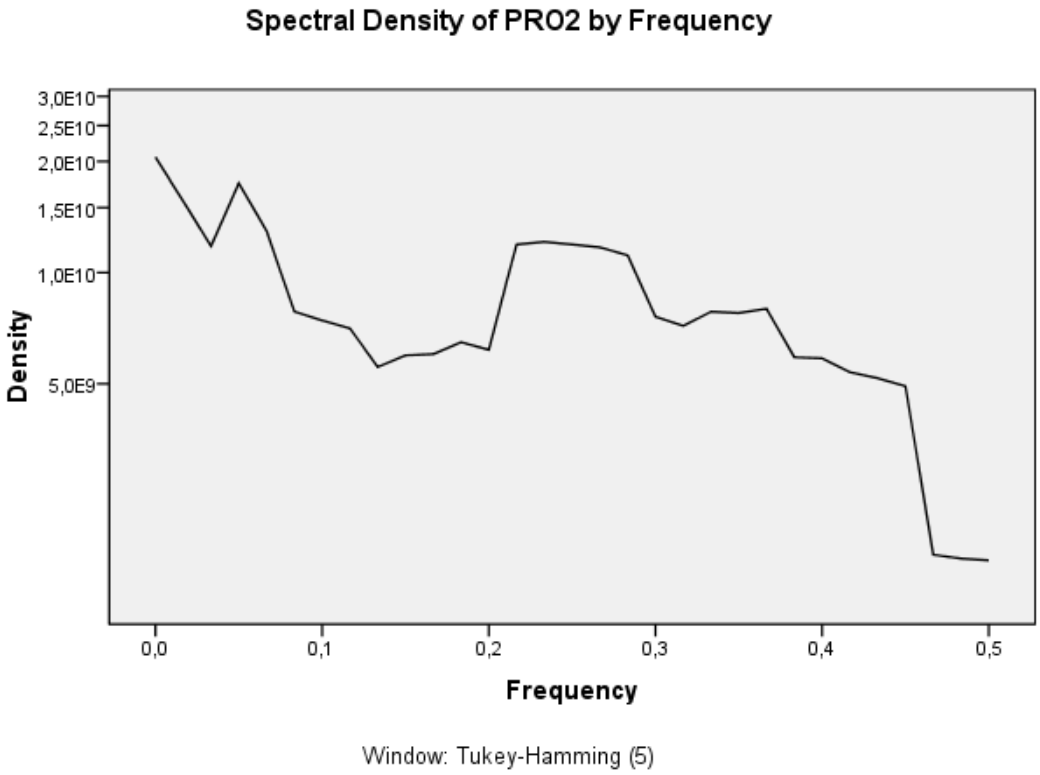

Figure 6.19: Spectral Density of Product 2 by Frequency

The spectral density of product 2 by frequency shows partly seasonal and partly periodical. There appears to be more periodicity toward the end of the figure than the beginning. This may be due to decrease in production and demand, which normally affect market supply as well. The spectral density of product 2 shows that it is partly seasonal and partly periodical. This spectral density has given a more details of the product analysis. If the rate of seasonality is compare with that of periodicity from the figure above, it is still more seasonal than periodic. This is in line with the graph of the product 2 when the data was used to plot the graph. There appears to be some level of relationship between periodogram and product data than spectral density by frequency. There is more deviation when the product data is compare with the spectral density of product 2 by frequency.

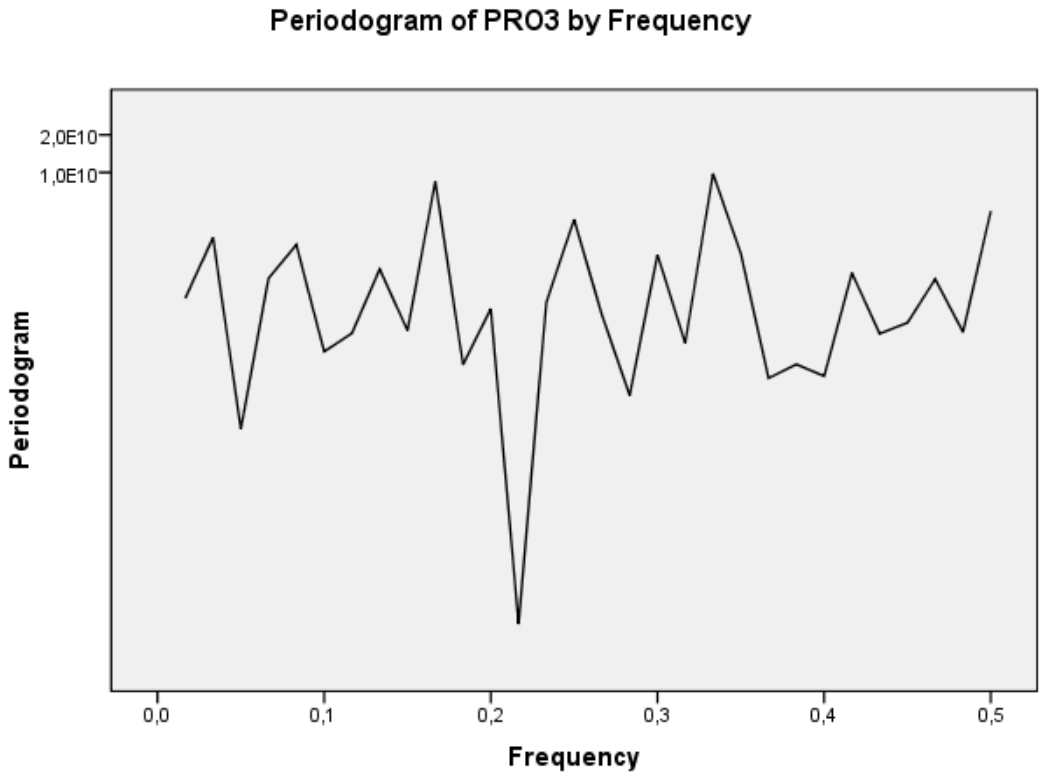

Figure 6.20: Periodogram of Product 3 by Frequency

The periodogram for product 3 by frequency shows absolute seasonality. There also appears to be great relationship between the product data graph and the periodogram. The seasonality of product 3 is a clear cut from the figure above. The seasonality of product 3 periodogram is quiet similar to the seasonality of product 3 data graph. There appears to be a correlation between product 3 data and its periodogram.

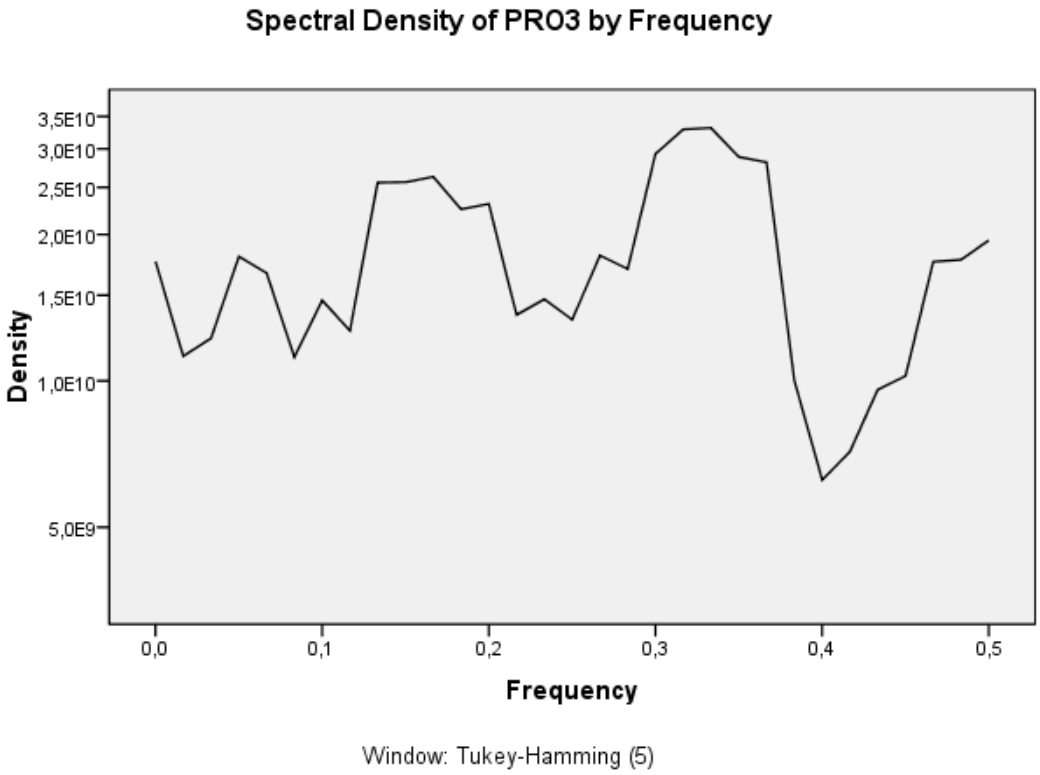

Figure 6.21: Spectral Density of Product 3 by Frequency

The spectral density for product 3 by frequency also shows high level of seasonality with little or none periodicity. The spectral density of product 3 shows that it is more of seasonal than periodical. This spectral density has given a more details of the product analysis. If the rate of seasonality is compare with that of periodicity from the figure above, it is more seasonal than periodic. This is a deviation with the graph of the product 3 data when the data was used to plot the graph. There seems to be partly relationship between periodogram and product data. There is quiet deviation when the product data is compare with the spectral density of product 3 on like product 1 and 2 by frequency. When this is compare and the result obtained by using expert modeler, I conclude that product 3 is partly seasonal and more periodical.

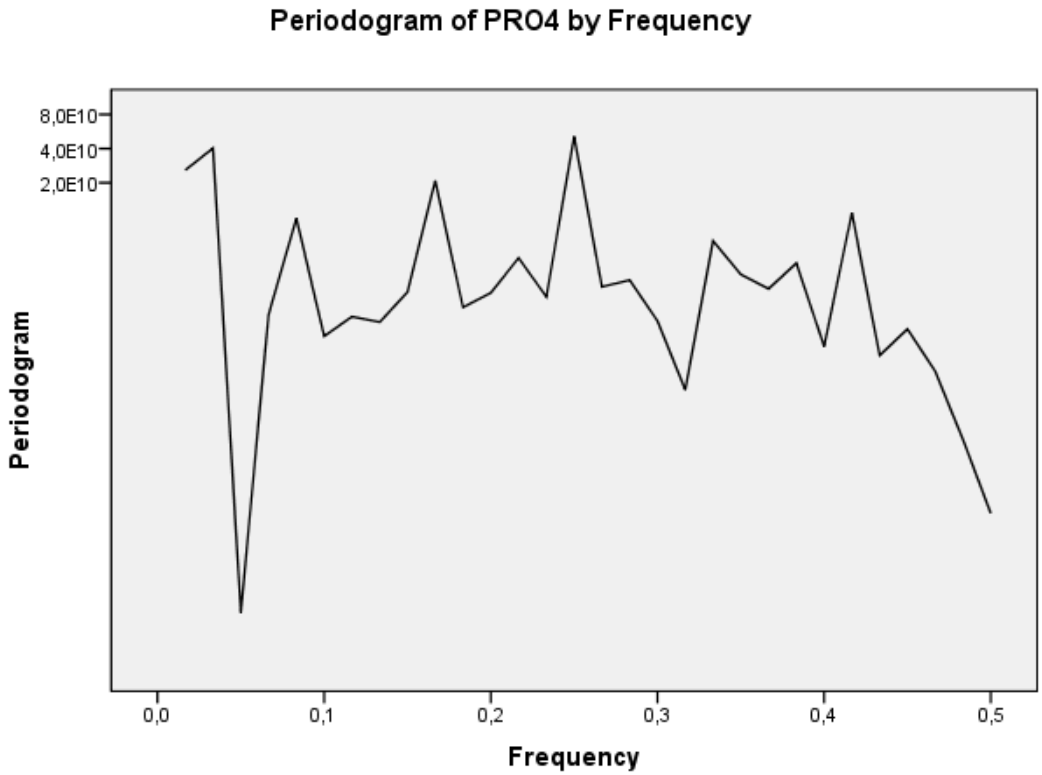

Figure 6.22: Periodogram of Product 4 by Frequency

The periodogram for product 4 by frequency shows absolute seasonality. The appears to be remarkable correlation between the periodogram of product 4 and the product data graph of product 4.When compared, the periodogram of product 4 give more accessible and easily assessment than the product data graph, but the seasonality is greatly showing on both.

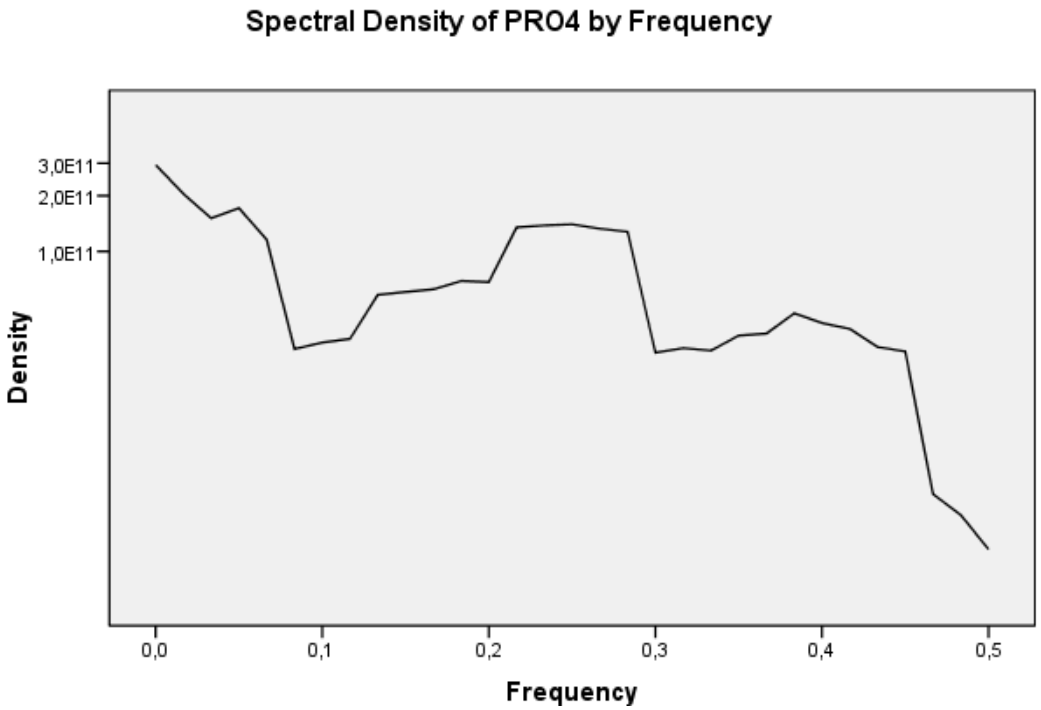

Figure 6.23: Spectral Density of Product 4 by Frequency

The spectral density of product 4 by frequency shows partly seasonal and partly periodical. This spectral density has given a more details of the product analysis. If the rate of seasonality is compare with that of periodicity from the figure above, it is still more seasonal than periodic. This is in line with the graph of the product 4 when the data was used to plot the graph. There seems to be great relationship between periodogram and product data than spectral density of product 4. There is quiet deviation when the product data is compare with the spectral density of product 4 by frequency. When this comparism and the result obtained by using expert modeler, I conclude that product 4 is seasonal.

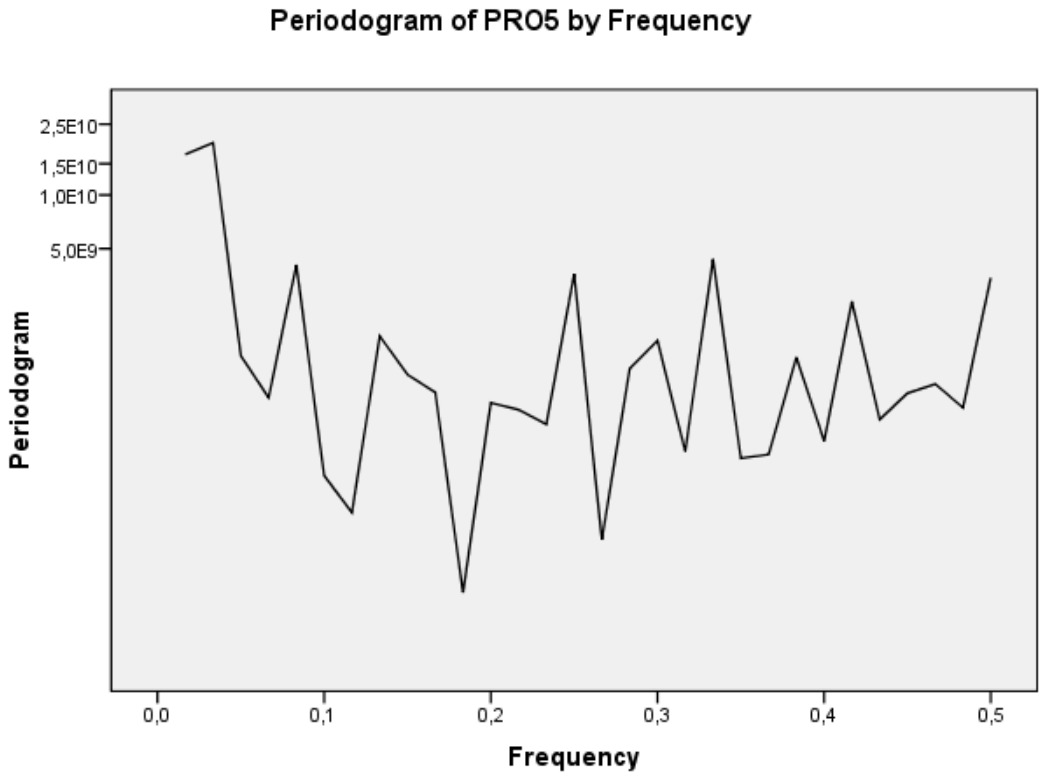

Figure 6.24: Periodogram of Product 5 by Frequency

The periodogram for product 5 by frequency shows absolute seasonality with little or none periodicity. When this is also compare with the product data graph, there appears to be a remarkable relationship between product 5 data graph and the product 5 periodogram by frequency. When the two are compared, periodogram of product 5 give more useful information than the graph of product 5 data.

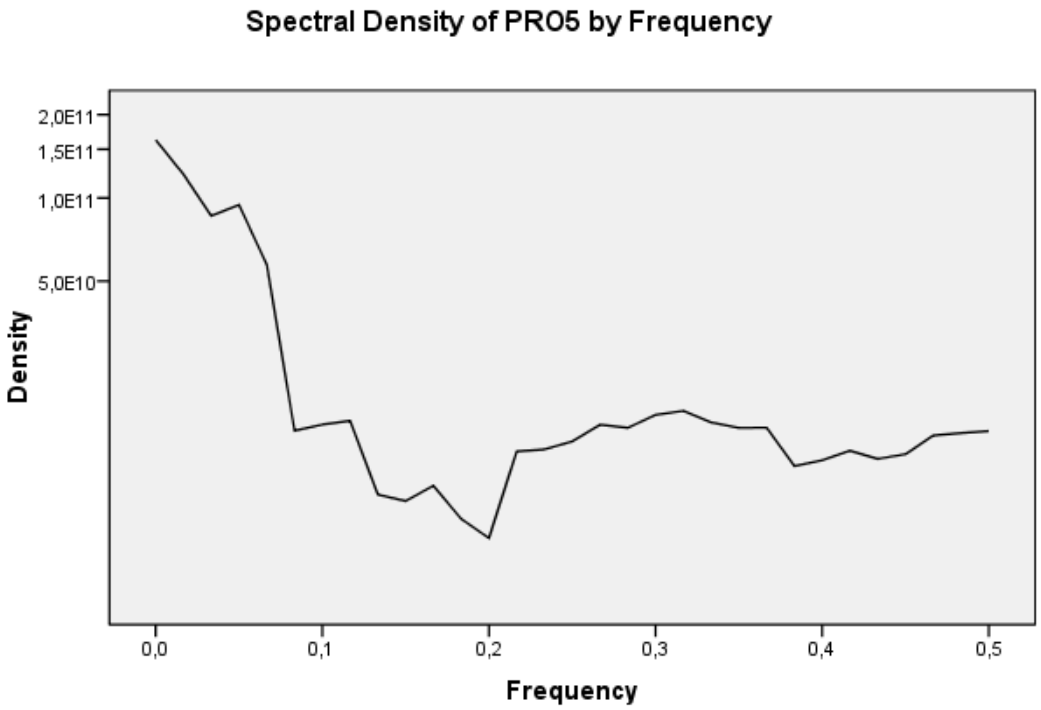

Figure 6.25: Spectral Density of Product 5 by Frequency

The spectral density of product 5 by frequency shows partly seasonality and more of periodicity with trend. This spectral density has given a more details of the product analysis. If the rate of seasonality is compare with that of periodicity from the figure above, it is more periodic than seasonal. There is quiet deviation when the product data is compare with the spectral density of product 5 by frequency.

6.7 Forecasting

For each model, forecasts start after the last non-missing in the range of the requested estimation period, and end at the last period for which non-missing values of all the predictors are available or at the end date of the requested forecast period, whichever is earlier.

Table .6.1: Forecasting Error

Model		Jan 2014	Feb 2014	Mar.14	Apr 2014	May.14	Jun 2014
PRO1-Model_1	Forecast	794,27	903,75	2739,74	455,98	84,75	1003,39
	UCL	3476,77	3709,95	7044,31	3201,54	2772,93	10246,04
	LCL	-1888,22	-1902,46	-1564,83	-2289,58	-2603,42	-8239,27
PRO2-Model_2	Forecast	8077,58	12909,27	10543,11	9897,68	5810,12	9264,28
	UCL	23872,93	31768,52	29279,14	29378,10	23433,36	32014,78
	LCL	-7717,77	-5949,99	-8192,93	-9582,73	-11813,13	-13486,22
PRO3-Model_3	Forecast	2253,18	3641,11	221154,59	-7784539,69	-21073,39	-45005,22
	UCL	35191,23	36930,78	633339,47	9146281,43	39530,85	76778,06
	LCL	-30684,88	-29648,56	-191030,28	-24715360,80	-81677,62	-166788,50
PRO4-Model_4	Forecast	46588,20	68802,05	55594,28	21537,31	68136,12	171942,53
	UCL	109981,64	137080,08	128430,06	98661,95	149323,38	256998,58
	LCL	-16805,24	524,02	-17241,49	-55587,34	-13051,14	86886,48
PRO5-Model_5	Forecast	48686,11	68455,74	38553,95	33744,16	79172,76	40324,17
	UCL	89475,55	114059,46	88510,13	87702,85	136856,91	101507,34
	LCL	7896,66	22852,02	-11402,23	-20214,53	21488,62	-20859,01
Model		Jul 2014	Aug 2014	Sep 2014	Oct 2014	Nov 2014	Dec 2014
PRO1-Model_1	Forecast	1771,35	573,39	1008,84	4818,22	1594,67	729,90
	UCL	18021,71	6527,91	11038,71	52320,97	17912,61	8756,99
	LCL	-14479,01	-5381,14	-9021,03	-42684,53	-14723,27	-7297,19
PRO2-Model_2	Forecast	9451,74	10388,85	5033,94	7950,59	35281,16	12454,53
	UCL	33626,52	37275,87	24413,86	34085,40	135370,06	51584,01
	LCL	-14723,05	-16498,18	-14345,99	-18184,22	-64807,75	-26674,95
PRO3-Model_3	Forecast	-12486,79	-103114,40	2967130,10	122564,02	11943,44	126637,90
	UCL	35173,44	197481,86	11909434,59	505680,39	62415,77	544854,00
	LCL	-60147,01	-403710,66	-5975174,38	-260552,35	-38528,89	-291578,21
PRO4-Model_4	Forecast	56251,54	11894,75	31144,97	54254,21	84180,46	18847,35
	UCL	145007,91	104203,22	126873,83	153285,39	186407,34	124173,02
	LCL	-32504,83	-80413,71	-64583,88	-44776,98	-18046,42	-86478,32
PRO5-Model_5	Forecast	63554,97	27792,77	28882,38	38827,39	37143,42	22681,27
	UCL	128047,62	95433,16	99530,40	112360,12	113451,89	101668,00
	LCL	-937,68	-39847,61	-41765,64	-34705,34	-39165,06	-56305,46

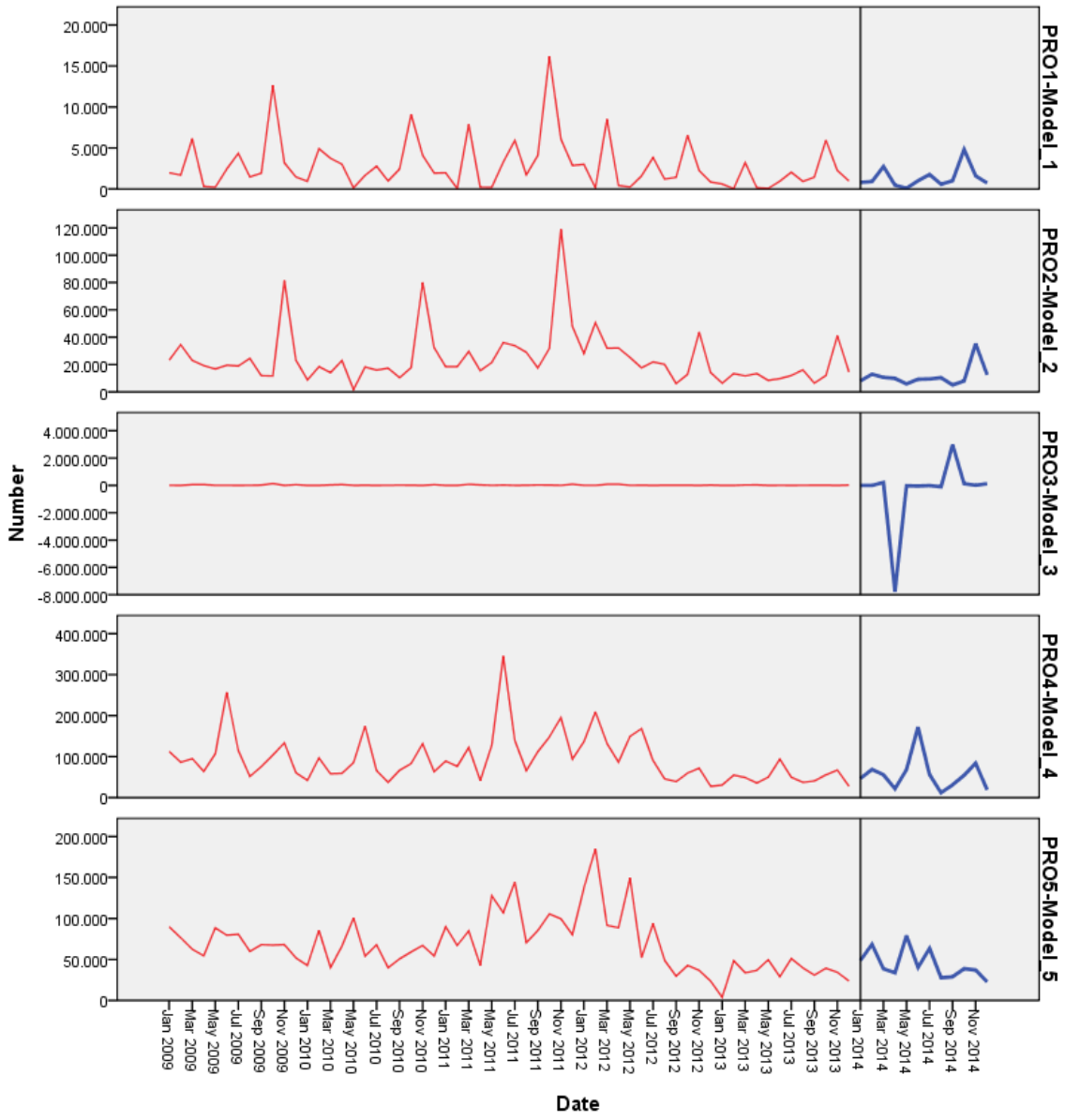

Figure 6.26: Forecasting Graphs

Taking a look at table 6:1 and 6:2, the forecasted values when compare with the actual values using their upper confidence limit and lower confidence limit, to compare the forecasted value for the two tables for the five products, they all falls within the limit, that means the forecasted values are with little or no error in it for the five products. There is only remarkable deviation from the trend only in product 3 which is somehow stable compare to the forecasted values which is partly seasonal and partly periodical.

7. Conclusion

This thesis discussed the need for professional management of lubricant in order to produce more standard products, with minimized cost, optimized profit, reduced waste, effective line of communication, risk management and also the modern improvement in products packaging. To reach these goals, market analysis and forecasting method is employed.

Another important aspect of lubricants industries is how different companies compete with each other in this sector. Different companies with the same products but different formulations, that is where competing through differentiation by making your products to be different from other products either by design or remarkable improvement on the qualities of the products which can be noticeable by the final consumer. The companies can also compete with other competitors by reducing cost of their products without reducing qualities. This can be done by engaging in mass production of lubricants which can reduce the cost of production. Another method to compete with other competitors is through response, that is by responding to consumers complain on time and also by rendering some free services to the final consumers. The market analysis of lubricants products in Nigeria shows a great remarkable increase for the demand for most of the products except for some of the products. The reasons for such steady demand may be due to some reasons like lack of proper awareness of such products, inadequate distribution channels, inability to act on customer feel back and high cost of products. The problems listed above has hindered wide spread of lubricant products in Nigeria as some customers have formed the habit of using cheaper, easily accessible and popular product as substitute when face with the problem of cost and availability without considering the consequences of such products on their engines or machines.

Based on the analysis done with the selected products it is possible to say that, the peak period for lubricants in Nigeria seems to be in the Months of October and June. It may be due to the weather conditions in the coastal area which may affect the

viscosity of the oil and eventually leads to often replacement of such lubricants. The rate of products purchases return or damage is extremely very low according to the autocorrelation analysis done by SPSS Statistics 17 Software using the products data.

Comparing the forecasted values for the different products with the original values and using the upper confidence limit and the lower confidence limit, the forecasted values have a great degree of accuracy. The different methods used to check the errors of the forecasting, also shows that the forecasting done was with little or no error in it. In conclusion, there will be a remarkable increase in the demand for lubricant products in the future some seldom decrease from time to time in Nigeria. The major problem encountered in this thesis is the difficulty of getting data as most companies sees their data as the secret of the company. Many companies were approached for data, but the offers were turned down. A better result would have being obtained if data from different lubricant companies were analyzed and compared. Another major setback in this study was unavailability of useful lubricants literature on line as most useful once were always for sell.

Further studies will be done on these very particular subjects, like comparing cost of production between animal's base oil, synthetics base oil, and base oil from crude oil. This will enable those that want to go into this venture tread saver paths. Countries that are not endour with crude oil can compare between these options and know what will be best for them. Further studies will also be carry out on the environmental impact of lubricants oil, ways to reduced the effect to the barest minimum, and how to recycled waste lubricants oil, how to disposed used lubricants oil without it causing hazards to the environment and aquatic life's. in addition, future studies like long range forecasting into the lubricants industries will also be carry out. What will become of the lubricants industries in twenty (20) years to come. How will the lubricants industries keep abreast to the evolving trend in the modern days technologies will also be consider in due time. Services will also be made available for companies that want to make projection for sales for their customers and planning for their annual productions schedule.

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Appendix

Table A. 1: Products Data

Date	Pro1	Pro2	Pro3	Pro4	Pro5
Jan 2009	1970,00	23220,00	4976,00	112782,00	89977,00
Feb 2009	1695,00	34516,00	2198,00	86275,00	76383,00
Mar-09	6135,00	23008,00	60383,00	95099,00	62565,00
Apr 2009	313,00	19200,00	63247,00	63874,00	54558,00
May-09	212,00	16767,00	6364,00	106946,00	88702,00
Jun 2009	2438,00	19534,00	8741,00	256742,00	79623,00
Jul 2009	4348,00	18905,00	3485,00	114975,00	80817,00
Aug 2009	1472,00	24518,00	8359,00	51660,00	59824,00
Sep 2009	1929,00	11813,00	22444,00	75600,00	68069,00
Oct 2009	12632,00	11635,00	141958,00	103808,00	67597,00
Nov 2009	3177,00	81397,00	2647,00	133574,00	68178,00
Dec 2009	1462,00	23142,00	55011,00	60574,00	51921,00
Jan 2010	934,00	8720,00	1869,00	42357,00	42668,00
Feb 2010	4922,00	18456,00	2461,00	96586,00	85512,00
Mar-10	3746,00	14046,00	38860,00	58056,00	40265,00
Apr 2010	3013,00	22901,00	60265,00	59059,00	66291,00
May-10	142,00	1567,00	4273,00	85464,00	100658,00
Jun 2010	1655,00	18204,00	11585,00	174320,00	54061,00
Jul 2010	2778,00	15876,00	1984,00	65487,00	67868,00
Aug 2010	982,00	17372,00	7531,00	37329,00	39948,00
Sep 2010	2436,00	10442,00	19840,00	66829,00	50818,00
Oct 2010	9081,00	17767,00	15003,00	82912,00	59223,00
Nov 2010	4108,00	80100,00	3423,00	131446,00	67092,00
Dec 2010	1936,00	32271,00	57443,00	63251,00	54215,00
Jan 2011	1969,00	18381,00	3939,00	89280,00	89937,00
Feb 2011	43,00	18386,00	1935,00	75963,00	67254,00
Mar-11	7894,00	29604,00	81905,00	122364,00	84865,00
Apr 2011	204,00	15498,00	41193,00	41601,00	42825,00
May-11	195,00	21508,00	5866,00	127746,00	127748,00
Jun 2011	3278,00	36053,00	22943,00	345238,00	107067,00
Jul 2011	5917,00	33812,00	4227,00	139474,00	144546,00
Aug 2011	1737,00	28944,00	13314,00	65992,00	70623,00
Sep 2011	4091,00	17532,00	33310,00	112202,00	85320,00
Oct 2011	16183,00	31662,00	26736,00	147754,00	105538,00
Nov 2011	6103,00	119009,00	5086,00	195296,00	99682,00
Dec 2011	2868,00	47798,00	85080,00	93684,00	80300,00

Table A. 1: Products Data (continue)

Date	Pro1	Pro2	Pro3	Pro4	Pro5
Jan 2012	3006,00	28058,00	6013,00	136284,00	137286,00
Feb 2012	120,00	50575,00	5324,00	208956,00	184999,00
Mar-12	8525,00	31970,00	88450,00	132142,00	91647,00
Apr 2012	422,00	32093,00	85301,00	86146,00	88680,00
May-12	229,00	25158,00	6861,00	149422,00	149421,00
Jun 2012	1597,00	17570,00	11181,00	168246,00	52178,00
Jul 2012	3838,00	21933,00	2742,00	90475,00	93765,00
Aug 2012	1206,00	20092,00	9242,00	45810,00	49025,00
Sep 2012	1422,00	6094,00	11578,00	38999,00	29656,00
Oct 2012	6556,00	12827,00	10832,00	59862,00	42758,00
Nov 2012	2245,00	43784,00	1871,00	71851,00	36674,00
Dec 2012	841,00	14012,00	24942,00	27464,00	23541,00
Jan 2013	608,00	6325,00	1425,00	30800,00	3884,00
Feb 2013	32,00	13375,00	1300,00	54792,00	48452,00
Mar-13	3216,00	11675,00	32525,00	48872,00	33749,00
Apr 2013	160,00	13425,00	35400,00	35568,00	36688,00
May-13	72,00	8375,00	2175,00	49664,00	49656,00
Jun 2013	952,00	9700,00	6300,00	93728,00	29013,00
Jul 2013	2044,00	11950,00	1600,00	49408,00	51100,00
Aug 2013	924,00	16100,00	7475,00	37244,00	39865,00
Sep 2013	1436,00	6400,00	12150,00	40656,00	30870,00
Oct 2013	5956,00	11925,00	10075,00	55496,00	39342,00
Nov 2013	2240,00	41050,00	1800,00	67296,00	34412,00
Dec 2013	988,00	14550,00	25025,00	27824,00	23750,00

Table A. 2: Forecasting Table

Model		Jan 2014	Feb 2014	Mar 2014	Apr 2014	May 2014	Jun 2014
PRO1-Model_1	Forecast	794,27	903,75	2739,74	455,98	84,75	1003,39
	UCL	3476,77	3709,95	7044,31	3201,54	2772,93	10246,04
	LCL	-1888,22	-1902,46	-1564,83	-2289,58	-2603,42	-8239,27
PRO2-Model_2	Forecast	8077,58	12909,27	10543,11	9897,68	5810,12	9264,28
	UCL	23872,93	31768,52	29279,14	29378,10	23433,36	32014,78
	LCL	-7717,77	-5949,99	-8192,93	-9582,73	-11813,13	-13486,22
PRO3-Model_3	Forecast	2253,18	3641,11	221154,59	-7784539,69	-21073,39	-45005,22
	UCL	35191,23	36930,78	633339,47	9146281,43	39530,85	76778,06
	LCL	-30684,88	-29648,56	-191030,28	-24715360,80	-81677,62	-166788,50
PRO4-Model_4	Forecast	46588,20	68802,05	55594,28	21537,31	68136,12	171942,53
	UCL	109981,64	137080,08	128430,06	98661,95	149323,38	256998,58
	LCL	-16805,24	524,02	-17241,49	-55587,34	-13051,14	86886,48
PRO5-Model_5	Forecast	48686,11	68455,74	38553,95	33744,16	79172,76	40324,17
	UCL	89475,55	114059,46	88510,13	87702,85	136856,91	101507,34
	LCL	7896,66	22852,02	-11402,23	-20214,53	21488,62	-20859,01

Note: For each model, forecasts start after the last non-missing in the range of the requested estimation period, and end at the last period for which non-missing values of all the predictors are available or at the end date of the requested forecast period, whichever is earlier.

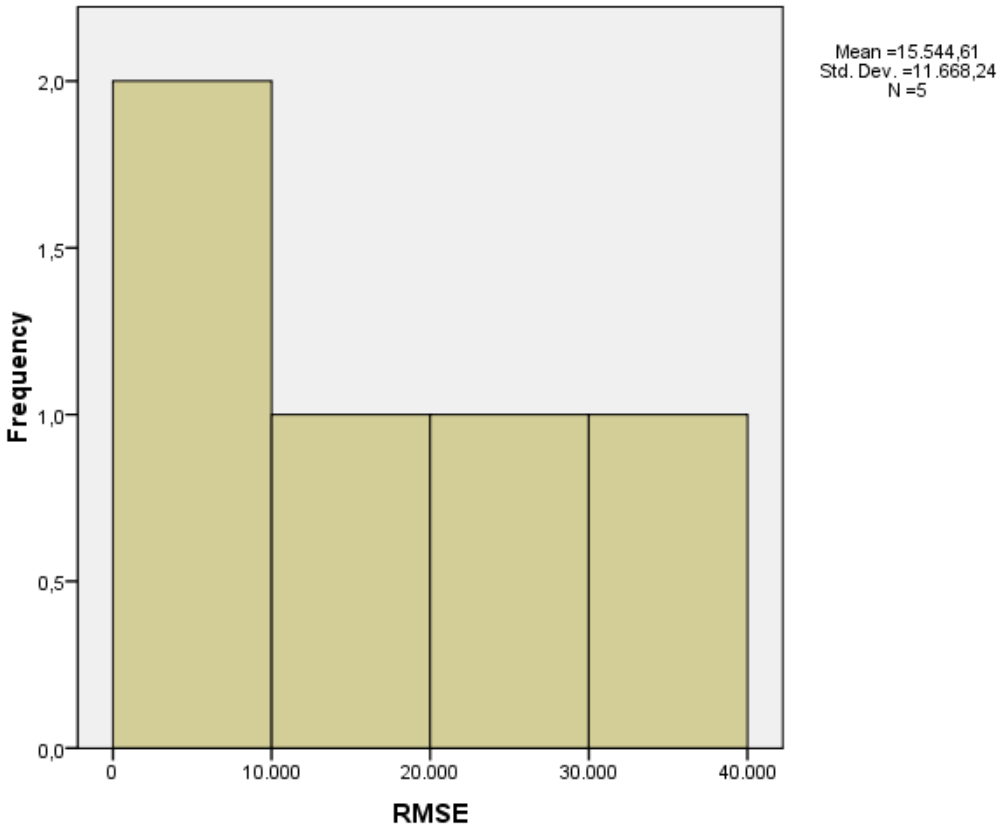

Figure A. 1: Root Mean Square Error

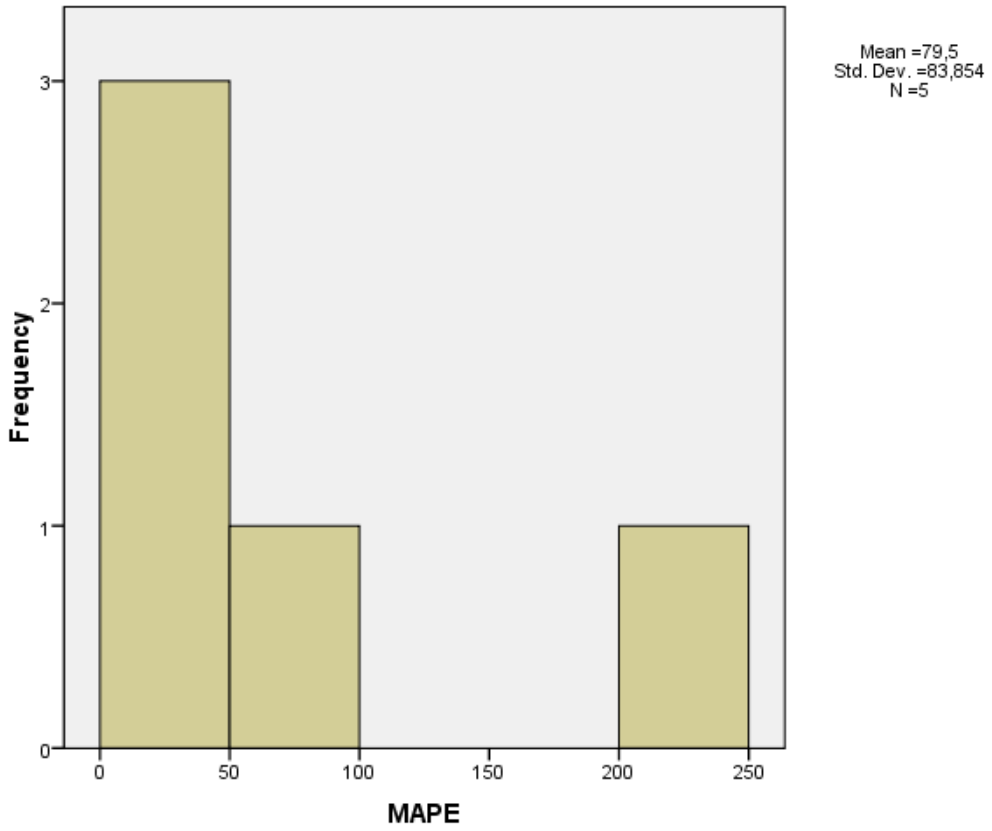

Figure A. 2: Mean Absolute Percentage Error

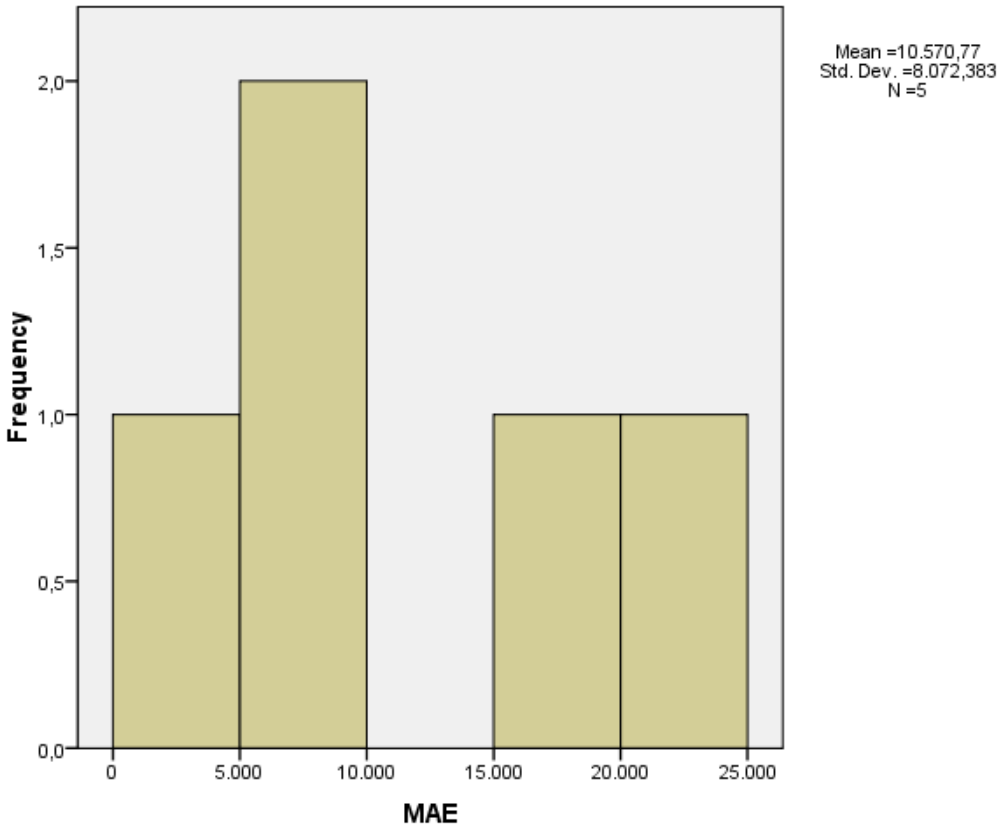

Figure A.3: Mean Absolute Error

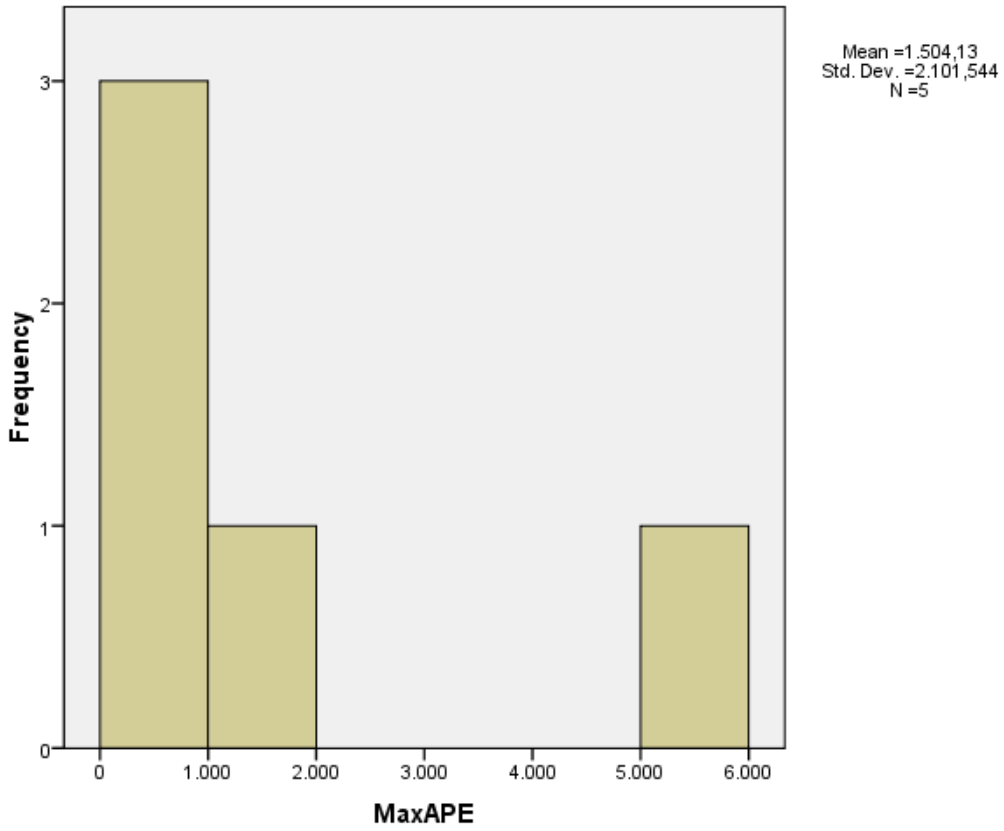

Figure A. 4: Maximum Absolute Percentage Error

Table A. 3: Model Summary

Fit Statistic	Mean	SE	Minimum	Maximum	Percentile		
					5	10	25
Stationary R-squared	,744	,042	,705	,814	,705	,705	,715
R-squared	,742	,085	,649	,842	,649	,649	,668
RMSE	15544,609	11668,240	1339,596	31669,524	1339,596	1339,596	4613,774
MAPE	79,500	83,854	28,193	227,677	28,193	28,193	31,798
MaxAPE	1504,126	2101,544	132,072	5193,433	132,072	132,072	254,930
MAE	10570,773	8072,383	910,529	21573,094	910,529	910,529	3184,360
MaxAE	54315,275	47275,778	3955,987	129188,168	3955,987	3955,987	15074,594
Normalized BIC	18,644	2,461	14,605	20,863	14,605	14,605	16,378

Table A. 4: Model Fit

Fit Statistic	Percentile			
	50	75	90	95
Stationary R-squared	,733	,779	,814	,814
R-squared	,710	,831	,842	,842
RMSE	16448,751	26023,374	31669,524	31669,524
MAPE	43,108	145,399	227,677	227,677
MaxAPE	596,702	3207,034	5193,433	5193,433
MAE	9903,063	18291,041	21573,094	21573,094
MaxAE	55559,531	92933,827	129188,168	129188,168
Normalized BIC	19,621	20,422	20,863	20,863

Table A. 5: Model Statistics

Model	Number of Predictors	Model Fit statistics	Ljung-Box Q(18)			Number of Outliers
		Stationary R-squared	Statistics	DF	Sig.	
PRO1-Model_1	0	,814	30,895	15	,009	0
PRO2-Model_2	0	,725	16,499	15	,350	0
PRO3-Model_3	0	,744	20,295	15	,161	0
PRO4-Model_4	0	,705	20,331	16	,206	0
PRO5-Model_5	0	,733	22,627	16	,124	0

Table A.6: Some features characteristics of lubricant.

Products	Relative Density at 20C°	Viscosity at 100C° (min) Centipoises	Index of Viscosity	Flash Point(min)	SAE	Foaming Test	Pour Point°
1	0.880	18.0	130	220	20W/50	23.9, 93.3	-24
2	0.885; 0.890; 0.895	11.5, 14.7, 18.4	90,90,90	200,210, And 210	30,40,50.	23,93.3, And 23.9	
3	0.890,0.890, 0.890	5.2,11.5,-14.5	90,90,90,130	200,200, 210, 220	10W,30,40 $ 15W/40	23,93.3,and 23.9	-60
4	0.890 $0.915	15.0, 25.0	90 and 90	210 & 249	90, 140	23.9, 33,and 23.9	-24 and -12
5	0.87,0.87,0.88 & 0.89	5.38,6.87,8.74, 11.3, 14.8	104,104,100,99,98	216,222,232, 240, &248	32,46,68.10 &150		-66-18

5, RUE DE LA, GRANGE COLOUMB, ROMBUILLET, FRANCE.

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Helix Osabuohien Aideyan

Career Objective:
To be an active part of a dynamic synergy of proactive mind by obtaining and updating the needed skills via both educational and work experiences so as to aligned with the common goal of the organization.

Sex:	Male
Date of Birth:	June 14, 1977
Place of Birth:	Urhonigbe
L. G. A.:	Oredo
State of Origin:	Edo
Nationality:	Nigeria
Marital Status:	Single

EDUCATIONAL INSTITUTIONS ATTENDED WITH DATES
2014-Till Date University of Versailles, Guyancourt, France
Feb. 2014 – Sept.2014. University of Rouen, France.
2013-2014 *Istanbul Aydin University,Istanbul,Turkey*
2000 – 2004 University of Jos, Jos.
1989 – 1995 Immaculate Conception College, Benin City, Edo State.
1983 – 1989 Enigbe Primary School, Urhonigbe, Edo State.

ACADEMIC QUALIFICATION WITH GRADE AND YEAR OBTAINED
IPM Eco-Innovation (Inview)
2014 Thesis in Managing Risk in Foreign Exchange Trade
2014 MBA
2004 B.sc Biochemistry
1995 S.S.C.E/G.C.E.
1996 F.S.L.C.

WORKING EXPERIENCE WITH DATES

Oct. 2014-Till Date. Member of board of Directors Assurance of Hope Foundation, Abuja, Nigeria.

April 2013-Till Date. Member of board of Directors Center Point Impex Services, Abuja, Nigeria.

Feb 2011-June 2011. Grand Petroleum Limited, Lagos, Nigeria

-Assistant Lube Manager.

- Writing of production report and supervision of production.
- Quality control and monitoring of oil spillage
- Sample collection for analysis and formulation request from the laboratory.
- Receiving and circulating of information from the top management.

Jan 2010 - Till 2013 Feb. Peace Engineering and Constructions Ltd.

- Admin Manager.

- Preparing of bids as well as attending bid meetings
- Sanitary and waste disposal
- Planning and budgeting-setting targets or goals for the future, establishing detailed steps for achieving those targets, and then allocating resources

Jan 2009 - Dec 2009 Pavilland Construction Company Ltd.

- P. A to the MD

- Preparing of bids as well as attending bid meetings
- Procurement of site and office materials
- I develops the capacity to achieve the organization plan by organizing and staffing-creating an organizational structure and set of jobs for accomplishing plan requirements, staffing the jobs with qualified individuals, communicating the plan, and devising systems to monitor implementation.

March 2007 –Dec 2008 Helosa Travel Agency Abuja

- Manager
- Processing of travelling documents
- Booking of travelling flight tickets
- I ensures plan accomplishment by controlling and problem solving-monitoring results versus the plan in some detail, both formally and informally, by means of reports, meetings ,and other tools; identifying deviations; and then planning and organizing to solve the problems.

March 2006 – Feb. 2007 National Youth Service Corps

- Baruten local Government, Kwara State
- Chemistry and Physics Teacher
-Preparing of chemical reagents for practical
-Supervision of Chemistry and Physics practical
-Instructor of Chemistry and Physics

Jan. 2003-Jun. 2003 - Industrial Training, NNPC, Abuja.

- Quality Control Officer
- Collection of samples
- Analyzing of samples
- Recording of results

RECOGNITION

NYSC Kwara State Award Winner as a dedicated and outstanding corps member in Baruten Local Government (2006 Batch A)

COMPETENCE/SKILLS KNOWLEDGE

Language Skill:Ability to speak,write and teach English Language.

Inter Personal Skill: Good attention and interest-work well with people motivate and encourage.

Quantitative Skill: Strong Statistical Skills

Research Skill: Good qualitative/quantitative research with good analytical skills.

Computer Literate: Good knowledge of Microsoft packages

Communication Skill: Good Listening and verbal skill

RESEARCH/PROJECT

Effect of Ascorbic Acid on Induced Potassium Dichromate Renal Failure

LOBE BIOGAS PLANT DESIGN

SEMINAR/ BOOK PUBLICATION

Biochemistry of Kidney Disease.

Managing Risk in Foreign Exchange Trading.

PERSONAL PROFILE/CAPABILITIES

High articulate, confident and persuasive term-builder
Good time manager, self-aware and good starter
Good strategic appreciation, proactive and innovative
Resourceful, resilient and good research

INTERESTS/HOBBIES

Reading, Travelling and Researching