

**“A SURVEY OF THE OPERATIONS OF
SERVICE STATIONS IN THE OIL
INDUSTRY USING TERRY HILL FRAME
WORK MODELS”**

UNIVERSITY OF NAIROBI
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**RESEARCH PROJECT SUBMITTED IN PARTIAL
FULFILMENT OF THE REQUIREMENTS FOR THE MASTER
OF BUSINESS ADMINISTRATION DEGREE (MBA)**

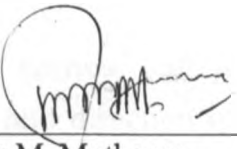
DEPARTMENT OF MANAGEMENT SCIENCE

OCTOBER 2002

Declaration

This research project paper is my original work and has not been presented for a degree in any other university I know of.

Signature



Julius M. Muthaura

Date: September 26th, 2002

This research project paper has been submitted for examination with my approval as University Supervisor

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Acknowledgement

Anyone who carries out a research or study knows that the greatest indebtedness and direction is to the supervisor and advisor of the project. I do therefore recognize the guidance and good counsel of Prof. Isaac Mbeche, his encouragement throughout the study especially during the choice of the research topic to be done. His insight into some of the researchable ideas did help me in the work that I actually finally did.

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I also want to recognize those who participated in the interviews from the various facilities for the success of this paper.

Julius M. Muthaura

Abstract

The oil industry in Kenya has over the years witnessed tremendous changes and growth. It started in 1899 with sales of Kerosene and has developed to what it is today. The developments have seen introduction of various grades of fuel and lubricants in the market to address customer requirements.

The industry throughout the world has seen better times in terms of its profitability and enjoyed better times for pricing. However, due to effects of political turmoil and economic effects contribution margins have continued to drop and thus affect shareholder returns. The Kenyan market has not been left behind in this respect.

As times have changed so have the companies in order to address the profitability and returns from the business. In this respect therefore the oil companies have devised operations management concepts that would help them win orders in the market and therefore sustain them in business. The study examined these strategies that help businesses win orders and evaluated them to categorize which ones were order winners and which order qualifiers.

Only fifty company stations replied to the questionnaires and on this basis the sample was thought adequate to give a representative indication of the results sought. Data analysis done actually did come up with indications of these strategies. It was found out that none can stand-alone and therefore a combination of them yields best results e.g. Cost, quality and new product development. These however need qualifiers in terms of location, speed of service etc. Recommendations have also been made for further study as thought that may expand the knowledge base on this subject.

Dedication

I wish to dedicate this project paper to my sons and wife without whose encouragement I would not have come this far. The study was carried out to instill a learning culture in the family. As we begin this 21st, century it will always be very challenging for those that will not be willing to learn and initiate new ideas that will bring innovation for the betterment of mans environmental surroundings and to create sustainable development.

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CHAPTER 1

1.0 INTRODUCTION

1.1. Background Information.

The first oil well was drilled in the USA in Pennsylvania in the year 1873. At the time, miners were actually after coal deposits and in the process found Methane gas (current CNG, LPGas) which are by-products of crude oil.

Over the years there has been development in this field, resulting in the discovery of many oil wells worldwide. Large deposits exist in the USA, Russia, Middle East and many other places. With oil discovery, entrepreneurs founded companies to exploit the new found (resources) opportunity. This has resulted in major oil companies such as Exxon/Mobil, BP Amoco Arco, Royal Dutch Shell, Total Fina Elf, ChevronTexaco to name but a few. The above are the largest oil companies in the world today, having been as a result of mergers for Exxon/Mobil, BP Amoco Arco, Total Final Elf and ChevronTexaco.

In Kenya, the first oil company to operate was Royal Dutch Shell in 1899 when they started selling Kerosene (DPK). The industry has continued to grow with the oil majors in Kenya up to 1996 being, Shell/BP Kenya Limited, Caltex oil (K) Limited, Agip Kenya Limited, Esso Kenya Limited (has since been replaced by Mobil locally though the company is known as Exxon/Mobil world wide), Total Kenya Limited and Kobil/Kenol petroleum.

Oil is a very politicized product in the world today. Oil reserves in many in countries have been the major causes of conflicts and wars centred on the oil reserves in the Middle East e.g the gulf war of 1991.

Petroleum products were cheap up to the Middle East crisis of 1973, when due to political pressure the price increased dramatically. In a

spate of a few days the price rose from US \$ 2/Barrel to US \$ 12 /Barrel. Since then the price has been fluctuating, increasing tremendously to the point of the gulf war when the price was at \$ 41.00/barrel.

The world economy continues to perform dismally, Kenya is not any exception and this has not helped to support the prices of petroleum products as well as other products in the market. The result of the collapse of the economies of South East Asia that resulted in a glut of oil in the market in 1997, giving rise to price variability, which dipped to a six year low of \$10.95/ barrel in January 1999. The retail prices of these products have also fluctuated as have the international product prices. In so doing the outlets have continued to seek and innovate new ways of presenting their products and thus attract customers to their outlets.

These on goings of the world have thus not spared Kenya. The incomes of customers have not been vibrant due to the dismal performance of the economy. The continued depreciation of the Kenya shilling against hard currencies (US\$, Sterling Pound e.t.c.) has had its toll on the economy as well. The economic performance of the manufacturing sector has also been very poor resulting in a growth of 1.5% in the year 2000. Quite a number of industries have closed due to importations and thus resulted in shrinking the market for fuel. Inflation in the country fueled by increased fuel and food prices has continually eroded the purchasing power of the individual, Economic survey Kenya (2001). The individual customers who therefore are the end consumers of the product have been severely drained and thus the need for factors that help the outlet to make a difference and thus improve on their volume sales and therefore their share of market (SOM). Due to the rise of crude oil prices against a depreciating shilling as compared to the dollar, the cost of oil imports went up by about 60% in Kenya in the year 2000, Economic survey Kenya(2001).

Oil companies are seen in the service stations they operate. This is one area that has been affected by the going on in the oil industry the world

over. The oil companies are therefore experiencing razor thin contribution margins through sales at retail outlets (services stations) and hence lower profits margins. The commercial side of the business is also no different. This has forced them (the oil industry players) to rethink the way forward and to redefine their continued operations. As a result we have seen companies redesign their retail outlets with enhanced features including service bays, tyre centers, convenience stores all to differentiate themselves and create a competitive advantage at the outlets. Stations are also built in such locations and layouts that are attractive to customers. Usually these facilities that are put up by the company itself and through training and communication of information the personnel at the outlets are sensitized to be more customer focused. However, at the end of this the customer needs factors (offerings) that influence them to buy from a certain location.

There are well over 800 service stations in Kenya today. As at the beginning of the year 2001, the following were the service stations of the oil majors;

Company	No of sites
Caltex	103
Shell/BP	141
Total	90
Kenol / Kobil	157
Mobil	92

The new entrants and the independents also have quite a number of sites that make up the difference today. New sites have also come up and are not included in these numbers here. Companies have merged in order to take advantage of economies of scale thus reducing costs in some areas with an improved contribution margin. Locally we have seen Shell/BP take on board Agip Kenya Limited, Kenol/Kobil took up Midoil

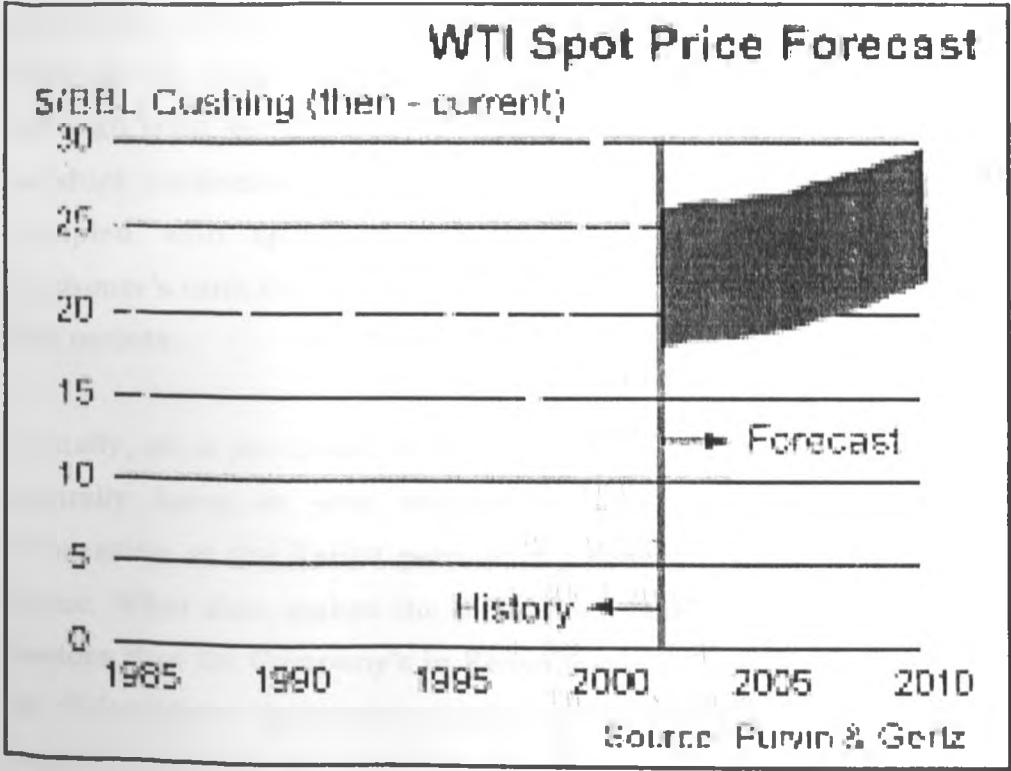
Africa Limited. Shell and BP have shared the service stations of former Agip Kenya Limited to increase their retail representation and thus street presence. This in essence helps them to reduce their operating costs through economies of scale, which they can then pass over to the outlets as price discounts and thus offer a lower retail price to the consumer.

On top of this, oil companies have devised other methods of differentiation that they use for their products to sell and the outlets are the custodians of such. In this respect issues of health, environment and safety (HES) that are devised by the company are actioned at the station level in terms of cleanliness and the adherence to safety requirements. This reflects positively to the customer in terms of grass lawns or flower beds at such premises that are well manicured and kept. Quality and speed of delivery have come into play also at service station outlets. These differentiation strategies are the ones one chooses to progress in order to increase share of market (SOM) and thus profitability. According to Terry Hill(1994), strategies that differentiate the products or services of one supplier from another are called order winners. In this case the order winning strategy could be product cost, product quality or reliability. On the other hand order qualifiers are the reasons that qualify a customer for repeat buying, Chase, Aquilano & Jacobs(1998). At the end of the day customers are interested in maximizing their purchase value. According to Khotler (2000), value is defined as the ratio of benefits to cost.

$$\text{Value} = \frac{\text{Benefits derived}}{\text{Cost of product/service}}$$

Order winners/qualifiers are factors that therefore can be employed and they precipitate new challenges to the operations of a business be it a station outlet, factory or a shop/kiosk. What however comes out is the fact that they truly help the particular business premises make a difference and therefore be a frequent choice for customers.

pLiberalization of the oil industry in Kenya in October 1994 brought in a new dimension of competition. Earlier under the government controlled price regime, the dealers at service stations had a set profit margin. With liberalization however, this has now to be carefully studied in setting up prices at outlets an issue that involves the company and the dealer. It is an every day event as prices keep on fluctuating from one station to another (see Table 4:1:00 & 4:1:01 on compare share of market for the years 2000 and 2001. The company price averages for oil companies are also given in table appendix 3 to give an indication of the costs of product by company for the years 2000 and 2001 up to June. It can be seen that the average prices as presented keep fluctuating up and down due to crude oil price fluctuations. The price of crude oil variability is as shown below for the years 1985 to date with a forecast into the future;



Therefore new factors have had to be laid to maximize on value and returns given the stringent prices that do not give room for high profitability in the market. With the advent of new entrants and the licensing of independent stations that have taken up some volume of the established oil company stations, the issue of the order winners/qualifiers have even a higher impact on how the outlet and the company address them. The new entrants have continued to grow market share at the expense of the established oil firms since the petroleum industry was liberalized. The market has also witnessed significant volumes of illegally imported products (duty and taxes not paid) that have distorted pricing of petroleum products within Kenya and especially the high volume area of Nairobi. These products are sold in the market at great price differences due to the tax factors. This kind of competition is based on price as the main driver and is not sustainable. In some cases, the integrity of the product is itself compromised in that petrol is mixed with kerosene and thus the mixture is offered at a lower price than petrol. The established multinational companies have seized this as an opportunity to differentiate their products in the market through their service station outlets. They are using this to ensure their product conformance to quality up to customers tank is guaranteed. Coupled with speed of delivery and operational efficiency to the customer's tank the companies want to segment the market they serve at the outlets.

Usually, oil is purchased from the same suppliers (the big oil companies actually bring in joint shipments) and their costs are the same. Processing at the Kenya petroleum Refinery Limited (KPRL) is also the same. What then makes the difference? This paper is meant to address factors that Oil Company's in Kenya (especially within Nairobi) are using to differentiate themselves at the service station outlet level and thus remain profitably in business. We thus need to find out which are the order winners and which are the qualifiers that make some stations have a high business turnover and others a lower one when operating within

the same locality. In addition we need to compare the operations factors used by individual oil companies to help differentiate their outlets from those of the competition.

As noted by Professor Terry Hill(1994), “ An interface between marketing and operations is necessary to provide a business with an understanding of its markets from both perspectives”. Today there are large refineries in the world that are able to produce cheaply and in large volumes that can meet the requirements of many countries needs. A report by the World Bank for Sub- Saharan Africa done in 1993 was actually to address the viability of their having many refineries in this region while the volume consumed did not reflect the same. Their volume consumption could not actually justify the existence of a refinery in Mombasa as well as in Dar es salaam. Oil Company's in the last decade have had to make decisions as to their continued operation of some refineries, many have had to close mainly in the USA and western Europe. Their continued existence could not be justified due to their high operating costs, which are at the end are borne by the consumer.

1.2 STATEMENT OF THE PROBLEMS

Petroleum products represent the most important energy source in Kenya. In Sub Saharan Africa, petroleum products represent approximately 60% of all the energy produced, with fuelwood still dominating the primary energy balance. Their importance is clearly reflected in their weight as a major source of revenue for the government. Taxes make about 40 – 45 % of the cost of petroleum products to the consumer in Kenya. This therefore makes the product more expensive. Mostly petroleum products are sold through the oil company's service station outlets to motorists and used to power automotive engines in the commercial sector. As is seen in the service station operations the factors that affect sales at these outlets keep on changing from one station to another.

Since petroleum products represent the main source of commercial energy in Kenya, covering about seventy (70%) of the requirements, their cost and availability play a key role in the economic development of the country.

From the time the petroleum industry in Kenya was liberalized, there has been an unprecedented influx of new players into the market. Estimated growth in volume of the sector at 1.5% per annum has been low due to illegal sales especially from diverted exports that are not captured and results indicate a growth rate of about 2% per annum. Volumes have had to be shared as margins have dropped, and illegal products meant for export are sold locally.

Following the liberalization of the oil industry the company's and service station operators have had to rethink their strategies of operation in order to remain competitive. This has seen the adoption of new strategies for product differentiation in the clamour for increased sales volumes in an increasingly crowded market. With this the adoption of the Terry Hill framework model of order winners/qualifiers has come into play for those who are to remain competitive.

This study will examine the operation factors adopted by service station outlets through the companies in order to increase their sales volumes and therefore their market share. As indicated earlier this will help define and identify the order winning factors and those that cause customers to experience repeat purchases or customer loyalty at particular outlets.

From the above it is now obvious that the existing company's have to use factors that would competitively grow their market share profitably. Accordingly Skinner (1974) and Terry Hill (1994) have identified the following as the main operation factors used by firms to gain competitive advantage:-

1. Product quality & Reliability
2. Flexibility in types of products available and manufacture
3. Facilities location
4. Cost –Low cost strategy
5. Reliability/consistency in delivery
6. Speed of execution
7. Procurement strategy
8. Product development
9. Capacity to cope with demand & design

As recorded by Chase, Aquilano and Jacobs (1998), it is evident that no firm can address all these strategies concurrently. In the case of Southwest Airlines they addressed speed and convenience to the traveler as their main operation factors for competitiveness within the travel (hospitality) industry, and low cost positioning to differentiate themselves in the market.

This paper will therefore seek to address and bring out the following:

1. What factors distinguish order winners and order qualifiers in the oil industry at the service station level.
2. What do consumers value in the purchase of petroleum products (Order winners).
3. How do the operations factors used by individuals firms at the station level compare?

1.3 Objectives of the study.

The objectives of this study will be as follows:

1. Establish and rank operation related factors (order winners) that oil firms in Kenya are using to influence customers purchases in fuel stations.
2. Compare each firms performance against the main factors that are used to attract customers at the station level (High performers and low)
3. To identify and bring out relationships (if any) between performance and the operations factors adopted at the station for companies.

1.5 Importance of the study.

This study will benefit the following:-

1. The petroleum companies to be aware which operations factors at the station level are more effective in their performance.
2. Those intending to invest in the industry to be aware of its profitability factors and areas of concern.
3. The report will help to improve on, the efficient delivery of the factors that most affect the industry.
4. To help researchers in this field to address the issues of the petroleum industry effectively and the main customer driving factors.

CHAPTER 2

2.0 Literature Review.

Why do we Operations Management (OM) at the customer delivery point for the oil industry? At the service station level is where the customer actually comes into contact with the company. At this level the company should have enough faith with those entrusted to sell their product to make sure the service delivery and thus the value proposition is good for the customers. The output from these, usually goods or services to the consumers should be accompanied by some addition value propositions such as costs, efficiency, quality etc. Operations Management brings efficiency and effectiveness in a firm for the delivery of its outputs.

Today's enterprises, in an effort to continue improving their operations strategy are constantly moving to seek new realms of opportunities in value delivery to the consumers. In their quest to remain competitive, firms are fine tuning themselves and collating their resources to remain in business. This has resulted in companies re-looking at themselves and defining their core business. On top of this the companies have also continued to expand the product offering to improve on their bottom line results given the dwindling contribution margins. Oil company's have therefore introduced convenience stores within their outlets, tyre centers, offering of services that help the consumer to want to come to certain localities of service station outlets..

At the same time companies have turned "global". This is to say organizations that operate globally with few plants and resources than before but with more efficiency and effectiveness to the consumers benefit. The intent of these organizations to be global is in order to

reduce costs (labour, tax, tariffs etc.) improve on their supply chain management, provide better goods and services, attract new markets, learn to improve operations and to attract and retain global talent (the human resource factor). In this case therefore, companies have developed strategies to be able to achieve their business plans and targets. All these are in an effort to address the cost of product to the customer. For oil companies these will be reflected at the service station level.

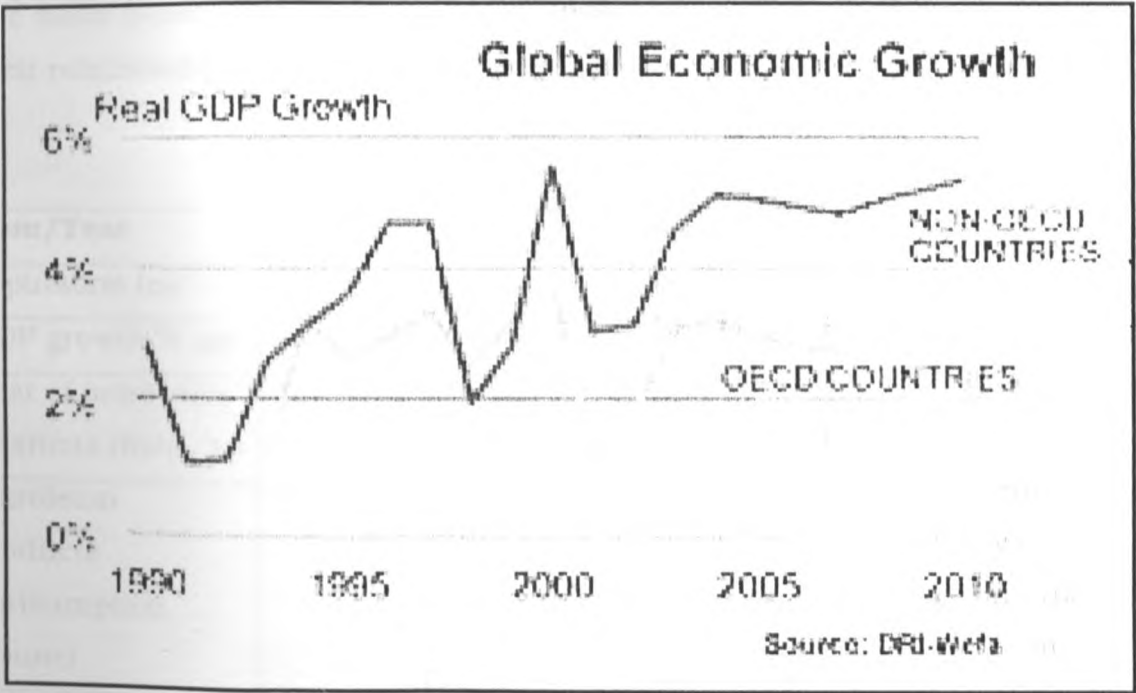
Strategy is a way of thinking, Macallister (1989). Strategy is about developing focus and integrating the company's functions, instead of allowing incompatible functional strategies to develop. Strategy is along haul that is always long term and is directed by the vision the organization has. It is important to note that, operations management strategies affect corporate strategy and vice versa, operations decisions can limit or enhance the corporations strategic options.

OPERATIONS FACTORS FOR OIL COMPANIES

Operations factors for oil companies are therefore, specially designed to fulfill the tasks demanded by the corporate strategic plans as in other companies. A company's different marketing strategies and approaches to gain a competitive advantage place different demands to operations management. Order winning capabilities seem to offer great promises for companies at the service station level. Order winning/qualifying criteria, can however be affected by such issues as training and therefore the companies are spending colossal sums of resources on training the service station attendants as well as the dealers to enhance their capabilities. Culture, cultural backgrounds and the technology infrastructure of the different firms and people have an impact even at the station level, habits, instincts and ways of thinking and reasoning. It means modifying a set of values that current management systems and day-to-day operations demand, Wickham Skinner (1974).

GLOBALIZATION TO ACHIEVE ECONOMIIES OF SCALE

The global economic downturn of the last two years has had a significant impact on the energy industry. Predictions are there that this is going to get better as we get into the later years of this decade. However, economic recovery is expected to be largely dependent on the performance of the U.S. economy and the contributions from Europe and Japan. Below is a chart showing historical, current and future trends of world economic trends as seen from a Gross Domestic Product(GDP) growth.



Oil companies are no exception to this and therefore are striving to this end too. The thinking of survival in terms of differentiation factors has also been much witnessed even in the Kenyan market. Companies are consolidating themselves as a result of continued poor performance, loss

of business to competition and a slumped sales in the market. Such a strategy of business consolidation is always significant and beneficial as it brings in new strength and the sharing of fiscal resources as a result of the company's size. Economies of scale set in as the new firm continues to serve its customers with a leaner resource base of personnel due to the consolidation of earlier different departments.

USAGE PETROLEUM PRODUCTS IN KENYA

Petroleum products are so important to the Kenyan economy such that without them it would be difficult for it to stay afloat. During the year 2000/2001 when drought resulted in a drop of the generation of hydro – power, a number of emergency generators were installed under a world bank funding to alleviate the shortfall of electrical power to industries. The table below shows some key indicators in the economy (Kenya) and their relationship with the petroleum industry;

Item/Year	1996	1997	1998	1999	2000
Population (m)	26.3	27.1	27.9	28.7	29.3
GDP growth % age	4.6	2.4	1.8	1.8	-0.3
Cost of petroleum Products (Kshs. M)	16,001.0	18,703.6	21,008.6	29,954.4	53,667
Petroleum products Consumption (Tonne)	2,230.5	2,175.2	2,199.1	2,311.6	2,448.1
GDP per Capita	3,732.0	3,707.5	3,665.0	3,613.3	3,527.5

Source: Economic survey, Kenya 2000

Table 1

As seen from the table above, the cost of petroleum products to the Kenyan economy has continued to rise over the five years recorded. With this rise has been the issue of drought occasioned by erratic rainfall patterns in the country. Both have fuelled inflation the country against a falling GDP (Gross domestic Product) at -0.30%(negative 0.3%) as at year 2000. In this same environment has been witnessed case of poor performance in the economy that has resulted in the loss of jobs for many. The cost of petroleum products has continued to rise, and oil company's sales volumes (share of market, SOM) have dropped. These companies have had to rethink on factors to use at the customer contact level to remain competitive.

Most oil companies process crude oil at the Kenya petroleum Refineries in Mombasa. The oil companies are forced process at Mombasa despite the fact that it adds a 15% cost element to the total cost of the product. Imports from efficient refineries would be relatively cheaper and the issue of global supplies from a strategic population location would be the preferred option for the oil companies. This would mean them exploiting their synergies of mergers to compete effectively and efficiently. According to oil industry sources, Kenya Petroleum Refineries (KPRL) charges US\$ 2.00/Barrel(1 barrel = 159 litres) of crude processing fee compared to a similar refinery in the Ivory Coast (Cote D' voire) that charges US \$ 0.94/Barrel. Whereas the firms would want to reduce costs and therefore increase their sales by passing the benefits to the customer at the service station level, there are inefficiencies through third parties and government taxes that increase their costs of the products offered.

It is against such a background that firms marketing their products here in Kenya find themselves in, the loss of purchasing power to the consumer due to eroded incomes therefore seeks for clearly differentiated products that deliver value. Due to this "companies have embarked on crusades to lower costs, improve productivity, increase flexibility, shrink cycle times, and enhance quality and service, Hammer (1996).

Another competitive strategy that the oil companies have introduced is the convenience stores that are offering merchandise that are offered at departmental stores (super markets) Due to the low investment concept of the new entrants they are not able to compete effectively on this end. The idea of the convenience store is to give a wide offering that will attract the customers to the retail outlet. We therefore see that other than price, oil companies are using other competitive methods to give them an upper hand in the market. Over the years companies have used various competitive priorities to differentiate themselves in the market.

Below is a table showing the changing competitive priorities used by various firms over different periods in order of priority:

1990	1992	1993	1996
Conformance quality	Conformance quality	Conformance quality	Conformance quality
On-time delivery	Product reliability	On-time delivery	Product reliability
Product reliability	On-time delivery	Products reliability	On-time delivery
Performance quality	Performance quality	Low price	Low price
Low Price	Low price	Fast delivery	Fast delivery
	Speedy NPI**	Speedy NPI**	Performance quality
Speedy NPI**			Speedy NPI**

Source: Production& Operations Management, Chase, Aquilano & Jacobs (1998),**NPI –New Product Introduction

Table 2

for example quality, (Many of the companies are now ISO 9000 certified for production, testing and distribution of their products) perceived or otherwise by the customer. They are also striving to be efficient and effective in their delivery of products, this introduces the element of speed and flexibility in the operations management system. It is with these in mind that the company's are strategizing their business in their preferred market areas/segments.

The operating environment in Kenya is fiercely competitive, with the major oil companies being at a cost disadvantage. The new entrants to the oil industry are using a lower operating cost as their strategy, which is based on minimal expenditure on location (service station), brand and allied to price competition. Price is becoming the order winner for service station selection with service and quality of products falling next in a second tier level for the strategic segments (Hi-end and Middle managers, point-to pointers, professional drivers and working women). The main factors to be considered for order winners/qualifiers according to oil industry sources are: product costs, speed and professionalism (fast and efficient service), product quality, location and layout, brand name and product quality assurance system.

OTHER FACILITIES AT SERVICE STATIONS.

In the recent past we find oil companies have partnered with food chains to increase their offering to the traveler and other customers. In the time that one is taking a snack from a fast food chain at a service station the customer will also fill up his/her tank for convenience. In Kenya we find Mobil oil has partnered with Nandos of Zimbabwe and Kenol/ Kobil with Kengeles. Much as this concept is new it is gaining in popularity and has been accepted as a market driver for the oil industry and therefore a order winning/qualifying factor.

CHAPTER 3

3.0 Research Methodology

3.1 Research Design

A research design is the strategy for a study and details the plan about which the concept of study will be carried out. The research design is going to be based on descriptive studies to bring out relationships and association between the strategies used at service stations to winner orders and repeat purchases. According to Cooper and Emory (1995) an association is relevant when one factor influences the out come of another. In this case the sales from the locations are influenced by the strategy used by the company. According to John Stuart Mill in the 19th century, “ When two or more causes of a given phenomenon have one and only one condition in common, then that condition can be regarded as the cause (or effect) of the phenomenon”. In the choice and selection of service station, several conditions are however considered. The oil companies all operate under the same environment and they strive for improved profit margins and higher share of market (SOM). The study will be of importance as it will bring out the movement of the share of market for the oil companies and what really are the factors that drive it at the service station level. The issues that have come out of the study indicate that the;

- a) emergence of price as a key driver to service station selection.
- b) Increased competition from low price operators
- c) Declining fuel margins, resulting in striving for quality
- d) Other factors that affect services station selection.

The survey was carried out within the Nairobi Central area as most of the service stations are located within the urban centers, mainly because of the need to tap high volumes and thus market share. Nairobi makes up more than 50% of the fuel market in Kenya.

3.2 The Population

Before the oil industry was liberalized in 1994 there operated 8 companies in Kenya. These were, Agip, Caltex, Esso, Kenol, Kobil, BP, Shell and Total oil companies and later National oil company. Since then we have seen the proliferation through registration of oil companies like Elf, Engen, Jovena, Fuelex, Galana, Gapco, Petro-Kenya and Mafuta. Todate it is believed there are over 100 registered oil companies in the country all of varying sizes.

The main players in the industry however, continue to be the established multinationals that have dominated the industry over the years. All the registered companies are relevant in this study, however some are not represented within the Nairobi central area and for the purposes of this study and are assumed to be represented by the sample of service stations taken. Since only service stations were considered to identify the order winning/qualifying factors, it was therefore not necessary to address each company separately.

Given the number of service stations within the area under study, it was considered appropriate that a sample of the 70 service stations would form a representative sample for the population. These were homogeneous due to the fact that most companies are now using the same strategies for product differentiation and the localities are not very much different. Some of the variables were weighted due to the fact that the data collected was not numerical. Stratified sampling method was used to select the service stations to be interviewed.

3.3 Data Collection Methods

Both primary and secondary data was used to explain the causes of order winning and order qualifying factors. Secondary data collected was to compare share of market for the oil companies as this was thought to have an indication of the kind of market movements that would result due to the use of strategies to increase sales volumes. Analysis of the data of the primary data was carried out separately as the secondary data was reflective of the historical share of market.

3.4 Primary Data

Primary data was collected by use of the following methods;

- (a) Observation of the volume of traffic flow at peak times of the day
- (b) interviewing at the selected service stations
- (C) Questionnaire containing structured and unstructured questions.

3.5 Secondary Data.

This comprised data that is normally collected on a daily basis about the market prices at petrol station outlets as well as monthly data on the percentage share of markets for the various oil majors in the country. The data on market share will be availed for a year in order to show the kind of market trends there are and to explain the reasons for the seasonal or varying trends.

Since there is more than one variable the data will be analyzed by use of multivariate statistical methods to establish relationships/associations, if any. Other methods used include the analysis of variance(ANOVA) and the t-distribution to get if there any associations between the different factors and the volumes sold.

3.6 Data Analysis

Data obtained for the various variables was analysed by the use of multivariate statistics. For example the t-test will be used to compare data on the various strategies the firms are using to differentiate themselves in the market before and after the merger resulting in improved volumes. Use of normal t-test (parametric tests), which assume that the underlying population is normally distributed about the mean. These are usually defined on the basis of specific population parameters, in this case volumes sold through or price charged.

At the same time the researcher compared various firms strategies against their lead strategy and to do this well the chi-square (χ^2). This applied to populations that are said to be distribution free, that is they do not assume any form of the underlying population and are not based on any population parameter. The volumes actually sold do not exhibit any form of distribution as was found out in the study. This is usually used to compare observed frequencies (values) with expected frequencies. These will include chi-square goodness of fit and chi-square tests of independence.

The researcher also used data on pricing at the service stations to compare the various strategies used and for this used the analysis of variance test (ANOVA). Using different prices at different outlets the researcher checked on volumes sales variance. This helped to locate how important the price variable is in this study is at the customer contact point.

CHAPTER 4

4:1 Description of Data collection techniques.

The study, was mainly a survey carried put as earlier described using a drop and pick questionnaire together with some observation and interviews where the dealers/supervisors were available. Mainly the identification of qualitative competitive strategies of operations management that result in order winning capabilities was the subject of the study.

4:1:0 Share of Market By Company

Market share of each company forms a significant measure of performance and as an indicator of average performance by each retail outlet.

Total Company Market share – Year 2000 in %

Brand Name	Jan	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Caltex	18.7	19.9	18.2	14.9	15	21.1	16.6	15.2	14.2	18.8	16.8	14.5
Mobil	15.1	17.8	14.9	11.2	15.3	18.2	11.1	11.2	12.7	10.1	12.1	12.4
Shell/BP/Agip	21.4	24.8	26.4	24.3	29.9	22.7	23.6	23.3	26.3	30.5	29.3	26.7
Agip	8.6	11	8.4	9	8.6	5.9	5.6	6.2	5.7			
Total	15.4	12.3	13.3	17.9	11.4	11.5	17.9	23.3	19.5	17.6	21.1	22
Kobil	14.3	9.5	14.6	12.5	13.9	15.5	15.6	12.5	14.6	15.5	12.5	12.9
Kenol	6.4	4.7	4.2	10.2	5.8	5	5.4	5.3	4.5	4.1	5	8.4
N/entrants							4.2	3	2.5	3.4	3.1	3.2

Source: Oil Industry 2000
Table 4:1:00

Total Company Market share – Year 2001 in %

Brand Name	Jan	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Caltex	15.3	16.8	14	16.1	15							
Mobil	10.5	10.4	13.3	11.6	11.5							
Shell/BP/Agip	27.4	29.2	30.2	30.5	30.8							
Agip												
Total	20.4	21.2	15.5	11.9	14.1							
Kobil	16.7	11.6	11.9	12.9	14.7							
Kenol	6	5.7	8.6	9.1	7.4							
N/entrants	3.7	5.1	6.5	7.9	6.5							

Source: Oil Industry
Table 4:1:01

The figures above depict the market shares for each of the established oil companies and have a lot of indication as to volumes commanded by the firm. Depending on what one company is doing to increase their sales it will be seen that the share of market keeps on changing. Agip was bought out by Shell/BP in year 2000 and therefore their volume sales from the date they stopped operating their market share was added over to the new company. As can be seen this was not a direct translation in that the market share did not increase by the figure that Agip had previously, meaning that in the transition they lost some business to other companies. The company's use of different order winning methods could have resulted in this market shift resulting in increase in others.

Throughout the year it will be seen these figures keep on changing from one company to another. I do not think there is any equilibrium for them as at any one time there is always a preferred station that takes volumes from others. The environment is also very dynamic and thus the reason for the market share changes from month to month. Also as can be seen from the tables, the new independent oil companies are gaining market share and this must be coming from the established oil firms.

4:1:1 Observations

Observations at sites during questionnaire handover/pick up reveal that some service station sites are more patronized than others. With peak

times of patronage e.g. morning and evening that are dependent on the location. Those on highways do not have any patterns as they attract long distance customers.

However, those near estates have the same daily high's and low's due to the timing for office hours. Public service vehicles do not have any regular periods as they are not scheduled and will top up when ready to move and thus the need to locate service stations at points where there is originating or turning traffic. This is an indication that locality in the preference for a service station is of importance for those located in residential areas this could be your order winning criteria.

Another observation was that established company's still enjoyed a higher patronage than the independents. As will be seen later, the perception of quality by consumers tends to remove them from the unpaved service stations that may indicate low quality of products offered due to the standards displayed by the finishing. These kind of features influence the customers perception of quality and thus choice of stations to fuel from.

Who owns the stations? Some stations are not branded and you would not know the source of products. Some customers are sensitive of this and would be selective in their choice of stations.

4:1:2 Response to Questionnaires:

Total No. of Questionnaires	<u>Actual responses</u>	<u>No response</u>	<u>% response rate</u>
70	51	19	73%

Source: Researcher

Table 3

The response rate to the questionnaires at 73% is no mean response. Indications are that the co-operation to complete questionnaires point

out that most people are interested in results that will come out of the research.

Stations from Total Kenya Limited and Mobil Oil Kenya Limited did not respond. Their reasons were that they are not allowed to participate in such research by the parent company as this may reveal information on how they operate. The researcher tried to get authorization from the Company's in writing to no avail.

However the researcher used the available data from the five company stations that did actually respond to evaluate the operations as most of these operations have the same drivers.

As indicated earlier competitive priorities of firms keep on changing and in this case various strategies were evaluated.

The different strategies used were each evaluated by collecting data and analyzing using the tools described. The following are short descriptions of the strategies;

4:2 Speed of product delivery.

Speed or on-time delivery is a very critical factor as far as the customer is concerned. Slow response will cause the customer to drive on to the next fuel point which may not be far.

Such would result in the long run to loss of service confidence at the location and thus loss of customer loyalty.

When evaluated speed was rated high as a major contributor to customer visits to a location. Out of a response of 50 the following table gives the rating:

Customer service speed table:

Rating	Frequency	%	Cumulative
1	0	-	-
2	-	-	-
3	-	-	-
4	13	26	26
5	37	74	100

Source: Researcher

Table 4

The rating was developed such that 1 had lowest customer service speed and 5 highest. It can clearly be seen that service is a factor that influences the customer loyalty. At the same time, service stations are served by oil company's and at their level they also value the response to the delivery of products. Delays to deliveries would result in stock outs that affect the customers (motorists) loyalty.

The table below indicates the rating for on time delivery at service stations as served by oil companies,

Rating	Frequency	Percent (%)	Cumulative
1	-	-	-
2	1	2	2
3	4	8	10
4	15	30	40
5	30	60	60

Source: Researcher

Table 5

The results here also indicate on time delivery is a critical factor as products are available to serve customers all the time.

4:3 Location of service stations.

Usually in operations management facility location is very important in that it demands services from the neighboring population. If it is a factory, it will require labour as well as raw materials from close to the location. At the same time location has to be right, as the market ought also to be close to the facility.

In the same way service station location is a critical factor that demands studies to be made well in advance in order establish traffic volumes and patterns within a certain area. If there are any other service stations nearby, one also would get the volumes sold to be able estimate the business in the location.

The researcher here wanted to find out if choice of location is important. The following table shows the responses indicating location Importance:

Rating	Frequency	%(Percentage)	Cumulative
1	-	1	-
2	-	-	-
3	7	14	14
4	4	8	22
5	39	78	100

Source: Researcher

Table 6

From the data it shows location is an important factor in locating a service station. The facility layout is also a prime factor in the choice for customers. Customers like spacious, not congested areas that are well

lit at night, and also those that are on the right places (i.e. near residential areas or on their way of travel)

Usually customers preference for location is for every kind of service centre, be it a departmental stall or otherwise.

4:4 Product Reliability (Availability)

According to the data collected product reliability is not a major competitive strategy (priority) in the market researched. It was found that customers do not attach any major priority to this factor.

This could be mainly due to the fact that there are several facilities next to each other and when one does not carry the product it is possible to get to the next for a fill. The table below shows the results of responses:

Rating	Frequency	Percentage %	Cummulative %
1	8	16	16
2	10	20	36
3	17	34	70
4	14	28	98
5	-	-	-

Source: Researcher

There was one questionnaire, which carried no response in this category. There is therefore no preference due to product reliability.

4:5 New product development (introduction)

The market under study has only a few informed motorists that crave for new products to go with new technology from the data collected and analysed. It is not clear on the preferences for new product introduction. Though a skewed relationship can be seen, it is not very evident as the data below shows:

Rating	Frequency	Percentage	Cumulative
1	5	10.2	10.2
2	7	14.3	24.5
3	11	22.4	46.9
4	13	26.5	73.5
5	13	26.5	100
Missing 1			

Source: Researcher

Table 7

From the ANOVA analysis, it is seen that new product development is a significant factor. It falls into the critical area and is therefore important to the operating company in the long run. New products have mainly to do with lubricants and in the recent past products that are environmental friendly e.g. unleaded gasoline or low sulphur diesel (gas oil).

Usually oil companies will try to keep up product development with original equipment manufacturers (OEM) for engines that are to use the products. Due to technological development today's equipment operate at higher speeds and thus higher temperatures. Products to operate at these higher temperatures have thus to be developed to support the new equipment mainly lubricating and hydraulic oils.

It has been witnessed that there are in the market today synthetic products (lubricants) to support these severe operating conditions.

4:6 Product quality

Product quality was identified as one of the competitive strategies (priorities) in the market studied. As seen in the table that follows:

Rating	Frequency	Percentage %	Cumulative (%)
1	-	-	-
2	1	2	2
3	2	4	6
4	12	24	30
5	35	70	100

Source: Researcher

Table 8

Many believe that product quality makes them more competitive at the station level. It is to be realized that in our market, there are known cases of product integrity interference. When this is perceived of a certain location customers will withdraw out of it to a safer one. This results in reduced volume sales of the products envisaged. Therefore product quality is seen as a major competitive priority in the market studied.

4:7 Quality rating

Quality is about performance of product and service. Usually petroleum products have two types there is the gasoline diesel, kerosene that are more or less commodities from various stations and then we have the lubricants that bring out concern for quality. These will dictate the kind of quality rating the equipment to use is engineered for.

In this case therefore the customer would seek quality that meets the purpose. In our market, this is not very defined due to the level of understanding of some of the motorists e.g. the matatu(taxi) drivers etc. Usually they would use a product that does not meet specification out of ignorance or lack of understanding just because it is cheap.

The table below however shows that customers perceived quality leads them to frequent outlets for this benefit;

Rating	Frequency	Percentage age	Cumulative %
1	-	-	-
2	-	-	-
3	1	2	2
4	8	16	18
5	41	82	100

Source: Researcher

Table 9

4:8 Supply Reliability

Service stations have their suppliers as the oil companies for their products. They will usually call for an order once they have capacity in their tanks to accommodate a certain volume. Many times oil companies require such calls be placed 48 hors before the expected delivery time. This will ensure timely delivery to preclude any stock outs

However, if one places an order later that this, it can still be delivered only that one is not assured of the reliability to deliver when you need it. Thus comes in the question of supply reliability.

Supply reliability is the ability of the firm to avail the product or service on or before a promised delivery date Chase, Aquilano & Jacob (1998). If product reliability is uncertain customers may not frequent service stations for fear that it does not have product. This causes the station to loose loyalty from customers.

The table below shows that supply reliability is significant as requirement for customer patronage.

Rating	Frequency	Percentage	Cumulative
1	1	2	2
2	-	-	-
3	2	4	6
4	13	26	32
5	34	68	100

Source: Researcher

Table 10

It can therefore be seen that supply reliability is a critical requirement if one has to operate a service station.

4:9 T-tests

The volume sales by station vary widely, from one to another. Several reasons evaluated contribute to this wide variability, including location of the facility. Layout, service reliability, products quality and reliability etc. From the analysis done it was found therefore that it is difficult to come up with an average volume sales for all stations, as this will actually not be a predictor of future sales per station.

In such a case therefore, no hypothesis can be established, as the sales from one facility cannot help us predict what others are going to have.

4:10 Analysis of Variance(ANOVA)

It is used to test that the means of several populations are equal. It can be used to compare the effects of a factor or strategy on a continuous dependent variable. ANOVA uses randomly selected samples and in this case they are (were). It uses squared deviations and assumes each group has its own mean, Cooper & Emory (1995)

ANOVA Results:

If the calculated value is less than the value from the table, this means that we reject the null hypothesis and therefore conclude that there are significant results achieved using a better strategy as in low price (low cost strategy). Cost Leadership.

ANOVA TABLE:

Strategy	Sum of squares	df	Mean squares	F	Assyp. Sign
Location	1.120	49	0.280	0.516	0.724
Low price	10.271	38	2.568	2.962	0.033
Product reliability	2.96	48	0.726	0.637	0.69
Product development (NPI)	23.567	48	0.520	4.427	0.04
Product quality	1.600	49	0.400	2.143	0.091
Service speed	3.363	48	0.841	1.136	0.352
Supply reliability	2.080	49	0.520	0.897	0.474
Customer speed	0.20	49	0.005	0.218	0.927
Delivery rating	<u>1.480</u>	49	0.370	0.666	0.619

(Source: Researcher's analysis)

Table 11

From this ANOVA table we find that there are significance differences of volume sold at stations as a result of the following strategies:

- 1. Low price strategy. This means that a low price is an order winner at the service station level.
- 2. New product Introduction (product development rating)m is an order winner

3. Perceived or known product quality. As said earlier, the customer perception about quality products being sold at a location is an outright order winner.

4:11 Chi- square Analysis

Chi-square is a Non-parametric test - the chi-square test is used in this case as a nominal scale measurement (data is classified). It will be used to test the differences between observed distribution data and expected one based on a null hypothesis.

From the chi-square table of results analysed and given below we find that there are quite a number of significant differences that are brought about by different strategies; The following strategies seem to influence sales at the service station level, thus resulting in increased volumes sold.

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Chi-square χ^2 analysis response tables:

Variable	Pearson chi square value	df (degrees of freedom)	Assymp. Sign. 2 sided
Merged company	9.263	4	0.055
Ownership(public or private)	50	4	0
Location	11.538	12	0.483
Product reliability	16.473	8	0.036
Product delay	5.266	4	0.261
NPI(New product introduction)	13.098	4	0.011
Speed of service	4.082	4	0.395
Other**	31.721	16	0.011
Planned diversification	19.252	12	0.83
Product quality	15.989	16	0.454
Products offered	23.526	12	0.024
Price(merger issue)	11	6	0.088
Other products	25.005	16	0.07

Source: researcher

Table 12

4:11:1 **Companies that have merged.**

Mergers result in economies of scale and therefore reduced costs of production. The end result is that the resulting companies are leaner in staff and the separate departments are merged for a lower cost organization but with the same or higher production volume. Such a firm can result in being a cost leader in the market. This company will therefore apply a strategy of low pricing to push more goods into the market and through higher sales realize improved returns (thus profits).

4:11:2 Ownership:

Ownership does not seem to have a real effect on the volumes sold in the market. From the analysis, and results of the ownership it looks there is no deducible relationship between company ownership and volume sales.

In Kenya there are only two publicly quoted oil companies (i.e. Total Kenya Limited and Kenol Oil. Out of the two only Kenol responded and thus lack of adequate data could also be the reason for not being able to establish any relationship.

4:11:3 Location of facility:

Where should a plant or service facility be located? Location is vital to any business venture. The service should be located near customers or on their way to and from their work place/business area. The facility that offers the service must be where the customer is when the customer needs it. The question of location of a facility has to do with:

1. The need to produce goods close to the customer, to reduce shipping time, costs etc.
2. Need to locate near a labour pool (especially cheap labour and take advantage of technical skills).

In the case of service stations the first is true. However from the result location is not a significant factor, probably because the customer thinks it is a given.

4:11:4 Product reliability

How reliable is the product in terms of its process quality? Customers want products that meet specifications and without defects. In essence therefore product reliability is about producing error free products. Adherence to specifications for a product in production ensures its

reliability as defined by its intended use. We find from the result that product reliability is significant in determining customer loyalty and thus high sales at service stations. Today motorists are concerned about product reliability due to their investments that can be wiped out by unreliable products.

4:11:5 NP1 (New product introduction) Product Development.

OEM'S (Original equipment manufacturers) are daily upbeat on developing new technology. This varies from the small equipment to cars and big equipment as in ships. The service providers in terms of products have to keep in tandem to provide reliable products. Therefore the survey found that frequency of new product introductions (NPI), was a significant factor in the choice of a fueling station

The impact on competitiveness is great as this is a clear response to customer's needs and a strategy to keep ahead of competition. This means that a company has to stay focused and its research and design department (R&D) has to keep abreast of OEM development.

4:11:6 Speed of service

From the analysis speed of service does not seem to be a significant player in the customer loyalty. In most cases, if service is slow at a certain site (service station), the customer will easily slip away to the next location for fuel. However, when it comes to quality at the next site, most would not mind waiting longer for the service.

The facility exists to serve the customer and the systems inherent in the organization are there to facilitate the process of service. Operations is responsible for service systems in terms of procedures, equipment and facilities.

4:11:7 Other aspects of customer choice.

Customers frequenting the service facility have issues that qualify according to their needs the location, such issues are to do with;

1. Security - Some places are dark at night and congested in the day. Many and especially lady motorists would not take this facility for a service point.
2. Cleanliness/service - cleanliness here refers to the general appearance of the location. During these times customers are looking not only at the cost of product but also at the possible other risk costs that may come with it. The service providers also need to look neat at all times, the reason why most organizations are having support services to provide uniforms or safety clothing to those using their products.
3. Credit facilities - These also do play a part in customer loyalty to a facility. Credit facilities help improve on ones cash flows.
4. Friendly service - Treatment of a customer in terms of friendliness and helpfulness helps attract them to a facility. With higher contact time between the customer and service systems there, is a higher degree of interaction and therefore leads a customer to gauge the quality of service provided.

From the analysis we find that these aspects of customer service are critical (significant) to the choice of a facility. If these are improved we find more loyalty and thus higher sales from the location.

4:11:8 Planned Diversification

Customers today are delighted by a one-stop shopping philosophy. In service stations the concept is catching up quite first. Customers will find the traditional petroleum products in a service station and new concepts of a convenience store/shop, tyre centers, oil change and service, motor vehicle accessories sales, restaurant etc.

The above and many others help to keep the station ahead of competition and therefore remain the facility of choice. However, the analysis here did not show any significant effect in improved sales of the core products(i.e. Petroleum products based products).

4:11:9 Product Quality.

Product quality is to do with focusing on customer requirements. A product should be fit for the purpose for its' intended use. Whereas, the chi-square analysis does not show it as significant, ANOVA (analysis does of variance) did show it as a critical requirement for customer preference to a certain facility. The goal here is for customers to experience products that meet their quality requirements.

4:11:10 Product offered at the facility.

Traditionally as mentioned above products offered for sale at service stations have had something to do with motor vehicles. These have played a part in the frequenting of service stations. From the analysis it is seen that there is a significant difference that helps attract customers for a location and thus increases sales.

Sales of such products make a station more reliable to the customers in terms of their reliability to offer these products. Introduction of these additional products make one a preferred location for customers and thus increased reliability with higher patronage.

4:12 Combined Analysis

From the analysis results of the three methods;

1. T-distribution test
2. Chi-square test
3. ANOVA –Analysis of variance.

We find that increased sales at service stations have to do with the following factors;

1. Price of product-

Petrol is treated as a commodity and therefore motorists are lured to the place with the lowest price. Mainly we find that most users, who are predominantly in the transport industry would negotiate price discounts to match the lowest posted prices. With the advent of liberalization prices are posted and vary from day to day. This was found to be the case as revealed by the questionnaire, that motorist would read off the prices and with time establish the best.

One case in point is on Thika road, in Nairobi where the station enjoyed good volumes due to its posting the lowest price. However, motorists soon discovered that the quality of products affected the performance of their vehicles. This led to a withdrawal and reduced sales by over 80% of those previously enjoyed.

2. New product Development.

The speed of new product introduction in time with OEM'S (Original equipment manufacturers) roll out of new product specifications is a factor that is significant in these operations of service stations.

New specifications call for products that would measure up to the requirements of OEM'S and the sooner they are available on the shelves the better, for a one stop shopping.

CHAPTER 5

CONCLUSIONS, RECOMMENDATIONS & LIMITATIONS

5:1 CONCLUSIONS

The use of operations management strategies to improve sales and position one in the market have become a daily requirement. Customers want products that are made to meet their needs (product quality) delivered in time and are priced competitively. As Chase, Aquilano & Jacobs(1998) summarized as the main objective of operations management; quality, flexibility and price (cost of product).

The basic operations management(OM) priorities are daily changing due to changing environmental operating modes. The priorities have in the past included cost, product quality and reliability, delivery speed, delivery reliability, changing demand, flexibility, new product introduction and other factors such as security that are evolving.

The combination of these strategies to win a market is quite possible and yields results far above the use of only one strategy. According to my research here the operators offering services tend to employ concepts of service which are effective. They tend to bring together low costs, high quality and acceptable customer service. The station owners (i.e. the oil companies) provide some of these as they directly benefit from them. Issues of location for facilities, facility layout, capacity (in terms of the number of service points and quantity in tanks), product costs and reliability.

Usually the requirement is that a combination of all these strategies should result in the lowest total cost of operation to the benefit of the station. However, costs alone will not usually win customers, there is a need to blend in other variables like time and customer service.

From the data analysis by chi-square tests and analysis of variance(ANOVA) there is strong evidence that the marketing/operations link of order winners in the service stations are mainly:

1. The price of products strategy
2. The new product introduction strategy
3. Conformance products quality.

One issue that came out very clearly from the data collected and analysed is that a low cost strategy is an order winner. Mergers have the effects of combining policies, personnel and operations management with an overall total cost advantage. Today mergers are happening to address that total customer requirement and be able to put more volume into the market at the lowest cost.

From the ANOVA analysis table we find three elements (factors or strategies) that have order winning capabilities, as they exhibit significant differences from the minimum requirements i.e. price, new product introduction and product quality. Therefore, applying these strategies will result in good volume sales and hence good returns. The order qualifiers here are speed of service to the customer and supply reliability. As has been said before, speed and convenience of service delivery are important to the customer and they make one to have repeat purchases. Coupled with this we have treatment of customer in terms of friendliness and assistance. Supply reliability is to do with availability of goods when the customer requires them. Customers would not frequent a facility where they are not sure to find their requirements, thus supply reliability is an order qualifier in this case.

From the chi-square analysis table the following exhibit significant differences from the minimum requirements, price, New product introduction, other aspects of customer choice (security, friendliness etc), products offered at service facility. Here also we find price ad New product development present themselves as order winners. The other

factors also are quite evident and strong in today's market to qualify for order winning capability.

The new independent oil companies have come up with their own strategies to compete in the market. As observed during the survey, they are mainly low cost operators with substandard facilities. Usually their forecourts are not paved (tarmacked) and operate in very unsafe conditions. Some operate right from inside buildings posing a risk to customers and occupants of the buildings.

Apart from these, the capital investments in terms of equipment is low and they will usually use old equipment probably purchased from established firms. Established oil companies facing this threat have therefore come up with the referred to order winning strategies. These are accompanied by order qualifiers.

The liberation of the oil industry was a boon to customers in that this has resulted in company's addressing other factors and not necessary price. Realization by the company's also that cost is not only in the product has brought about other value added services that the customer now enjoys.

Before the liberalization of the oil industry some of the strategies now used to win orders and qualify them were never seen or had not been developed. The cartel type industry that existed then was to the detriment of customers requirements for value added services. Due to this, issues of innovation, initiative, creativity and discovery that would result in improved value services were stifled down. Thanks to the liberalization for helping bring these up. When established oil companies operated in the years before liberalization they enjoyed good volume sales and high contribution margins and therefore had no cause to worry.

To conclude therefore, the survey identified three order winners in price, conformance product quality and new product introduction. Additionally, the order qualifier are, speed and convenience of service delivery, supply reliability, other aspects of customer choice and products offered for sale at outlets. As seen in the data analysis and interpretation all these are important to the choice of the facility by customer.

5:2 Recommendations:

From the findings that are enumerated several issues come up to be addressed to using the marketing/operations link of order winners and qualifiers;

1. a combination of several strategies need to be used to be competitive in the market. The researcher recommends that price, new product introduction and quality be used together to win orders and thus customers. This is evident not only in the oil industry but also in the fast moving consumer goods (FMCG) industry. In the recent past we have for example seen Uchumi and Nakumatt stores use these strategies to win customer. The mix of these strategies I believe can be applied to other industries like the motor and others. It brings in increased volume sales and therefore returns.
2. a combination of other strategies act to qualify the orders for customers to have repeat purchases. This is evident again not only in the oil industry but in others. The FMCG and motor industry are good examples. Uchumi for example is moving close to the customers (location), and providing value adding services like parking, supply reliability, security as in Nakumatt. In the motor industry we see the comeback (location) of Audi and Citroen in the market in Kenya to reposition themselves for the future market. Therefore order

qualifying strategies are also necessary to support the order winning strategies.

3. Liberalization seems to be a pacesetter in any industry. The government therefore needs to open up areas that are still controlled for the private sector to bloom in selling what they are best at. Industries such as the communication one (i.e. Telkom Kenya Limited, Posta etc.) cause delivery of services to have bottlenecks and customers to lack value added services that would come with them. The vision of this country can only be realized in a free economy that also helps government to collect enough revenue to provide services like security, health and other infrastructure necessary for industries to flourish.
4. Institutions of higher learning should embrace the fact that company's of the future will survive due to operations strategies they adopt. The company of the future will have procurement as its main strategy to reduce cost of goods (raw materials) for production. Institutions should link operations management to industry applicability for students to get more informed on the strategic survival of future businesses. Supply chain management and e-procurement strategies are future tenets that need to be pursued.

At the end the product cost is the main driver in sales, however, many other processes count to this final cost eg. Efficiency, cost of inputs, conformance quality etc. that will be addressed in operations management.

5:3 Limitations to this study:

There were limitations to this study that were mainly in the areas of:

1. Most dealers (supervisors) were unwilling to divulge information that they felt was confidential. Some were not sure of the use of data collected as the researcher works in the same industry. There was fear that data may be used to benefit the firm.
2. Some companies were reluctant to allow information to be collected from their sites. Most of them promised to accept but much as the researcher followed up this did not happen.
3. Due to (1) above some areas received inadequate data making analysis difficult thus creating gaps.
4. The study was limited to stations in Nairobi due to time constraints as well as resources to conduct the same outside. A more detailed and revealing study should have come out were some facilities outside Nairobi included in the study.
5. Security was a major concern to those who did not know the researcher. They claimed later that at first they thought investigations on their dealings were being monitored behind the scenes for possible attacks.

5:4 Recommendations for further research.

In this study other factors like promotions and advertisements were held constant. Probably it may be appropriate to study the effects of these in future. This may reveal other trends associated with such introductions.

Additionally a survey of customers themselves may reveal their very drivers to visit certain service providers. Data in this survey may probably change what in this case was seen as the order winners/qualifiers. Stratification of high and low volume sites could also be done, to reveal why we have low volume stations and high volumes.

The research could be applied to other industries as pointed out in the conclusions. Terry Hills model does not limit one as to the industry of application.

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Questionnaire

Company Data

1. Name _____ of _____ the
firm.....
2. Name _____ of _____ service _____ station
.....
3. Data _____ company _____ started _____ operations _____ in _____ Kenya
.....
4. Ownership of company [] Public Limited Company
[] Private Limited Company
5. When _____ did _____ station _____ start _____ operation
.....
6. Location of service station Name of road.
7. How was choice of location made; -
[] Close to estate
[] Due to location of high volume station
[] On highway out of urban center
[] Other consideration
8. What products are offered for sale at this site;
(i)
(ii)
(iii)
(iv)

(v)

(vi)

9. What other products ate planned for in the future

.....

10. Give reasons fir the intended change/sale of other products

.....

.....

.....

.....

Criterion Factors

11. Is product quality important for your business

[] Yes

[] No

How would you rate the quality of product sold at your station based on customer feedback on a scale of 1-5 (please circle one)

5 High

4

3

2

1 Low

Why is product quality important, please give reasons?

.....

.....

If not quality is not important, why is this the case,

.....

.....

12. Would you **emphasize** on quality? Why?

.....
.....

13. What precautions do you take to ensure quality of product is maintained?

.....
.....

14. How do you rate delivery on time of your products on a scale of 1-5
(please circle one)

- 5High
- 4
- 3
- 2
- 1 Low

15. If your products ordered are not there on time, what are the effects?

.....
.....

16. How do you rate product reliability supply to you station on a scale of 2-5 (please circle one)

- 5High
- 4
- 3
- 2
- 1 Low

17. What effects if any, does reliability have on your daily sales.

[] Affect our daily sales

☐ ☐ Has no effect at all

Please indicate other additional comments that product reliability has on your daily sales.

.....

.....

18. What causes your customers to come back for a refill.

☐ ☐ Product quality

☐ ☐ Product reliability

☐ ☐ Speed of Service

☐ ☐ Low price

☐ ☐ All of the above

19. Do you consider speed an important elements in customer care?

☐ ☐ Yes

☐ ☐ No

20. How would you rate speed in serving customers on a scale of 1-5 (

Please circle one)

5 High

4

3

2

1 Low

NB

21. How would you gauge responsiveness to customers one scale 1-5 (Please circle one)

5 High

4

3

2

1 Low

22. What is your current price for the various products in Kshs./Litre

Premium

Regular

Kerosene

Diesel

Others

23. What is your volume sales per day in litres?

Premium

Regular

Kerosene

Diesel

Others

24. What is your volumes sales per month in litres?

Premium

Regular

Kerosene

Diesel

Others

25. Do you consider location an important element in your business, how
would you rate it on scale 1-5 (please circle one);

5 High

4

3

2

1 Low

26. Do you often have new products introduced in the market?

[] Yes

[] No

27. Do you consider new product development an important aspect in your business, how would you rate it on a scale of 1-5.

5 High

4

3

2

1 Low

28. What other aspects would you consider important in the customers choice of services station;

.....

.....

.....

.....

29. With the mergers that are coming up, what aspect of them has affected you?

.....

.....

30. Do the mergers have bring in any significant differences for the station operator?

.....

.....

31. How are mergers addressing the issues of price, quality, reliability, conformance to quality e.t.c.

.....

.....

32. Do you think there are any benefits derived from mergers?

[] Yes

[] No

33. If yes what are they? If not state briefly what you consider is good for mergers

.....

.....

Thank you very much for your time in this case.

Appendix 2

Frequency Table

Company				
	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Caltex	10	20.0	20.0	20.0
Shell	10	20.0	20.0	40.0
BP	10	20.0	20.0	60.0
Kobil	10	20.0	20.0	80.0
Kcnol	1	20.0	20.0	100.0
Total	50	100.0	100.0	

Customer response to speed

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 4	13	26.0	26.0	26.0
5	37	74.0	74.0	100.0
Total	50	100.0	100.0	

Customer service speed

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 4	13	26.0	26.0	26.0
5	37	74.0	74.0	100.0
Total	50	100.0	100.0	

Ontime delivery rating

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 2	1	2.0	2.0	2.0
3	4	8.0	8.0	10.0
4	15	30.0	30.0	40.0
5	30	60.0	60.0	100.0
Total	50	100.0	100.0	

Is Location Important

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 3	7	14.0	14.0	14.0
4	4	8.0	8.0	22.0
5	39	78.0	78.0	100.0
Total	50	100.0	100.0	

Price Sensitivity Products

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1	2	4.0	5.1	5.1
2	14	28.0	35.9	41.0
3	16	32.0	41.0	82.1
4	3	6.0	7.7	89.7
5	4	8.0	10.3	100.0
Total	39	78.0	100.0	
Missing System	11	22.0		
Total	50	100.0		

Other Reasons

	Frequency	Percent	Valid Percent	Cumulative
Valid 1	10	20.0	66.7	66.7
2	3	6.0	20.0	86.7
3	1	2.0	6.7	93.3
4	1	2.0	6.7	100.0
5	15	30.0	100.0	
Total	35	70.0		
Missing System	50	100.0		
Total				

Product Reliability (Availability)

	Frequency	Percent	Valid Percent	Cumulative
Valid 1	8	16.0	16.3	16.3
2	10	20.0	20.4	36.7
3	17	34.0	34.7	71.4
4	14	28.0	28.6	100.0
5	49	98.0	100.0	
Total	1	2.0		
Missing System	50	100.0		
Total				

New Product Development

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1	5	10.0	10.2	10.2
2	7	14.0	14.3	24.5
3	11	22.0	22.4	46.9
4	13	26.0	26.5	73.5
5	13	26.0	26.5	100.0
Total	49	98.0	100.0	
Missing System	1	2.0		
Total	50	100.0		

Product quality

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 2	1	2.0	2.0	2.0
3	2	4.0	4.0	6.0
4	12	24.0	24.0	30.0
5	35	70.0	70.0	100.0
Total	50	100.0	100.0	

Quality Rating

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 3	1	2.0	2.0	2.0
4	8	16.0	16.0	18.0
5	41	82.0	82.0	100.0
Total	50	100.0	100.0	

Service Speed

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 2	3	6.0	6.1	6.1
3	10	20.0	20.4	26.5
4	22	44.0	44.9	71.4
5	14	28.0	28.6	100.0
Total	49	98.0	100.0	
Missing System	1	2.0		
Total	50	100.0		

Supply Reliability

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1	1	2.0	2.0	2.0
3	2	4.0	4.0	6.0
4	13	26.0	26.0	32.0
5	34	68.0	68.0	100.0
Total	50	100.0	100.0	

*
Volume Sold/Month

		Frequency	Percent	Valid Percent	Cumulative
Valid	15600	1	2.0	2.9	2.9
	36000	1	2.0	2.9	5.7
	57000	1	2.0	2.9	8.6
	64000	1	2.0	2.9	11.4
	75000	1	2.0	2.9	14.3
	84000	1	2.0	2.9	17.1
	88000	1	2.0	2.9	20.0
	93000	1	2.0	2.9	22.9
	102000	1	2.0	2.9	25.7
	103500	1	2.0	2.9	28.6
	138000	1	2.0	2.9	31.4
	150000	1	4.0	5.7	37.1
	159000	1	2.0	2.9	40.0
	160500	1	2.0	2.9	42.9
	162000	1	4.0	5.7	48.6
	165000	1	2.0	2.9	51.4
	173000	1	2.0	2.9	54.3
	193000	1	2.0	2.9	57.1
	192000	1	4.0	5.7	62.9
	198000	1	2.0	2.9	65.7
	201000	1	2.0	2.9	68.6
	219000	1	2.0	2.9	71.4
	222300	1	2.0	2.9	74.3
	225000	1	2.0	2.9	77.1
	237000	1	2.0	2.9	80.0
	270000	1	2.0	2.9	82.9
	286000	1	2.0	2.9	85.7
	330000	1	2.0	2.9	88.6
	372000	1	2.0	2.9	91.4
	375000	1	2.0	2.9	94.3
	486000	1	2.0	2.9	97.1
	735000	1	2.0	2.9	100.0
Total		35	70.0	100.0	
Missing System		15	30.0		
Total		50	100.0		

Company * Product quality Crosstabulation

			Product quality				Total
			2	3	4	5	
Company	Caltex	Count			1	9	10
		% of Total			2.0%	18.0%	20.0%
	Shell	Count		2	3	5	10
		% of Total		4.0%	6.0%	10.0%	20.0%
	BP	Count	1		2	7	10
		% of Total	2.0%		4.0%	14.0%	20.0%
	Kobil	Count			3	7	10
		% of Total			6.0%	14.0%	20.0%
	Kenol	Count			3	7	10
		% of Total			6.0%	14.0%	20.0%
Total		Count	1	2	12	35	50
		% of Total	2.0%	4.0%	24.0%	70.0%	100.0%

Chi-Square tests

	X ²	(C-1)X(R-1)	Asymp. Sig. (2-sided)
Pearson Chi-Square	14.476 ^a	12	.271
Likelihood Ratio	12.352	12	.418
Linear-by-Linear Association	.000	1	1.000
N of Valid Cases	50		

Customer response to speed of service

			Cust resp to speed		Total
			4	5	
Company	Caltex	Count	3	7	10
		% of Total	6.0%	14.0%	20.0%
	Shell	Count	2	8	10
		% of Total	4.0%	16.0%	20.0%
	BP	Count	3	7	10
		% of Total	6.0%	14.0%	20.0%
	Kobil	Count	4	6	10
		% of Total	8.0%	12.0%	20.0%
	Kenol	Count	3	7	10
		% of Total	6.0%	14.0%	20.0%
Total		Count	15	35	50
		% of Total	30.0%	70.0%	100.0%

Chi-square tests

	Value	df	Asymp. Sig. (2-sided)
Peason Chi-square	.952 ^a	4	.917
Likelihood Ratio	.966	4	.915
Linear-by-Linear Association	.187	1	.666
N of Valid Cases	50		

a. 5 cells (50.0%) have expected countless than. The minimum expected count is3.00.

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Crosstabulation-Product reliability

		Prod reliability				Total
		2	3	4	5	
Company	Caltex	Count	2	4	4	10
		% of Total	4.1%	8.2%	8.2%	20.4%
	Shell	Count	1	2	4	9
		% of Total	2.0%	4.1%	8.2%	18.4%
	BP	Count	2	2	4	10
		% of Total	4.1%	4.1%	8.2%	20.4%
	Kobil	Count	3	2	2	10
		% of Total	6.1%	4.1%	4.1%	20.4%
	Kenol	Count	2	2	3	10
		% of Total	4.1%	4.1%	6.1%	20.4%
Total		Count	8	10	17	49
		% of Total	16.3%	20.4%	34.7%	100.0%

Chi-square Tests

	Value	df	Asymp. Sig. (2-sided)
Peason Chi-square	5.061a	12	.956
Likelihood Ratio	6.550	12	.886
Linear-by-Linear Association	1.487	1	.223
N of Valid Cases	49		

a. 20 cells (100.0%) have expected count less than 5. The minimum expected count is 1.47.

Crosstabulation Service speed

		Service speed				Total
		2	3	4	5	
Company	Caltex	Count	1	6	3	10
		% of Total	2.0%	12.2%	6.1%	20.4%
	Shell	Count	1	2	6	9
		% of Total	2.0%	4.1%	12.2%	18.4%
	BP	Count	2	1	5	10
		% of Total	4.1%	2.0%	10.2%	20.4%
	Kobil	Count		2	5	10
		% of Total		4.1%	10.2%	20.4%
	Kenol	Count		4	6	10
		% of Total		8.2%	12.2%	20.4%
Total		Count	3	10	22	49
		% of Total	6.1%	20.4%	44.9%	100.0%

Chi-square Tests

	Value	df	Asym. Sig. (2-sided)
Pearson Chi-square	21.17a	12	.048
Likelihood Ratio	27.155	12	.007
Linear-by-Linear Association	2.267	1	.132
N of Valid Cases	49		

a. 20 cells(100.0%) have expected count less than 5. The minimum expected count is .55.

Crosstabulation supply reliability

		Supply reliability				Total
		1	3	4	5	
Company Caltex	Count			2	8	10
	% of Total			4.0%	16.0%	20.0%
Shell	Count			3	7	10
	% of Total			6.0%	14.0%	20.0%
BP	Count	1		4	5	10
	% of Total	2.0%		8.0%	10.0%	20.0%
Kobil	Count		1	2	7	10
	% of Total		2.0%	4.0%	14.0%	20.0%
Kenol	Count		1	2	7	10
	% of Total		2.0%	4.0%	14.0%	20.0%
Total	Count	1	2	13	34	50
	% of Total	2.0%	4.0%	26.0%	68.0%	100.0%

Chi-square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.937a	12	.708
Likelihood Ratio	8.783	12	.721
Linear-by-Linear Association	.435	1	.510
N of Valid Cases	50		

a. 15 cells (75.0%%) have expected count less than 5. The minimum expected count is .20.

Crosstabulation-Location of facility

		Is loc important			Total
		3	4	5	
Company Caltex	Count	2		8	10
	% of Total	4.0%		16.0%	20.0%
Shell	Count		1	9	10
	% of Total		2.0%	18.0%	20.0%
BP	Count	2	1	7	10
	% of Total	4.0%	2.0%	14.0%	20.0%
Kobil	Count	2	1	7	10
	% of Total	4.0%	2.0%	14.0%	20.0%
Kenol	Count	1	1	8	10
	% of Total	2.0%	2.0%	16.0%	20.0%
Total	Count	7	4	39	50
	% of Total	14.0%	8.0%	78.0%	100.0%

Chi-square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-square	3.645a	8	.888
Likelihood Ratio	5.748	8	.675
Linear-by-Linear Association	.077	1	.782
N of Valid Cases	50		

Company * delivery rating

Crosstabulation-delivery rating

		Delivery rating				Total
		2	3	4	5	
Company Caltex	Count			3	7	10
	% of Total			6.0%	14.0%	20.0%
Shell	Count		1	3	6	10
	% of Total		2.0%	6.0%	12.0%	20.0%
BP	Count	1	1	3	5	10
	% of Total	2.0%	2.0%	6.0%	10.0%	20.0%
Kobil	Count		1	4	5	10
	% of Total		2.0%	8.0%	10.0%	20.0%
Kenol	Count		1	2	7	10
	% of Total		2.0%	4.0%	14.0%	20.0%
Total	Count	1	4	15	30	50
	% of Total	2.0%	8.0%	30.0%	60.0%	100.0%

Chi-square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-square	6.333a	12	.898
Likelihood Ratio	6.353	12	.897
Linear-by-Linear Association	.167	1	.683
N of Valid Cases	50		

a. 15 cells (75.0%) have expected count less than 5. The minimum expected count is .20.

ANALYSIS OF VARIANCE OF THE DIFFERENT VARIABLES

Descriptives

		N	Mean	Std Deviation	Std Error	95% confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
Delivery rating	Caltex	10	4.70	.48	.15	4.35	5.05	4	5
	Shell	10	4.50	.71	.22	3.99	5.01	3	5
	BP	10	4.20	1.03	.33	3.46	4.94	2	5
	Kobil	10	4.40	.70	.22	3.90	4.90	3	5
	Kenol	10	4.60	.70	.22	4.10	5.10	3	5
	Total	50	4.48	.74	.10	4.27	4.69	2	5
Is loc important	Caltex	10	4.60	.84	.27	4.00	5.20	3	5
	Shell	10	4.90	.32	1.00E-01	4.67	5.13	4	5
	BP	10	4.50	.85	.27	3.89	5.11	3	5
	Kobil	10	4.50	.85	.27	3.89	5.11	3	5
	Kenol	10	4.70	.67	.21	4.22	5.18	3	5
	Total	50	4.64	.72	.10	4.43	4.85	3	5
Low price	Caltex	6	2.33	.52	.21	1.79	2.88	2	3
	Shell	8	2.38	.92	.32	1.61	3.14	1	4
	BP	8	3.75	.89	.31	3.01	4.49	3	5
	Kobil	9	2.89	.93	.31	2.18	3.60	2	5
	Kenol	8	2.63	1.19	.42	1.63	3.62	1	5
	Total	39	2.82	1.02	.16	2.49	3.15	1	5
Other reason	Caltex	1	1.00					1	1
	Shell	5	2.60	1.82	.81	.34	4.86	1	5
	BP	4	1.00	.00	.00	1.00	1.00	1	1
	Kobil	2	1.00	.00	.00	1.00	1.00	1	1
	Kenol	3	1.00	.58	.33	.23	3.10	1	2
	Total	15	1.67	1.23	.32	.98	2.35	1	5
Prod reliability	Caltex	10	4.20	.79	.25	3.64	4.76	3	5
	Shell	9	3.78	.97	.32	3.03	4.52	2	5
	BP	10	3.60	1.07	.34	2.83	4.37	2	5
	Kobil	10	3.50	1.27	.40	2.59	4.41	2	5
	Kenol	10	3.70	1.16	.37	2.87	4.53	2	5
	Total	49	3.76	1.05	.15	3.45	4.06	2	5

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
Product devp rating	Caltex	10	4.00	.82	.26	3.42	4.58	3	5
	Shell	10	4.50	.97	.31	3.80	5.20	2	5
	BP	10	3.10	1.37	.43	2.12	4.08	1	5
	Kobil	10	2.80	1.14	.36	1.99	3.61	1	5
	Kenol	9	2.78	1.39	.46	1.71	3.85	1	5
	Total	49	3.45	1.31	.19	3.07	3.82	1	5
Product quality	Caltex	10	4.90	.32	1.00E-01	4.67	5.13	4	5
	Shell	10	4.30	.82	.26	3.71	4.89	3	5
	BP	10	4.50	.97	.31	3.80	5.20	2	5
	Kobil	10	4.70	.48	.15	4.35	5.05	4	5
	Kenol	10	7.70	.48	.15	4.35	5.05	4	5
	Total	50	4.62	.67	9.43E-02	4.43	4.81	2	5
Quality rating	Caltex	10	4.90	.32	1.00E-01	4.67	5.13	4	5
	Shell	10	5.00	.00	.00	5.00	5.00	5	5
	BP	10	4.50	.71	.22	3.99	5.01	3	5
	Kobil	10	4.90	.32	1.00E-01	4.67	5.13	4	5
	Kenol	10	4.70	.48	.15	4.35	5.05	4	5
	Total	50	4.80	.45	6.39E-02	4.67	4.93	3	5
Service speed	Caltex	10	4.20	.63	.20	3.75	4.65	3	5
	Shell	9	4.22	1.20	.40	3.30	5.15	2	5
	BP	10	3.70	1.06	.33	2.94	4.46	2	5
	Kobil	10	4.10	.74	.23	3.57	4.63	3	5
	Kenol	10	3.60	.52	.16	3.23	3.97	3	4
	Total	49	3.96	.87	.12	3.71	4.21	2	5
Supply reliability	Caltex	10	4.80	.42	.13	4.50	5.10	4	5
	Shell	10	4.70	.48	.15	4.35	5.05	4	5
	BP	10	4.20	1.23	.39	3.32	5.08	1	5
	Kobil	10	4.60	.70	.22	4.10	5.10	3	5
	Kenol	10	4.60	.70	.22	4.10	5.10	3	5
	Total	50	4.58	.76	.11	4.36	4.08	1	5

Descriptives									
		N	Mean	Std. Deviation	Std. Error	95% confidence interval for mean		Minimum	Maximum
						Lower Bound	Upper Bound		
Vol other I sold	Caltex	7	178942.86	106091.58	40098.85	80824.51	277061.20	15600	330000
	Shell	9		123498.42	41166.14	135770.71	325629.29	88000	486000
	BP	7		105205.75	39764.04	88200.91	282799.09	64000	372000
	Kobil	4	63992.19	31996.09	1674.15	205325.85	57000	198000	
	Kenol	8	230700.00	215436.67	76168.37	47327.93	407547.07	36000	735000
	Total	35	185500.00	138150.53	23351.70	148569.35	243482.08	15600	735000
				103500.00					
			227437.50						
			196025.71						
Cust resp speed	Caltex	10	4.70	.48	.15	4.35	5.05	4	5
	Shell	10	4.80	.42	.13	4.50	5.10	4	5
	BP	10	4.70	.48	.15	4.35	5.05	4	5
	Kobil	10	4.60	.52	.16	4.25	4.97	4	5
	Kenol	10	4.70	.48	.15	4.35	5.05	4	5
	Total	50	4.70	.46	6.55E-02	4.57	4.83	4	5
Cust serv speed	Caltex	10	4.80	.42	.13	4.50	5.10	4	5
	Shell	10	4.60	.52	.16	4.23	4.97	4	5
	BP	10	4.80	.42	.13	4.50	5.10	4	5
	Kobil	10	4.60	.52	.16	4.23	4.97	4	5
	Kenol	10	4.90	.32	1.00E-01	4.67	5.13	4	5
	Total	50	4.74	.44	6.27E-02	4.61	4.87	4	5

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Delivery rating	Between groups	1.480	4	.370	.666	.619
	Within Groups	25.000	45	.556		
	Total	26.480	49			
Is loc important	Between groups	1.120	4	.280	.516	.724
	Within groups	24.400	45	.542		
	Total	25.520	49			
Low price	Between groups	10.271	4	2.568	2.962	.033
	Within groups	29.472	34	.867		
	Total	39.744	38			

ANOVA

	Sum of squares	df	Mean Squares	F	Sig.
Other reason					
Between groups	7.467	4	1.867	1.346	.319
Within groups	13.867	10	1.387		
Total	21.333	14			
Prod reliability					
Between groups	2.9.6	4	.726	.637	.639
Within groups	50.156	44	1.140		
Total	53.061	48			
Product devp rating					
Between groups	23.567	4	5.892	4.427	.004
Within groups	58.556	44	1.331		
Total	82.122	48			
Product devp rating					
Between groups	2.080	4	.520	1.188	.329
Within groups	19.700	45	.438		
Total	21.780	49			
Quality rating					
Between groups	1.600	4	.400	2.143	.091
Within groups	8.400	45	.187		
Total	10.000	49			
Service speed					
Between groups	3.363	4	.841	1.136	.352
Within groups	32.556	44	.740		
Total	35.918	48			
Supply reliability					
Between groups	2.080	4	.520	.897	.474
Within groups	26.100	45	.580		
Total	28.180	49			
Vol other l sold					
Between groups	5.58E+10	4	1.39E+10	.705	.595
Within groups	5.93E+11	30	1.98E+10		
Total	6.49E+11	34			
Cust resp to speed					
Between groups	.200	4	5.00E-02	.218	.927
Within groups	10.300	45	.229		
Total	10.500	49			
Cust serev					
Between groups	.720	4	.180	.910	.466
Within groups	8.900	45	.198		
Total	9.620	49			

Kenol			Mobil				Shell/BP				Total			
rms	ago	ik	pms	rms		ik	pms	rms	ago	ik	pms	rms	ago	ik
49.60	42.70	28.00	49.39	48.52		27.57	49.02	48.19	40.99	27.55	50.46	49.48	42.55	28.00
47.00	40.00	29.00	46.49	45.49		27.99	49.15	47.99	38.37	28.20	48.00	47.00	40.00	28.00
47.00	40.00	29.00	47.16	46.16		28.33	49.15	47.99	38.37	28.20	48.00	47.00	40.00	28.00
48.10	40.73	29.35	48.37	47.24		28.97	48.85	47.85	39.10	27.86	49.75	48.75	41.25	29.25
52.70	44.29	32.29	52.73	51.73		32.29	53.80	52.80	44.80	32.80	53.31	52.31	44.30	32.90
49.84	40.99	32.70	50.24	47.99		31.99	52.92	51.92	44.10	32.80	47.82	45.99	37.97	32.42
49.99	40.99	32.50	51.89	49.89		32.40	49.99	48.99	39.99	32.84	48.89	46.21	38.42	31.99
51.12	41.39	33.13	50.99	49.02		33.02	50.74	48.64	40.68	31.92	49.99	47.72	39.98	33.23
54.53	45.78	34.85	54.49	53.47		36.19	55.53	54.53	45.35	34.02	55.37	54.44	45.29	34.87
55.20	47.20	35.20	55.99	55.19		35.19	56.20	55.20	47.20	35.20	56.20	55.20	47.20	35.20
57.20	49.20	37.20	57.79	56.89		37.19	58.20	57.20	49.20	37.20	57.99	57.19	49.19	37.19

Kenol			Mobil				Shell/BP				Total			
rms	ago	ik	pms	rms	ago	ik	pms	rms	ago	ik	pms	rms	ago	ik
54.12	46.12	34.28	54.52	53.62	44.97	34.19	55.20	54.20	46.20	34.20	55.15	54.19	46.19	34.19
52.99	43.99	33.70	53.69	52.89	43.39	33.19	54.59	53.59	45.35	33.70	54.54	53.59	44.37	33.95
53.47	44.09	34.70	53.64	52.84	43.09	33.69	54.29	53.47	43.97	34.45	54.47	53.47	44.09	34.69
53.69	44.69	35.20	53.77	52.89	53.22	34.19	53.82	52.96	43.29	34.89	53.96	52.96	43.29	34.86
52.99	43.49	35.20	53.74	52.74	43.24	34.19	53.99	52.99	43.49	35.20	53.99	52.99	43.49	35.20
53.66	43.16	35.37	54.16	52.82	43.32	34.53	54.32	53.32	43.49	35.20	54.66	53.66	43.49	34.86

Analysis of Variance(ANOVA)

The other method of analysis that was used is the ANOVA attempts to analyse the variation of data collected and to assign a portion of this variation to each of a set of independent variables. The aim bein to be able to locate important independent variables of a study and to determine how they interact and affect each other(or the dependent variables)

Therefore;

$$Sst = \Sigma(y - \bar{y})^2$$

where;

sst = total su of squares

y = actual value(average)

y = variance from actual values