A SURVEY OF OPERATIONS IMPROVEMENT PRACTICES IN THE KENYAN OIL INDUSTRY

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A research project submitted in partial fulfillment of the requirements for the award of Degree of Master Business Administration (MBA), School of Business, University of Nairobi.
DECLARATION

This Project is my original work and has not been submitted for a degree in this or any other University.

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I dedicate this work to my family, wife Sylvia and children, Angela, Sharon and Mark and to my entire extended family.
First, I would like to acknowledge the invaluable contribution, guidance and critique of my Project Supervisors, Mr. Onserio, Nyamwange and Mr. Tom Kongere and indeed all other MBA lecturers at the University of Nairobi for intellectual shaping during my studies. I also wish to thank all the respondents who took their valuable time to provide me with the information sought for this study.

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ABSTRACT

This study sought to find out the operations improvement practices that are being applied in the oil industry in Kenya and to establish the challenges facing the industry that constrains its performance.

The findings were based on primary data collected from seventeen respondent oil importing and marketing companies in Kenya, the Kenya Petroleum Refineries (KPRL) and Kenya Pipeline Company (KPC). The data was collected by use of structured questionnaires with both closed and open ended questions. The target respondents comprised of operations, engineering managers or other senior managers. Data was analyzed using descriptive statistics of frequencies, proportions and arithmetic means.

The study found out that the operations improvement practice adopted by the oil companies was dependent on the size of the company. Large companies were found to attach a lot of importance on benchmarking, supplies chain management (SCM) strategies and total quality management while small companies ranked lean operations and SCM strategies as the most important improvement practices. KPRL and KPC’s major improvement practices were on based on business process reengineering projects. On challenges facing the industry, storage capacity limitations at Kipevu Oil Terminal was ranked as the biggest impediment facing the oil industry followed by high operational costs. Legal requirement to process crude oil at KPRL, inefficient refinery performance and pipeline (KPC) throughput limitations followed in the ranking.
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LIST OF ABBREVIATIONS

BPR  Business Process Reengineering
ECR  Efficient Consumer Response
EDI  Electronic Data Interchange
E&P  Exploration and Production
ERC  Energy Regulating Commission
JIT  Just-In-Time
KPC  Kenya Pipeline Company
KOSF  Kipevu Oil Storage Facility
KOT  Kipevu Oil Terminal
KPRL  Kenya Petroleum Refineries Ltd.
LPG  Liquid Petroleum Gas
OMCs  Oil Marketing Companies
MOE  Ministry of Energy
MNCs  Multinational Corporations
NOCK  National Oil Corporation of Kenya
OTS  Open Tender System
QR   Quick Response
RCM  Reliability Centered Maintenance
SCM  Supply Chain Management
TBC  Time Based Competition
TQM  Total Quality Management
TPM  Total Productive Maintenance
CHAPTER 1: INTRODUCTION

1.1 Background

Fierce competition, globalization, and development of new technologies have forced organizations to continuously search for and adopt new configurations by which to exist (Fernandez et. al, 2001). In other words, organizations are undergoing changes to evolve, survive and compete in their respective environments. To meet the challenges posed by the contemporary competitive environment, organizations must infuse quality and performance improvement initiatives in all aspects of their operations to improve competitiveness.

Amolo (2002) observed that all operations, no matter how well managed, were capable of improvement. The urgency, direction and priorities of improvement will be determined partly by whether the current performance is judged to be good, bad or indifferent. Operations improvement work should be connected to the performance objectives set out by the organization. Companies compete in the marketplace by virtue of one or more of the following competitive priorities of quality, cost, speed and flexibility (Hayes et. al, 1984) with other authors adding other priorities such as dependability and innovation. These are the operations performance objectives through which the effectiveness of operations is judged on.

The oil industry in Kenya is confronted with many business challenges for survival and success in a turbulent business environment. The industry faces squeezed margins due to fierce competition between the oil marketers, inadequate/inefficient infrastructure, regulations requirements such as the Open Tender System, fluctuating crude oil prices, high operational costs such as finance and distribution cost among other challenges. The industry players have no choice but to adopt proactive approaches so as to survive and thrive. The premise of this study was that the oil companies can enhance their performance by employing operational improvement practices such as benchmarking, lean operations, total productive maintenance, business process reengineering, certification and TQM. Manufacturing firms have widely used these methods and the service industry can borrow and adopt some of them to their operations.
1.1.1 Operations Improvement and Performance

Improvement refers to both the initiatives which organizations take in relation to various operations elements and to their results in terms of performance. Some initiatives tend to improve performance in the area of quality, while others tend to reduce the costs, while others again tend to work on reducing lead times (Filippini et al, 1996). The initiatives concern the improvement actions which have been structured and applied in time to the technological and organizational variables in one or more areas, such as production, supply and maintenance.

Nowadays, in world-class manufacturing organizations, the improvement of performance and the attainment of a sustainable competitive advantage are achieved through continuous effort towards the maintenance and improvement of the operative system (Hayes et al, 1988). The initiatives are carried out in a coordinated way, and have an impact on more than one performance area (Hayes et al, 1984; Schonberger, 1986). Quality performance, for example is related to initiatives which involve product development, manufacturing and distribution (Filippini et al, 1996). Further, the reduction of production costs is related to flow simplification, to the elimination of activities which do not generate value and to greater involvement of all actors in the production process. The compression of time is linked to simultaneous engineering, a closer relationship with suppliers, and to the synchronization of production flow and distribution systems.

Improvement initiatives are aimed at achieving the improvement of multiple performance type, and in particular, those of time, service, quality and cost. Improvement in specific performance areas can be aided by good performance in other areas. For example, the achievement of improvements in time performance is aided by good quality performance (Ferdows et al, 1990).

1.1.2 Improvement Methods

The need to improve the effectiveness of operations has, over time, given rise to a series of philosophies, tools and techniques. Such methods or philosophies include total quality management (TQM), benchmarking, lean manufacturing, just-in-time (JIT), six sigma, total productive maintenance and agile supply chains. The steady stream and changing nature of these methods and techniques vividly illustrate the evolution of the role of operations in
organizations, and provide a window of insight into the general practical problems of building new operational capabilities (Upton, 1996).

Organizations now face the challenge of choosing from a plethora of methods that claim to effectively and efficiently operations. Euske et al. (1996) observed that one way for the whole organization to improve is to apply different methods simultaneously, because each revolutionary method, by itself, may be ineffective or inefficient in parts of the organization. Different functional groups have different focuses on their perspective of improvement and therefore use different methods. For example, Operational managers will focus on operational flow, eliminating waste and delay and will apply lean or just-in-time practices. Quality assurance managers will focus on identification and elimination of defects and waste and will apply practices such as TQM. Human resources will focus on more effective use of personnel and thus employee empowerment will be prescribed as an improvement method.

While individual improvement programs help to improve organizational operations in many aspects, they are not necessarily effective at solving all issues. To overcome the weaknesses of one program or the another, more recently, a number of companies have merged different initiatives together, resulting in a combined improvement program that is far more reaching than any one individually (Bhuiyan, 2005). Lean six sigma is the most well known hybrid methodology, a combination of six sigma and lean manufacturing. By combining the two methods, waste is first removed (lean manufacturing), which then allows for variations to be spotted more easily (the six sigma) and therefore greater value to the customer is provided.

1.1.3 The Oil Industry in Kenya

Prior to 1994, the oil industry in Kenya was a regulated sector, dominated by pervasive Government participation. Kimuyu et al. (2002) notes that the Government monopolized virtually all the aspects of supply, storage and transportation, while marketing was done by the private sector through multinational companies.

Post 1994 (when oil industry was liberalized) period to date have seen a lot of changes taking place in the industry. From a few multinational companies then, there are currently about 40 oil marketers, mostly minors with under 1% market share each and with the top 5
commanding over 75% of the market (Petroleum Insight, 2009). By 2010, most multinationals oil companies had left the market leaving only Total Kenya as the only remaining MNC as Shell has expressed intent to exit the country by the end of the year (Njiriani, 2010). Industry observers cite squeezed margins, lack of strong regulatory framework to govern the industry, lack of adequate infrastructure to help movement of products and lack of a level playing field in the use of state-owned facilities as some of the challenges facing the industry. As Obath (2010) lamented “The downstream oil business in Kenya is very brutal because it lacks an even playing field and a strong regulatory framework”. The industry is too fragmented, creating room for malpractices and unfair competition.

The oil marketers are required by a statutory requirement (Section 31A of Petroleum Rules and Ministerial Regulations) to process a share of the “base load” of crude oil at KPRL according to their market share. The base load is the minimum throughput of crude oil that the refinery can operationally process and stands at 1.6 Million tons of crude oil which is currently about 50% of the local market consumption while the rest is imported as refined products.

The main players in the oil industry are: KPRL which refines crude oil to produce various petroleum products (Petrol, Diesel, Kerosene, LPG etc); KPC which transports petroleum products from Mombasa to Nairobi and to Western Kenya using pipeline and also offers storage and loading facilities to the OMCs; OMCs which procure, distribute and retail petroleum products. OMCs consists of major oil companies comprising multinationals (Shell is exiting the market, leaving Total as the only MNC), regional companies i.e. KenolKobil & OilLibya and NOCK, controlling about 75% of the local market share and Independent oil dealers controlling the balance 25% (Petroleum Insight, Oct-Dec 2009); NOCK, a government corporation also has the mandate of oil exploration and building up strategic oil reserves; Road Transporters are also an important part of the oil industry to get products from the depots to the retail outlets and industrial consumers. The Railways currently accounts for only a small proportion of petroleum products transportation.

The Ministry of Energy (MOE) manages the Open Tender System (OTS) through which Kenya meets its petroleum needs. Energy Regulating Commission (ERC), under the MOE, regulates, monitors, ensures implementation of, and the observance of fair competition in the
industry among other mandates. Legal Notice No. 102 of 2005 requires that duties and levies shall be paid upon import of refined products at Mombasa and crude oil products after refining at KPRL before products are assessed to the oil marketing companies.

1.2 Problem Statement

The choices which lead companies to pursue certain improvement paths rather than others are conditioned, by among other things, their business environment (Porter, 1980). The business environment the Kenyan oil industry operates in has statutory controls which constrain full market forces from taking place. Amolo (2002) found out that most oil companies were constrained in achievement of operations objectives; the major constraints identified being the shared infrastructure and government legislations.

The main distinguishing features of the global oil industry as highlighted by Varma et al (2007) includes: Petroleum products are produced and moved in bulk leading to high working capital requirements for procuring crude oil, transportation, processing and distribution; Volatility of crude oil prices in the international market is rather high as opposed to other industries where prices of raw materials are relatively stable; Safety issues are critical due to the high flammability of petroleum necessitating specialized handling all through from shipment, storage, refining, and transportation to retailing; and its supply chain is usually rather long. These features are important to put into perspective when making attempts to replicate studies from other industries to the oil industry.

Opportunities exist for organizations to identify and adopt new developments in order to improve operations, increase production, reduce costs and ultimately increase revenue. Examples of such improvement methods and philosophies include: value analysis; focused asset and maintenance management programs; agile supply chain management; quick response manufacturing/operations; lean operations; benchmarking and total quality management. The first objective of this study was to find out the operations improvement methods that are being applied in the oil industry in Kenya while the second objective was to establish the challenges facing the industry that constrains its performance.
Studies carried out on the Kenyan oil industry in operations improvement initiatives have focused on specific initiatives, these includes: Amolo (2002), “Benchmarking the order delivery process for continuous improvement”. He found out that most oil companies were constrained in achievement of operations objectives; the major constraints identified being the shared infrastructure and government legislations; Tuitoek (2007), “Benchmarking HSE performance measurement practices in the oil industry in Kenya”. He highlighted some of the challenges encountered when benchmarking HSE practices as lack of top management commitment, low priority of HSE function within companies and unwillingness to share information among competing partners.

The study sought to answer the following research questions:

1. Which operations improvement practices are employed by the Kenyan oil companies to enhance their performance?
2. What challenges are facing the oil industry that constrains its performance?

1.3 Objectives of the Research Study

The objectives of the study were to:

1. Identify the operations improvement practices employed by Kenyan oil companies.
2. Establish the challenges faced by the oil industry that constrains its performance.

1.4 Importance of the Study

1. The findings of this study will help Kenyan Oil Companies identify operations improvement practices they can pursue to enhance their performance and the challenges they are likely to encounter while pursuing those initiatives.
2. To contribute to research on improvement practices which organizations can undertake in order to innovate operations to obtain higher levels of performance.
3. The knowledge and information from this study will be of use to other researchers in the field of operations improvement and provides basis for further research and reference.
2.1 Evolution of Performance Improvement

The industrial revolution was the spur for performance improvement initiatives. Grunberg (2003) observed that the first well documented practitioners in the area of performance improvement include Adam Smith (1776), Eli Whitney (1800), Taylor (1903) and Henry Ford (1913). Since the 1950s, competition between companies has increased as markets have become increasingly global and there are no signs that this competition will ease. This increased competition creates an ever great need for first rate improvement methods that can sustain competitiveness.

Post Second World War period gave rise to many of the improvement methods still in use today. These methods were imported to, and improved on in Japan, for example at the Toyota Company (Womack et al., 1996). Examples of such methods are the total preventive maintenance (TPM) that arose from the concept of preventative maintenance (PM) and total quality management (TQM) developed by Juran and Deming. From simple, basic concepts and approaches, the Toyota production system (TPS) was synthesized with additions of a number of derivative methods like Kaizen and Benchmarking. Japan then developed the lean manufacturing concept while the West counteracted with methods such as theory of constraints (TOC), business process reengineering (BPR) and business process improvement (BPI) which is basically BPR including Kaizen concept (Grunberg, 2003).

Since 1970’s, companies have been investing in becoming lean and flexible in order to respond rapidly to environment and market changes, benchmarking continuously to achieve best practice and outsourcing aggressively to achieve efficiencies (Porter, 1996). The Japanese are famous for deriving competitive advantage through operational effectiveness. These investments in achieving operational efficiency have resulted in operational improvements and competitive advantage.

While improvement initiatives in the past reflected the use of various principles related to work improvement, modern day improvement is associated with organized and comprehensive methodologies. These improvement programs, such as TQM, typically
involve change in the overall organization (Bhuiyan et al., 2005). These improvement methods have the fundamental aim of improving operations; however, they are different in the means by which they set out to accomplish this, and in their scope. It is important that the improvement methods are dynamic since operational activity is dynamic.

2.2 Performance Objectives

Performance improvement focuses on the performance objectives, also sometimes referred to as competitive priorities. Slack et al. (2002) distinguishes between five types of performance objectives: cost, quality, speed, dependability and flexibility. The performance objectives are the foundations of competitiveness. The role of operations is to ensure that these performance objectives are translated into operational activities, with the following operational constructs being for each of the objectives (Boyer, 1998; Chase et al, 2004).

Cost - making things cheap: Low cost operations allow the company to sell their products at a competitive price and therefore sales which leads to increased profitability. This is achieved by reducing inventory and production costs while increasing capacity utilization and labour productivity.

Quality - making things right: Provide high performance products, offer consistent, reliable quality and improve conformance to design specifications. Quality forms the platform for the other competitive priorities to build from it because products or services must first meet customer acceptance.

Speed - makings things fast: Provide fast deliveries, meet delivery promises and reduce production lead time. Fast operations reduce the level of in-process inventory between micro operations, as well as reducing administrative overhead.

Dependability – being reliable: dependable operations can be relied on to deliver exactly as planned. This eliminates wasteful disruption and allows other micro operations to operate efficiently. Further, it creates customer satisfaction.

Flexibility – changing what is made: Make rapid design changes, adjust capacity quickly, make rapid volume changes, offer large number of product features, offer a large degree of
product variety and adjust product mix. Flexible operations adapt to changing circumstances quickly and without disrupting the rest of the operation. Flexible micro operations can also change over between tasks quickly and without wasting time and capacity (Tangen, 2003).

In Kenya, a number of studies have been carried out focusing on competitive priorities. Such studies include Nyamwage (2001) whose research found out that for Kenyan large manufacturing firms to be successful, they need to focus on the following priorities (in order of priority) 1) High Quality 2) Low Cost 3) Time/speed; Innovativeness and flexibility were ranked equally. Karuri (2007) also made nearly similar ranking of the competitive priorities in physical distribution of Kenyan oil industry ranking quality, cost, time and flexibility as the order of importance.

Historically, firms competed on a single niche strategy of cost, quality, and speed or product differentiation. Today, successful organizations have to compete in two or more strategic dimensions. These dimensions are now seen as synergetic and simultaneously attainable, rather than as trade-offs, which improved performance in one dimension often complementing and enhancing performance in one or more of the others (Meredith et al., 1994). Skinner (1969) defined trade-offs as a balance between competitive objectives such as quality, delivery, dependability, variety, lead-time, and so on. Trade-offs implies devising an appropriate positioning of an operations competitive objective according to their relative importance.

2.3 The Sand Cone Model of Improvement

The Sandcone model of improvement is an analogy that seeks to explain how assigning priorities to operations objectives may result in lasting improvements in performance. Ferdows and De Meyer (1990) suggest that lasting improvements in performance depend on effort being applied in creating a particular sequence of capabilities and that these capabilities should be considered as cumulative developments, building on each other. The first “layer” of improvement, and a precondition to all lasting improvement, is effort applied to quality performance. Only when the operation has reached a minimally acceptable level in quality should it then tackle issues of internal dependability. Once a critical level of dependability is reached, enough to provide some stability in the operation, the next stage is to turn attention
to the speed at which materials flow through and eventually on cost efficiency (see Fig. 2.1 below).

According to Ferdows and De Meyer (1990), the recommended order of pursuit of the performance objectives should be first quality followed by dependability then flexibility and lastly cost efficiency. The sand cone model theory explains that to move up each step in the path toward development of lasting capabilities requires greater effort than earlier steps. Thus to improve the cost efficiency by a small percentage requires increasingly bigger percentage improvements in speed, dependability and quality.

Figure 2.1: Sandcone Model

![Sandcone Model Diagram]

Source: Ferdows and De Meyer (1990)

2.4 Continuous Improvement

Continuous improvement is a culture of sustained improvement targeting the elimination of waste in all systems and processes of an organization (Bhuiyan et al, 2005). It involves everyone working together to make improvements without necessarily making huge capital investments. Continuous improvement or Kaizen, the Japanese equivalent, can occur through evolutionary improvement, in which case improvements are incremental, or through radical changes that take place as a result of an innovative idea or new technology. Often, major improvements take place over time as a result of numerous incremental improvements.
One of the time tested tools for coordinating continuous improvement efforts is the Deming’s PDCA (Plan-Do-Check-Act) Cycle. It emphasizes and demonstrates that improvement programs must start with careful planning, must result in effective action, and must move on again to careful planning in a continuous cycle. The PDCA cycle is a checklist of the four stages which should be followed to get from “problem-faced” to “problem-solved” (www.hci.com.au/hcisite3/toolkit/pdacycl.htm).

PDCA cycle is a four step model consisting of the following steps:

Step 1: Plan - Identify problem and develop plan for improvement.

Step 2: Do – implement plan on a test basis. This is prudent to avoid committing a lot of resources before knowing whether it will work out well when it is implemented on full scale.

Step 3: Check (or Study) – assess whether the plan is working. The pilot basis is assessed whether it is working as expected.

Step 4: Act – institutionalize improvement by implementing changes on a larger scale if the plan is working. Make the changes a routine part of the activity.

2.5 Scope and Nature of Improvement

The approaches to improvement can either incremental or quantum (see table 2.1 below). Incremental performance improvement assumes more, smaller and orderly incremental improvement steps and is continuous. They are characterized by low investment and involve improving the existing facilities. They includes: process improvements achieved by removing minor improvements and removing redundancies and duplications; automation and process simplification.

Quantum or radical improvements are more innovative aimed at achieving major and dramatic improvements in performance objectives such as quality, cost reduction, flexibility and speed. Quantum approaches are long term in nature and have a higher risk as compared to incremental approaches but have higher returns. They are characterized by high investment, usually one major project and may involve reengineering rather than improving existing facilities (Kenduiwo, 2007).
Table 2.1: Continuous Improvement vs. Breakthrough Improvement

<table>
<thead>
<tr>
<th>Breakthrough Improvement (Innovation)</th>
<th>Continuous Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creativity based</td>
<td>Adaptability based</td>
</tr>
<tr>
<td>Individualism (champion based)</td>
<td>Teamwork (systems approach)</td>
</tr>
<tr>
<td>Specialist oriented</td>
<td>Generalist oriented</td>
</tr>
<tr>
<td>Attention to great leaps</td>
<td>Attention to details</td>
</tr>
<tr>
<td>Technology oriented</td>
<td>People oriented</td>
</tr>
<tr>
<td>Information: closed, proprietary</td>
<td>Information: open, shared</td>
</tr>
<tr>
<td>Functional orientation</td>
<td>Cross functional orientation</td>
</tr>
<tr>
<td>Seeks new technology</td>
<td>Build on existing technology</td>
</tr>
<tr>
<td>Line &amp; staff oriented</td>
<td>Cross functional organization</td>
</tr>
<tr>
<td>Limited feedback</td>
<td>Comprehensive feedback</td>
</tr>
</tbody>
</table>


Fig. 2.2: Deming Wheel: PDCA Cycle

2.6 Performance Standards and Measures

Performance standards provide a platform from which to gauge an organization’s performance. Performance standards include historical, industry and absolute standards, set targets and competitor performance (Nyamwange, 2007). Benchmarking is useful in setting standards and targets.

Performance evaluation is an important activity for the survival and growth of any firm and as the old adage goes, “you can’t improve what you can’t measure. Performance measurement provides feedback on efforts for continuing improvement. There is need to support and verify the performance improvement programs such as JIT, TQM, concurrent engineering etc. Management gurus have long argued that a key to continuous improvement is to measure, measure and measure (Lapiede, 2000).

Traditionally, firms have focused on financial indices (e.g. return on investment, discounted cash-flow) for measuring performance; however, financial indicators do not capture information on all aspects of business as they tend to be historically oriented, lacking forward looking perspective and are not directly tied to operational effectiveness/efficiency (Lapiede, 2000). One of the emerging tools of strategic management is the balanced scorecard (BSC) and is an all round performance evaluation system including financial and non-financial indicators. BSC, as proposed by Kaplan et al, (1996) analysis a business from four perspectives, including: financial, customer, internal processes, and learning and growth. The indicators help the management to gain an in-depth and comprehensive understanding of the company’s overall performance.

2.7 Classification of Improvement Methods

Organizations have been forced to consider, and in many cases adopt, or implement a wide variety of innovative management philosophies, approaches and techniques (Yasin et al, 2001). Such methods differ from each other on what to improve on and how improvement should be achieved and implemented. Each of the improvement methods has a particular background and was developed to solve particular problems within particular contexts. Theory of Constraints (TOC), for example pays attention to bottlenecks. It recognizes that it is important to increase throughput to a maximum in any bottleneck within a production process
(Rahman, 1998). Total Productive Maintenance (TPM), Total Quality Management (TQM) and lean manufacturing focus on the reduction of “waste”. Business Process Reengineering (BPR) is a more of a general improvement methodology whose approach is to consider radical changes as a means of improving operations (Vakola et al, 2000) compared to the evolutionary and incremental improvements.

Any improvement method has four major components (Euske et al, 1996), these are: Perspective or framework of reference that defines its approach and objective. This is an observation platform that allows a manager to focus on the objective and chart the route for getting there. For instance, just-in-time management reduces waste, delay, and unevenness and thus focuses on minimizing their impact on the organization; each improvement method will have its terminology which provides a means to communicate and make others understand the opportunity; each improvement method uses specific tools to make the existing environments’ problems more visible and help managers decide on a course of action. For instance, total quality management will use quality tools such as Flowcharts, Pareto chart and Fishbone diagram; change tools and techniques during implementation. The basic tool is the plan which specifies what the issue is, what actions to take, responsibilities and targets.

Improvement methods can be classified by their common perspectives, similar languages, and shared tools Euske (1996). The main classifications are: Quality-based methods (e.g. Total Quality Management, Quality Function Deployment, and Statistical Process Control); Activity-based methods (e.g. Activity-based costing, Activity-Based Management and Activity-Based budgeting); Time-based methods (e.g. Just-in time, Time to Market, Quick Response, Total Productive Maintenance, Concurrent Engineering and Time Compression Management); Employee-based (e.g. Empowerment, Learning organization, Self-directed work teams and Skill-based pay); Technology-based methods (e.g. Material Resource Planning, Computer aided design, Computer aided manufacturing and Electronic data interchange); and process-based methods (Business Process Reengineering, Benchmarking, Theory of Constraints and Best Practices). This forms the broad classification of operations and performance improvement methods which are commonly.
2.8 **Improvement Focus and Processes**

Operations are a hierarchical aggregation of many levels, in each which can be a context of improvement (Williams, 1988). An important step in describing an improvement initiative is to identify the primary focus of the improvement, which can range from the shop floor control to the plant network level. Each level defines a particular area of concentration in the improvement initiative, moving from the narrowest scope (though not least important), to the broadest, most ambitious operations improvement campaigns.

The definition of the processes that are employed to improve performance is an important step in defining an operations improvement project. Upton (1996) highlighted the following as some of the common improvement process elements: Training, to provide skills needed to carry out new tasks; focused team initiatives to address a particular problem; new processes and tools, such as Statistical Process Control and Quality Function; organizational change; knowledge development and capture, where some initiatives use the knowledge development process as the mechanism by which improvement is carried out and external comparison through benchmarking.

2.9 **Operations Improvement and the Oil Industry**

In the rapidly changing market, real time monitoring is reshaping how operations are being carried out in the global oil industry. Malik (2009) notes that Royal Dutch Shell among other refinery owners, have been spending millions of dollars in the past two years to link up thousands of pieces of equipment into company-wide Internet-based networks to more effectively monitor operations, supply, energy consumption and environmental issues. While the technology is clearly being seen as a way to improve profitability overall, easy access to information also allows top executives to get a more accurate view of facility operations across the entire company. Malik further observes that the real-time "dashboards" act as a continuous health check that fore-warn you on problems before they bring you to your knees.

The case for improvement of operations in the oil industry in Kenya has been highlighted in various circles and publications and includes the operations of the refinery, storage and transportation through to distribution and retailing. For example, Kilinda, S. (2009) points out that KPC intends to continuously review and improve operations and systems to ensure
continued provision of effective and efficient services. Kilinda cites capacity constraints for the western Kenya pipeline to meet the market demand and plans to build a parallel line from Nairobi to Eldoret to address this constraint; Oil Marketing Companies capacity in Nairobi depots are partly constrained by regulation disallowing night truck transportation and power outages disrupting pumping operations.

KPRL is planning substantial investments to improve operating efficiencies, increase throughput and produce clean products. It is planning to upgrade its plants to enable it produce more white oil products such as petrol, jet fuel and diesel as opposed to its current state where it produces more of lower value fuel oils thus making it less efficient and profitable (Ssambu, 2009). KPRL is also mulling over own power generation to reduce disruptions of operations due to unreliable power supply from Kenya Power & Lighting as well as reducing the high power bills.

The oil marketing companies are being affected negatively by problems in the upstream facilities at the Refinery and Pipeline. Maonga (2010) lamented that the “usual constraints experienced in the oil industry namely, pipeline pumping capacity limitations and the unreliability of the refinery continued to persist sometimes occasioning stock outs in the upcountry markets” negatively affected Total’s profitability in 2009. Similar sentiments were also expressed by Kenol-Kobil while releasing their end year financial results. Other visible initiatives in the service stations includes use of high technology appliances such as fuel dispensers, offering complimentary services such as tyre services, car cleaning and convenient stores which also generates some revenue while adding value to the core service of selling fuel.

2.10 Operations Improvement Practices in Various Commercial Sectors

Can the operations improvement strategies applied in fast moving supply systems such as consumer goods be mapped directly onto another sector such as the oil industry? Lowson (2002) identified the dominant operations strategies evident in various commercial sectors as:

Grocery - Efficient Consumer Response, Supply/demand management; Clothing – Quick Response; Electronics – Lean production, Just-in-time (JIT); Automotive – JIT.
Ahmed et al (1995) identified some operations improvement practices commonly used to enhance organizational performance as: total quality management (TQM), just-in-time (JIT) production methods, manufacturing cells, flexible manufacturing systems (FMSs), concurrent engineering, computer networking with suppliers and customers (EDI), and benchmarking. The study concluded that while operations improvement strategies have a bearing on organizational performance, it is not necessarily true that a firm has to employ all the available strategies to be competitive. To be competitive, a firm should concentrate on perfecting a few appropriate operations improvement strategies.

Each sector or industry has its unique practices which may not be replicated directly onto another sector. Some of the types of operations improvement practices applied in various industries that will be considered in this research study are discussed below.

2.10.1 Total Quality Management (TQM)

Total quality management refers to the broad set of management and control processes designed to focus an entire organization and all its employees on providing products or services that do the best possible job of satisfying the customer. According to Sashkin and Kiser (1993), TQM means that the organization’s culture is defined by, and supports, the constant attainment of customer satisfaction through an integrated set of tools, techniques, and training. This involves the continuous improvement of organizational processes, resulting in high quality products and services.

Edward Deming, considered to be the guru of modern quality, summarized his business philosophy in his famous “14 points”. These points have inspired significant changes among leading companies striving to compete in the increasingly competitive environment. These points include: 1) Constancy of purpose – for continual improvement of products and services 2) Adopt the new philosophy – can no longer live with commonly accepted levels of delays, mistakes, defective materials, and defective workmanship 3) Cease dependence on mass inspection 4) End lowest tender contracts 5) Improve every process – improve constantly and forever every process for planning, production and service 6) Institute training on the job 7) Institute leadership 8) Drive out fear – encourage two way communication and other means to drive out fear throughout the organization.
For an organization to realize the value of a TQM implementation, it must have an internal organizational structure that is capable of fully supporting the implementation (Waldman & Gopalakrishnan, 1996). According to Shea and Howell (1998), the preferred structure for organizations that implement TQM balances the need for control of activities with the flexibility needed to respond and adapt quickly to the changing marketplace. It is thus important to assess organizational structure when evaluating an organization's TQM implementation.

Recent literature has begun to describe and evaluate TQM as a potential source of competitive advantage (Powell, 1995). The implementation of TQM is accomplished through a set of practices that supports the TQM philosophy. TQM philosophy dictates that the practices function as an interdependent system (Hackman & Wageman, 1995) that can combine with other organizational assets to generate competitive advantage. Competitive advantage is based not on individual assets or practices that can be easily duplicated, but on the combination of a series of assets that he labeled "compound assets." Thomas et al (2001) identified seven key or common practices that combine to support the TQM philosophy. These practices are: top management team involvement, adoption of a quality philosophy, emphasis on TQM-oriented training, focus on the customer, continuous improvement of processes, management by fact, and use of TQM methods.

2.10.2 Certification

Globalization has radically changed the competitive landscape and process flows of business. A greater need exists for shrewder investment in infrastructure and process standardization for business success. In this regard, the International Organization of Standardization (ISO) seeks to promote standardization and the development of related activities worldwide in order to facilitate the international exchange of goods and services, and cooperation in the spheres of intellectual, scientific, technological and economic activities. The ISO 9000 standards series is now widely accepted as a minimum standard for a quality system for companies (Marquardt, 1992).

When organizations attempt to enhance operational efficiency and improve business performance, product quality is a key factor that cannot be overlooked. According to Garvin
(1984), the enhancement of product quality is beneficial to market expansion and cost reduction and can boost an organization's confidence for their products and customer satisfaction. Good quality control allows organizations to create a positive reputation and increase their market share. Gotzamani (2005) found a significant influence of ISO certification on TQM through the promotion and implementation of the ISO system.

The most widely recognized and respected ISO certification is the ISO 9001: 2000 for quality management systems. ISO 9001: 2000 is a set of universally understood and accepted quality practices and principles; a comprehensive set of rules that, if followed, lead to the improvement of the overall performance of an organization (Mutuku, 2007). The main goals of the ISO 9001: 2000 standard are beneficiary (stakeholders) satisfaction and continual improvement. Gotzamani (2005) highlights the quality management systems guidelines for performance improvement as customer focus, leadership, involvement of people, process approach, system approach to management, continual improvement, factual approach to decision making and mutually beneficial supplier relationship.

2.10.3 Total Productive Maintenance (TPM)

TPM has its origins in Japan in 1970’s and was tailored to support its lean manufacturing concept. It aims to continuously improve productivity through improved availability of the plant. TPM is a production-driven improvement methodology that is designed to optimize equipment reliability and ensure efficient management of plant assets. It is an innovative approach to maintenance that optimizes equipment effectiveness, eliminates breakdowns, and promotes autonomous maintenance by operators through day-to-day activities involving total workforce (Bradury, 2000). TPM is implemented by various departments (engineering, operations and maintenance) and involves every single employee from top management to shop floor workers.

TPM requires development of an effective preventive maintenance (PM) program that keeps the equipment at a high level of overall effectiveness. One of the approaches to developing an effective PM program is by use of Reliability Centered Maintenance (RCM) strategy. RCM is a systematic approach used to optimize PM strategies whose primary objective is to preserve system function (Smith, 1993). RCM is a maintenance strategy which focuses on identifying
and establishing the operational, maintenance and capital improvement policies that will manage the risks of equipment failure most effectively. RCM is used to achieve improvements in fields such as establishment of the safe minimum levels of maintenance, changes to operating procedures and strategies and the establishment of capital maintenance regimes and plans.

2.10.4 Lean Operations

A lean operation is both a methodology and philosophy that focuses on eliminating waste and reducing the time between a customer’s order and delivery. By trimming waste, manufacturers of goods and providers of services can achieve higher quality, higher productivity, improved customer interactions and speed (Womack, J.P. et al. 1996). Waste, as defined by Toyota’s president, Fujio Cho, is anything other than the minimum amount of equipment, materials, parts, and workers which are absolutely essential to production. Fujio further identified the seven prominent types of waste as 1) waste from overproduction 2) waste of waiting time 3) transportation waste 4) inventory waste 5) processing waste 6) waste of motion 7) waste from product defects.

The basic steps that are used to improve operations includes identifying activities that create value, determining the major steps to deliver that value, eliminating activities that do not add value, ensuring that products are available when customers want them and continuously improving processes.

Bashin et al., (2006) suggests that rather than embracing one or two isolated tools it is suggested that it is important that companies practice as many pursuits as possible including: Continuous improvement or Kaizen in quality, cost, delivery and design; step change or Kaikaku by making radical improvements of an activity to eliminate waste; supplier development by actively developing links with suppliers and working closely with them for mutual benefit as intimated; supplier base reduction; value addition and the seven wastes elimination; total productive maintenance (TPM) to improve the reliability, consistency and capacity of equipment through maintenance regimes and the general visual management to reduce clutter and inefficiency of the work environment.
2.10.5 Benchmarking

Camp (1989) defined benchmarking as the search for industry’s best practices that lead to superior performance. Benchmarking is one way of identifying and understanding the practices needed to reach new goals as well as finding new ways of operating. Tuitoek (2007) observed that benchmarking, as a management tool and technique for continuous improvement, has proved to be valuable in helping individual companies evaluate their competitive position relative to their competitor, develop strong capabilities ensure an inward flow of ideas and establish true competitive gaps.

Benchmarking can be classified as: Process benchmarking which is used to compare operations, work practices and business processes; Product benchmarking which is used to compare products and/or services; and Strategic benchmarking which is used to compare organizational structures, management practices and business strategies. Classifications of benchmarking based on type of partner according to Camp (1989) are: Internal benchmarking, which is comparison of performance of units or departments within one organization or comparison of similar products or services of similar business units; Competitive benchmarking, which is comparison of products, services or processes performance with direct product competitor; Functional benchmarking, which is specific function comparison with best practice within the industry; Generic benchmarking, which is the search for the best practice irrespective of the industry.

Voss et al., (1997) proposes that benchmarking promotes performance directly through identification of practices and performance goals. Further, benchmarking increases organization’s understanding of its position relative to competitors, which is beneficial for performance. Also, benchmarking is part of a learning organization, which has links to increased performance. Benchmarking helps to measure and compare business results, highlight gaps in performance, identify the potential for improvement and change the way business is conducted, in order to achieve superior performance.

It is important to align benchmarking projects with competitive and operations strategy so that organizational efforts for improvements are directed towards dimensions of performance critical to competitiveness. There is a clear relationship between benchmarking and
Improvement strategies in the sense that if it is to be used as part of the business strategy for gaining competitive advantage, improvement projects must be prioritized by taking into consideration the company performance levels relative to competitors on product and operational aspects most important to present and future market demands (Zairi et al., 1994).

2.10.6 Supplies Chain Strategies

Supply chain management is the practice of coordinating the flow of goods, services, information and finances as they move from raw materials to wholesaler to retailer to consumer (Russell, 2001). It takes into consideration all aspects of the events required to produce the product in the most efficient and cost effective manner possible. The requirement for organizations to become more responsive to the needs of customers, the changing conditions of competition and increasing levels of environment turbulence has brought about the concept of agile supplies chain. SC agility is the ability of the SC as a whole and its members to rapidly align the network and its operations to the dynamic and turbulent requirements of the demand network (Ismail et al., 2006). Agile supplies chains are capable of rapid adaptation in response to unexpected and unpredicted changes and events, market opportunities and customer requirements.

One of the most significant paradigm shifts of modern business management is that individual businesses no longer compete as solely autonomous entities, but rather as supply chains (Lambert et al., 2000). Chase et al. (2004) observed that many companies are achieving significant competitive advantage by the way they configure and manage their supply chain operations.

Process industry supply chains like the one in the petroleum industry operate at massive scales which make it all important to bring about efficiency in the supply chain. But companies must not view SCM for improving efficiency only, but also a way to bring about increase in sales, boost competitive advantage and create shareholder value (Vlasimsky, 2003). In their study of the Indian petroleum supply chain performance, Varma et al. (2007) rated the importance of the four balanced scorecard perspectives in descending order as: customer, financial, internal business process, and innovation and learning. Within these
perspectives, the following factors seem to be most important respectively: purity of product, market share, steady supply of raw material, and use of information technology.

Lee (2002) characterizes four types of supply chain strategies namely:

1) Efficient Supply Chains (ESC). ESC utilizes strategies aimed at creating the highest cost efficiency. For high cost efficiency to be achieved, non-value added activities should be eliminated, scale economies pursued, optimization techniques deployed to get best capacity utilization in production and distribution, and information linkages established to ensure the most efficient, accurate, and cost effective transmission of information across the supply chain. This strategy is apparent in the oil industry where the small companies combine to import a big cargo of crude oil or refined products. 2) Responsive Supply Chains which utilize strategies aimed at being responsive and flexible to the changing and diverse needs of the customers.

3) Agile Supply Chains which utilize strategies aimed at being responsive and flexible to customer needs, while the risks of supply shortages or disruptions are hedged by pooling inventory and other capacity resources. 4) Risk-hedging supply chains which utilize strategies aimed at pooling and sharing resources in a supply chain so that the risks in supply disruption can be shared.

2.10.7 Business Process Outsourcing (BPO)

Outsourcing is the act of moving some of a firm’s internal activities and decision responsibility to outside providers (Chase et al., 2004) and many organizations have widely adopted it for their non-core business activities. Non-core activities remain important to the overall success of organizations, and are best provided by specialist organizations that make those activities central to their business. Managing outsourced business processes is the key to providing competitive products or services and, along with managing core activities, will determine the success of organizations in achieving competitive excellence (May, 1998).

Outsourcing as a key business strategy has been used by companies in various industries for many decades. Competitive pressures have forced companies to look objectively and critically at business processes. Business processes such as information technology, payroll, logistics, human resources management and security are among the common ones regularly outsourced.
in most of the industries. In the present era, companies are using strategic and transformational outsourcing to seek improved business focus, mitigate risks, build sustainable competitive advantage, and extend technical capabilities and free resources for core business purposes.

Chase et al., (2004) identified the various reasons why organizations outsource and the benefits that accrue as follows: 1) organizationally driven reasons - to enhance effectiveness by focusing on what you do best, to increase flexibility to meet changing business conditions 2) Improvement driven reasons - to improve operating performance (quality and productivity, shorten cycle times among others), to obtain expertise, skills, and technologies that are not otherwise available, to improve management and control, to improve credibility and image by associating with superiors providers 3) Financially driven reasons - to reduce investments in assets and free up these resources for other purposes, to generate cash by transferring assets to the provider 4) Revenue driven reasons – to gain market access and business opportunities through the provider’s network, to accelerate expansion by tapping into the provider’s developed capacity, processes, and systems, to expand sales and production capacity during periods when such expansion cannot be financed, to commercially exploit existing skills 5) Cost-driven reasons – to reduce costs through superior provider performance and the provider’s lower cost structure, to turn fixed costs into variable costs 6) Employee driven reasons – to give employees a stronger career path, to increase commitment and energy in non-core areas.

Recently in Kenya, BPO centres are being set up to meet the growing need for outsourcing services. This study will attempt to find out whether outsourcing is used as an operations improvement practice in the oil industry in Kenya.

2.10.8 Diversification

Sustaining business growth is one of the key challenges to any business. Diversification is one of the methods that address this challenge. Zook (2001) research shows that diversification around the core business (concentric diversification) has a higher success rate than any other approaches to diversification. The characteristic of successful concentric diversification efforts include existence of a strong core business, diversification into adjacencies that are
close to the core business and leveraging of skills from the core business. Zook further observes that most businesses fail to achieve sustained profitable growth because they wrongly diversify from their core business. In order to succeed, firms must know their “key assets” - consistent with concentric diversification. They must reach their full potential in their core business and then expand into logically adjacent businesses surrounding the core.

The other types of diversification are horizontal and conglomerate diversifications. In the horizontal diversification, the company adds new products or services that are technologically or commercially unrelated (but not always) to current products, but which may appeal to current customers. Aidan et al. (1996) observes that in a competitive environment, this form of diversification is desirable if the present customers are loyal to the current products and if the new products have a good quality and are well promoted and priced. In conglomerate diversification, the company markets new products or services that have no technological or commercial synergies with current products, but which may appeal to new groups of customers. It has very little relationship with the firm’s current business. It is a risky strategy but if successful, can provide increased growth and profitability.

Many service stations in Kenya offer complimentary services such as tyre service, car wash, restaurants and convenient stores as value addition to their core business. Such activities generate some revenue as well.

2.10.9 Business Process Reengineering (BPR)

Business process reengineering (BPR) is one approach for redesigning the way work is done to better support the organization’s mission and reduce costs. Reengineering starts with a high-level assessment of the organization’s mission, strategic goals, and customer needs. Reengineering focuses on redesigning the process as a whole in order to achieve the greatest possible benefits to the organization and their customers.

Hammer and Champy (1993) define re-engineering as the “fundamental” rethinking and radical redesign of business processes to bring about dramatic improvements in critical contemporary measures of performance such as cost, quality, services and speed. BPR encompasses the envisioning of network strategies, the actual process design activity, and the
implementation of change in all its complex technological, human, and organizational dimensions (Davenport, 1993). The drive for realizing dramatic improvements by fundamentally rethinking how the organization’s work should be done distinguishes reengineering from process improvement efforts that focus on functional or incremental improvement such as TQM.

BPR derives its existence from different disciplines, and four major areas can be identified as being subjected to change in BPR – strategy, organization, technology, and people – where process view is used as a common framework for considering these dimensions. Business strategy is the primary driver of BPR initiatives and the other dimensions are governed by strategy’s encompassing role. The organization dimension reflects the structural elements of the company, such as hierarchical levels, the composition of organizational units, and the distribution of work between them. Technology is concerned mainly with the use of information and communication technology (ICT) in the business. The people/human resources dimension deals with aspects such as education, training, motivation, and reward systems.

3.3 Data Collection

This study used primary data obtained from Operations Managers, Engineering Managers, other senior managers of the various oil marketing companies, KPLC and KPC. The questionnaires consisted of three parts. Part I which was designed to capture general information about the company profile. Part II (1) which was designed to identify key concerns experienced by the organization. Most data in part II were obtained through interviews and surveys of top management and key informants. Part III was designed to capture the highest priority ranked most important issues related to the company. This was made through the Delphi and Ground Truth Method. Data were also collected through face-to-face interviews and telephone interviews. The data obtained were analyzed using the following factors: the relationships between three aspects.
CHAPTER 3: RESEARCH METHODOLOGY

3.1 Research Design

The survey targeted the Kenyan oil industry consisting of all licensed oil marketing companies, the Kenya Petroleum Refineries and the Kenya Pipeline Company. The study was designed to identify the operations improvement practices that are employed in the industry and challenges facing the industry that constrains its performance. The data was collected by use of structured questionnaires with both closed and open ended questions.

3.2 Population of Study

The population of study consisted of all the oil marketing companies licensed by the Ministry of Energy to import and process petroleum products in Kenya, the Kenya Petroleum Refineries and the Kenya Pipeline Company. The target population of the oil marketing companies was thirty two firms which are currently active in business. The research captured data from a broad base consisting of small, medium and large oil marketing companies.

3.3 Data Collection

This study used primary data obtained from Operations Managers, Engineering Managers or other senior managers of the various oil marketing companies, KPRL and KPC. The questionnaire consisted of three parts: Part A which was designed to capture general information about the company profile, Part B (1) which was designed to identify operations improvement practices the firm had employed and Part B (2) which was designed to establish the challenges experienced by the oil companies. Most data in part B was collected using Likert scale with ranking of importance of a parameter ranging from the lowest (0 or 1) implying least important to the highest number ranked most important. Initial contact with respondents was made through telephone and email after which drop and pick method and email was used. Follow up on telephone and email was also extensively done in attempt to get the questionnaires returned.
3.4 Data Analysis

The data collected in this study was checked and collated for accuracy and consistency and tabulated for ease of interpretation. Data was analyzed using descriptive statistics of frequencies, proportions and arithmetic means. The data collected in part A of the questionnaire on the general features of the oil marketing companies was first analyzed so as to classify the companies in terms of their sizes based on the market share each held. The companies were classified as small, medium or large. This classification was henceforth used as basis of categorizing companies while analyzing data collected in part B (1) of the questionnaire. Arithmetic mean rating was used in the analysis of data collected in part B (2) of the questionnaire. Tabulation was then done in a descending order of the mean rating of the significance of challenges experienced in the industry for ease of discussion.

4.2 General Features of the Oil Marketing Companies

4.2.1 Local Market Share

Respondents were asked to indicate the percentage of the local market share of petroleum products they held in the country as of 1st quarter of 2010. The results are shown in Table 4.2.1 below. The findings indicated that 20.6% of the respondents companies held under 5% each of the local market share of petroleum as of third quarter of 2010 and were classified as small oil marketing companies for the purpose of this study. 53% (i.e. 1 company) of respondents companies held between 5 and 9% of the market and were classified as medium size company. 29.9% of the remaining companies held over 10% each and were classified as large companies. The classification by market size was important in the analysis so as to determine whether the size of a company had a bearing on the importance of practices adopted.

The results are presented in Table 4.2.2 below with what is in the public domain that over 20% of the local market share of petroleum is held by a few large companies (currently 5 in number), which are national/international or regional companies. The rest of the market is shared out by small companies marketing about 5% with most having less than 1% market share. Medium sized companies with 1.9% market share each are very few.
CHAPTER 4: DATA ANALYSIS, RESULTS AND DISCUSSIONS

4.1 Introduction

In this chapter, the data obtained from the respondents has been analyzed and interpreted in line with the objectives of the study. This was done by use of frequencies, percentages, mean scores and mode. Data was collected from seventeen oil marketing companies which responded to the questionnaire out of a population of thirty two to whom questionnaires were sent to, representing a response rate of 53%. This excludes KPRL and KPC whose data have been analyzed separately since their operations are distinct.

4.2 General Features of the Oil Marketing Companies

4.2.1 Local Market Share

Respondents were asked to indicate the percentage of the local market share of petroleum products they held in the country as of 3rd quarter of 2010. The results are shown in Table 4.1 below. The findings indicated that 70.6% of the respondent companies held under 5% each of the local market share of petroleum as of third quarter of 2010 and were classified as small oil marketing companies for the purpose of this study. 5.9% (i.e. 1 company) of respondent companies held between 5 and 9.9% of the market and was classified as medium size company. 23.5% of the respondent companies held over 10% each and were classified as large companies. The classification by market size was important in the analysis so as to determine whether the size of a company had a bearing on the improvement practices adopted.

The results are generally in line with what is in the public domain that over 70% of the local market share of petroleum is held by a few large companies (currently five in number), which are either multinationals or regional companies. The rest of the market is shared out by small companies, numbering about thirty with most having less than 1% market share. Medium sized companies with 5-9.9% market share each are very few.
4.2.2 Nature of Distribution of Products

The respondents were asked to indicate the scope of their business in Kenya and the results are tabulated in Table 4.2 below. All the respondents indicated that they were importers of crude oil and white products. However, all the companies with small market share indicated that they do not deal with LPG as well as special products such as greases. In terms of nature of distribution of products, 41% indicated that they only do bulk distribution while 59% do both bulk and retail distribution.

The companies dealing with only bulk distribution were found to be mainly the ones with small market share implying that they have not established retail distribution network which is quite involving in terms of capital and marketing. Small companies do not have the capacity to brand products such as LPG, lubrication oils and other special products given the low market penetration while some do not have retail outlets to sell such products. Medium and large companies have both bulk and retail distribution networks. Most of them indicated that they were also distributing using resellers (note: resellers are not licensed to import oil into the market).

Table 4.1: Local Market Share

<table>
<thead>
<tr>
<th>% Local Market Share</th>
<th>Frequency</th>
<th>Percentage Frequency</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-0.9%</td>
<td>8</td>
<td>47.1%</td>
<td>Small (S)</td>
</tr>
<tr>
<td>1-4.9%</td>
<td>4</td>
<td>23.5%</td>
<td></td>
</tr>
<tr>
<td>5-9.9%</td>
<td>1</td>
<td>5.9%</td>
<td>Medium (M)</td>
</tr>
<tr>
<td>10-20%</td>
<td>3</td>
<td>17.6%</td>
<td>Large (L)</td>
</tr>
<tr>
<td>Over 20%</td>
<td>1</td>
<td>5.9%</td>
<td></td>
</tr>
<tr>
<td>Cumulative</td>
<td>17</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

Source: Primary data

Table 4.2: Nature of distribution of Products

<table>
<thead>
<tr>
<th></th>
<th>Bulk only</th>
<th>Bulk &amp; Retail</th>
<th>Cumulative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>7</td>
<td>10</td>
<td>17</td>
</tr>
<tr>
<td>% Frequency</td>
<td>41.2%</td>
<td>58.8%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: Primary data
4.3 Operations Improvement Practices in the Kenyan Oil Industry

The various improvement practices applied in the oil industry as obtained from the study are analyzed and discussed below.

4.3.1 Supplies Chain Management (SCM) Strategies

The respondents were given a list of attributes of SCM strategies and asked to rate the importance they attach to each as an improvement practice in their respective companies. The results are shown in Table 4.3 below. Small companies scored a mean rating of 3.0 on the application of SCM strategies for all the attributes of SCM which were listed with the medium company scoring 3.4 and the large companies scoring 3.7 out of maximum 4.0. Small companies attach a lot of importance on collaboration with other oil marketers which had a mean score of 3.6 and lean and efficient logistics by eliminating non-value adding activities and agents, with a mean score of 3.8. However, they scored a low on flexible physical distribution of products with a mean score of 2.3 and scale of economies with a mean score of 2.7. Also they scored low on use of information technology (IT) and networking with suppliers and customers. Medium and large companies are enjoying scales of economies by importing large cargoes and having larger distribution volumes and scored maximum rating of 4.0 on this element. They also scored high on flexible physical distribution of products and use of IT and networking with suppliers and customers.

The findings are in line with what is found in other industries. Large companies are better placed to take advantage of scale of economies due to the large volumes of trade, thus attracting quantity discounts and lower per unit cost as fixed costs are distributed over the bigger volumes. They are also expected to be able to take advantage of enhanced technology and networking with suppliers and customers. However, they may not have as lean and efficient logistics as the smaller companies.

4.3.2 Lean Operations

The respondents were given a list of attributes of lean operations and asked to rate the importance they attach to each as an improvement practice in their respective companies. The
results are shown in Table 4.3 below. Small companies scored a mean rating of 3.3 on lean operations for all the elements which were listed with the medium and large companies both scoring 3.2. Small companies scored higher than the medium and large companies on optimal inventory holding, optimal transportation model, use of resellers and lean staff but scored lower on outsourcing of services such as transportation of products. KPRL scored maximum points on lean operations while KPC indicated minimal lean operations.

The findings show that small companies have slightly leaner operations than the large companies. However, the margin is rather small which could be due to the centralized Open Tender System of procuring petroleum in the country which ensures competitiveness among all the bidding importers, both small and large companies. Due to limited resources and to some extent being independent unlike the multinationals which may have a standard way of doing things wherever they operate, small companies have the advantage of flexibility to eliminate any activity in the value chain that may not be adding much value.

4.3.3 Benchmarking

The respondents were given a list of attributes of benchmarking and asked to rate the importance they attach to each as an improvement practice in their respective companies. The results are shown in Table 4.3 below. Large companies were found to practice wider scope of benchmarking than the medium and small companies which mostly carry out competitor benchmarking with a mean score of 3.8, 3.3 and 2.5 respectively. KPRL and KPC also indicated that they carry out some external benchmarking.

Large companies, which are either multinationals or regional companies, are able to benchmark with the other companies in their flagship in other countries unlike most of the small companies which do not have presence outside the country. Areas of benchmarking include health, safety and environmental statistics, asset management data such as mean time between failure of equipment, cost data among others. Such benchmarking information is not easily available among competitors and thus companies without presence in other countries may not be in a position to do benchmarking easily.
4.3.4 TQM and Certification

The respondents were given a list of attributes of TQM and asked to rate the importance they attach to each as an improvement practice in their respective companies. The results are shown in Table 4.3 below. Large companies were found to practice more aspects of TQM than the medium and small companies with a mean score of 3.4 compared to 2.8 and 2.6 respectively. Small companies had a higher score on employee empowerment than the bigger companies but scored lower on continuous improvement and none were ISO 9001 certified. Three of the large companies are ISO 9001 certified. KPRL and KPC had a score of 3.0 and 2.8 respectively for all the applicable elements of TQM and certification.

TQM is a management approach to long-term success through customer satisfaction where all members of an organization participate in improving processes, products, services and the culture in which they work. Successful and sustained implementation TQM requires dedication from top management and champions who are designated to drive TQM processes in a company. Large companies are more likely to push this drive through the entire company unlike the small companies which may not have focal point for such processes. Successful implementation of TQM requires continuous improvement in processes, products and services which mean resources are required and may explain why small companies’ score lower in TQM and certification.

4.3.5 Total Productive Maintenance (TPM)

The respondents were given a list of attributes of TPM and asked to rate the importance they attach to each as an improvement practice in their respective companies. The results are shown in Table 4.3 below. Large companies were found to have embraced TPM practices more than the medium and small companies with more preventive maintenance as opposed to reactive or breakdown maintenance. Small companies have largely organized operations and maintenance as a single entity as opposed to the distinction found in medium and large companies. KPRL and KPC scored 2.7 and 3.3 respectively indicating commitment in adopting TPM practices.

TPM as an asset management approach has a higher rating in large companies than the smaller companies. This could be explained by the fact that large companies have more
production assets whose outage would be rather disruptive and expensive. Therefore, it has become prudent to have a proactive rather than reactive approach to maintenance. Large companies are also in a position to have a separate maintenance department rather than it being combined with operations.

4.3.6 Diversification

The respondents were given a list of attributes of diversification and asked to rate the significance of the revenue they generate from other non-core income generating activities they have engaged in. The results are shown in Table 4.3 below. All the companies indicated that the non-core activities they had engaged in were of slight significance in terms of additional revenue (i.e. upto 2.5% of revenue). The businesses cited are mostly to support the core business and includes convenience stores, car wash and tyre service. KPRL indicated it had plans for major diversification business streams in future.

Small oil marketing companies have potential for concentric diversification by engaging in businesses related to other petroleum products they are currently not dealing in. These include products such as LPG, fuel oils, bitumen and lubrication oils. However, they need to establish retail network to reach wider market. For the large companies, these products are already part of the core business range of products. Horizontal diversification may be difficult to engage in using the same facilities and resources besides requiring new licensing. Medium sized companies may be better placed to diversify in a wider range of products than either the small or large companies as they have more resources and better penetration of the market. There is therefore room for small companies to diversify their product range while large companies may not easily diversify further other than offering support services to attract customers.

4.3.7 Business Process Outsourcing

The respondents were asked to indicate which services they have outsourced either partially or fully. The results are tabulated in Table 4.4 below: The results shows that large companies have fully outsourced operation of service stations while 75% have fully outsourced transportation of products. They have partially outsourced maintenance of facilities, 50% have partially outsourced lubeoil blending with the balance carrying out their own lubeoil blending.
They have not outsourced depot facilities and LPG bottling. The medium company has partially outsourced transportation of products, maintenance of facilities and depot facilities. It has fully outsourced operation of service stations and lubrication oil blending. 66.7% have fully outsourced operation of service stations.

Companies usually outsource the activities they consider to be non-core. Large companies have outsourced more of the activities some of which the small companies have not outsourced or partially outsourced. Small companies have a blend own transportation and partial outsourcing while they have largely outsourced depot facilities since most do not own such facilities.

4.3.8 Business Process Reengineering

The respondents were asked to indicate the BPR projects they have undertaken or are planning to undertake in areas such as business strategy, organizational restructuring and technological investments. The results in Table 4.5 below: 41.7% of the respondent small companies indicated that they are investing in retail network and 25% are planning to broaden their products portfolio. The respondent medium company is investing in depot facilities and maximizing use of resellers. 50% or two of the large companies (multinationals) have undertaken business reorganization and restructuring after acquisition of exiting companies while one company is investing in alternative sources of energy through the parent company. KPRL is planning major projects to provide cleaner fuels, increase efficiency, create new business streams and cut costs. KPC has carried out capacity enhancement project, automation of processes and organizational restructuring.

The study indicated that the nature and complexity of the reengineering projects being carried out was dependent on the size of the company. Further, the complexity was also found to be dependent on the association of the companies with international or regional organizations, for example local multinational oil companies carried out reengineering projects which were in line with their parent companies policies. This includes restructuring following acquisition of exiting companies and different organizational and reporting structures after changes in the MNCs regional or global structures.
<table>
<thead>
<tr>
<th>Improvement Practice</th>
<th>Attributes</th>
<th>Mean Importance Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Company classification</td>
</tr>
<tr>
<td></td>
<td></td>
<td>S</td>
</tr>
<tr>
<td>Supplies Chain</td>
<td>Scale of economies (e.g., large import cargoes and distribution volumes)</td>
<td>2.7</td>
</tr>
<tr>
<td>Management Strategies</td>
<td>Collaboration with other oil marketers (e.g., jointly importing crude and</td>
<td>3.6</td>
</tr>
<tr>
<td></td>
<td>product, use of depots)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flexible distribution of products</td>
<td>2.3</td>
</tr>
<tr>
<td></td>
<td>Lean/efficient logistics (eliminate non-value adding activities)</td>
<td>3.8</td>
</tr>
<tr>
<td></td>
<td>Enhanced IT/networking with suppliers, customers</td>
<td>2.6</td>
</tr>
<tr>
<td></td>
<td><strong>Mean Rating for SCM</strong></td>
<td><strong>3.0</strong></td>
</tr>
<tr>
<td>Lean Operations</td>
<td>Optimal inventory holding</td>
<td>3.6</td>
</tr>
<tr>
<td></td>
<td>Optimal transportation model</td>
<td>3.7</td>
</tr>
<tr>
<td></td>
<td>Use of resellers</td>
<td>3.6</td>
</tr>
<tr>
<td></td>
<td>Outsourcing non-core activities (e.g., transportation, facilities maintenance)</td>
<td>2.6</td>
</tr>
<tr>
<td></td>
<td>Lean staff</td>
<td>4.0</td>
</tr>
<tr>
<td></td>
<td><strong>Mean Rating for Lean Operations</strong></td>
<td><strong>3.3</strong></td>
</tr>
<tr>
<td>Benchmarking (BM)</td>
<td>Competitor benchmarking</td>
<td>4.0</td>
</tr>
<tr>
<td></td>
<td>External (non-competitor) BM such as best practices in safety</td>
<td>1.2</td>
</tr>
<tr>
<td></td>
<td>Within global oil industry</td>
<td>2.2</td>
</tr>
<tr>
<td></td>
<td><strong>Mean Rating for Benchmarking</strong></td>
<td><strong>2.5</strong></td>
</tr>
<tr>
<td>TQM &amp; Certification</td>
<td>Entire organization focused on customer satisfaction</td>
<td>4.0</td>
</tr>
<tr>
<td></td>
<td>Top management involved in TQM process</td>
<td>2.2</td>
</tr>
<tr>
<td></td>
<td>Adoption of quality philosophy</td>
<td>2.6</td>
</tr>
<tr>
<td></td>
<td>Continuous improvement of processes, products, services</td>
<td>2.2</td>
</tr>
<tr>
<td></td>
<td>Empowerment of employees</td>
<td>3.5</td>
</tr>
<tr>
<td></td>
<td>ISO 9001 certification</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td><strong>Mean Rating for TQM</strong></td>
<td><strong>2.6</strong></td>
</tr>
<tr>
<td>Total Productive</td>
<td>Thorough preventive maintenance developed</td>
<td>1.8</td>
</tr>
<tr>
<td>Maintenance</td>
<td>Proactive maintenance approach rather than reactive</td>
<td>1.8</td>
</tr>
<tr>
<td></td>
<td>Operations and maintenance organized as a single entity</td>
<td>3.6</td>
</tr>
<tr>
<td></td>
<td><strong>Mean Rating for TPM</strong></td>
<td><strong>2.4</strong></td>
</tr>
<tr>
<td>Diversification</td>
<td>Alternative revenue centres established</td>
<td>1.0</td>
</tr>
</tbody>
</table>

*Source: Primary data*
**Table 4.4: Services Outsourced**

<table>
<thead>
<tr>
<th>Service</th>
<th>Outsourced?</th>
<th>% Frequency</th>
<th>Company Classification</th>
<th>KPRL</th>
<th>KPC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>S</td>
<td>M</td>
<td>L</td>
</tr>
<tr>
<td>Transportation of petroleum</td>
<td>Not outsourced</td>
<td>33.3%</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Partially</td>
<td>58.3%</td>
<td>100%</td>
<td>25%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fully outsourced</td>
<td>8.4%</td>
<td></td>
<td></td>
<td>75%</td>
</tr>
<tr>
<td>Operation of service stations</td>
<td>Not outsourced</td>
<td>16.7%</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Partially</td>
<td>16.7%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fully outsourced</td>
<td>66.7%</td>
<td>100%</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>Maintenance of facilities</td>
<td>Not outsourced</td>
<td>16.7%</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Partially</td>
<td>50%</td>
<td>100%</td>
<td>100%</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Fully outsourced</td>
<td>33.3%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depot facilities</td>
<td>Not outsourced</td>
<td>16.7%</td>
<td>N/A</td>
<td>N/A</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Partially</td>
<td>8.3%</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fully outsourced</td>
<td>91.7%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LPG bottling</td>
<td>Not outsourced</td>
<td>N/A</td>
<td>N/A</td>
<td>100%</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Partially</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fully outsourced</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Luboil blending</td>
<td>Not outsourced</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Partially</td>
<td>50%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fully outsourced</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Primary data

**Table 4.5: Business Process Reengineering Projects**

<table>
<thead>
<tr>
<th>Company Classification</th>
<th>BPR Focus</th>
<th>% Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>Diversification of product mix (e.g. LPG, black fuels, luboil)</td>
<td>25%</td>
</tr>
<tr>
<td></td>
<td>Developing retail network</td>
<td>41.7%</td>
</tr>
<tr>
<td>M</td>
<td>Additional/new facilities – depots, truck loading, LPG storage</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>Maximizing use of resellers</td>
<td>100%</td>
</tr>
<tr>
<td>L</td>
<td>Business reorganization and restructuring</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>Maximizing use of resellers</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>Alternative sources of energy (research being carried out by parent MNCs)</td>
<td>50%</td>
</tr>
<tr>
<td>KPRL</td>
<td>Cleaner fuels to meet international standards – planned upgrade</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>Efficiency–competitiveness with imported products, planned upgrade</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cost cutting – investment in own power generation planned</td>
<td></td>
</tr>
<tr>
<td></td>
<td>New business projects – selling excess power generated, fuel loading</td>
<td></td>
</tr>
<tr>
<td>KPC</td>
<td>Capacity enhancement – increased flow through the pipeline - done</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>Automation of processes - done</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Organizational restructuring – recurring</td>
<td></td>
</tr>
</tbody>
</table>

Source: Primary data
4.4 Challenges Experienced by the Kenyan Oil Industry

Respondents were asked to rate the significance of various challenges experienced in the oil industry on a Likert scale with 0 representing no challenge, 1 being a slight challenge and 4 being a major challenge. These are the business, operational and statutory challenges which impacts on the performance in terms of efficiency and effectiveness of the industry and affects profitability. Table 4.6 below shows the mean rating of the challenges arranged in descending order starting with the highest ranked.

Table 4.6: Rating of Challenges

<table>
<thead>
<tr>
<th>Challenge Faced</th>
<th>Mean Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Storage capacity limitations at KOSF</td>
<td>4.0</td>
</tr>
<tr>
<td>2 High operational costs (distribution, financing, administrative, etc)</td>
<td>3.5</td>
</tr>
<tr>
<td>3 Legal requirement to process a percentage of a firm’s oil market share as crude oil at KPRL</td>
<td>3.3</td>
</tr>
<tr>
<td>4 Inefficient KPRL performance</td>
<td>3.0</td>
</tr>
<tr>
<td>5 Pipeline (KPC) throughput limitations</td>
<td>3.0</td>
</tr>
<tr>
<td>6 KRA requirements for release of products from bonded warehouses (delays and upfront payment of duties)</td>
<td>2.8</td>
</tr>
<tr>
<td>7 Volatility of international crude oil prices</td>
<td>2.6</td>
</tr>
<tr>
<td>8 Inadequate tax incentives for capital investments</td>
<td>2.6</td>
</tr>
<tr>
<td>9 Large oil tankers (over 80,000 tons) cannot be handled at the port of Mombasa</td>
<td>2.4</td>
</tr>
<tr>
<td>10 Long lead time from crude oil order to delivery of products to customers</td>
<td>2.3</td>
</tr>
<tr>
<td>11 Inefficient &amp; narrow network of Railways service leading to the more costly road transportation of oil products</td>
<td>2.1</td>
</tr>
<tr>
<td>12 Consistent products quality offered to the customers</td>
<td>1.2</td>
</tr>
</tbody>
</table>

Source: Primary data

Storage capacity limitations at KOSF was rated as the biggest challenge facing the oil industry with the maximum score of 4.0 followed by high operational costs with a score of 3.5. The third challenge in significance rating was the legal requirement to process crude oil at KPRL with a score of 3.3. Inefficient KPRL performance and pipeline (KPC) throughput limitations were both ranked fourth with a score of 3.0. The least challenge in significance was consistent products quality with a score of 1.2, implying that products quality was meeting requirements. Long lead time from crude oil order to delivery of products to customers had a score of 2.3, implying its significance is medium. The challenges were found
to be largely independent of the size of company from the consistency of the ratings across most respondent companies.

These findings are closely related to Amolo’s (2002) and Karuri’s (2007) findings. Amolo found out that most oil companies were constrained in achievement of operations objectives; the major constraints identified being the shared infrastructure and government legislations. The shared infrastructure includes the refinery (KPRRL) and pipeline/storage facilities, including KOT which are owned by KPC. Karuri findings ranked government legislations, customs requirements and pipeline’s capacity and operations as the three top factors constraining flexibility as a competitive priority. Karuri also ranked financial requirements and refinery’s production and operations as some of the top factors constraining cost as a competitive priority. The financial requirements were taken to include high operational costs referred to in this study while refinery’s production and operation were taken to imply the inefficient operations of KPRRL.

4.5 Summary of Findings, Discussions & Interpretations

The objectives of this study were to identify the operations improvement practices employed by Kenyan oil companies and to establish the challenges faced by the Kenyan oil companies that constrain their performance. The findings are summarized below first on the general features of the industry and then with respect to each objective.

4.5.1 General Features of the Industry

The findings indicated that 70.6% of the respondent companies held under 5% each of the local market share of petroleum as of third quarter of 2010 and were classified as small oil marketing companies for the purpose of this study. 5.9% of respondent companies held between 5 and 9.9% of the market and was classified as a medium sized company. 23.5% of the respondent companies held over 10% each and were classified as large companies.

The findings showed that 41.2% of the respondent companies deal only with bulk distribution while 58.8% deal with both bulk and retail distribution. The companies dealing with only bulk distribution are the ones with small market share implying that they have not established retail
distribution network. All the companies with small market share indicated that they do not deal with LPG as well as special products such as greases. This can be explained by the fact that they do not have the capacity to brand such products given the low market penetration and also some do not have retail outlets.

4.5.2 Operations Improvement Practices in the Oil Industry

Among the large oil companies, the findings indicated that benchmarking, SCM strategies and TQM were ranked as the most important improvement practices with a mean rating of 3.8, 3.7 and 3.4 respectively out a maximum rating of 4.0. Lean operations were rated at 3.2. This is explained by the fact that large companies, which are either multinationals or regional companies, are able to benchmark with the other companies in their flagship in other countries unlike most of the small companies which do not have presence outside the country. They are also able to take advantage of SCM strategies due to the large volumes of products they deal with. The large companies have outsourced non-core services such as operation of service stations largely outsourced transportation of products and partially outsourced maintenance of facilities. 50% have carried out business reengineering mostly reorganization and restructuring following acquisition of other companies.

The medium sized company which responded indicated that SCM strategies, benchmarking and lean operations were ranked as the most important improvement practices with a mean rating of 3.4, 3.3, 3.3 and 3.2 respectively. SCM was understandably ranked highest because getting the products at the cheapest cost ensures competitiveness especially with the Open Tender System being used to procure petroleum products in the country. It is imperative for medium sized companies to benchmark against the large companies so as to adopt best practices which can lead to faster growth; this may explain the reason for the high ranking in importance of benchmarking. Lean operations was also rank high which could be attributed to efficiency and flexibility measures companies of such size are likely to put in place.

The small companies which responded ranked lean operations, SCM strategies and TQM as the most important improvement practices with a mean rating of 3.3, 3.0 and 2.6 respectively. Lean operations are critical to the small sized companies as it forms the basis of their competitiveness. Small companies attach a lot of importance SCM strategies such as
collaboration with other oil marketers due to the need to pool resources (e.g. to import joint cargoes) and use of the bigger companies facilities such as depots and truck loading facilities. They scored low on scale of economies which is attributed to their low volumes of business and low capital outlay. Small sized companies were found not to have outsourced as many services as the medium and large such as transportation of products, however, they outsource depot and truck loading facilities as most do not own such facilities.

The study indicated that the nature and complexity of the reengineering projects was found to be dependent on the size of the company. 41.7% of the respondent small companies indicated that they are investing in retail network while the respondent medium company was investing in depot facilities and two of the large companies (multinationals) have undertaken business reorganization and restructuring after acquisition of exiting companies. KPRL is planning major projects to provide cleaner fuels, increase efficiency, create new business streams and cut costs. KPC has carried out capacity enhancement project, automation of processes and organizational restructuring.

4.5.3 Challenges Experienced by the Industry

The study showed that storage capacity limitation at KOSF was the biggest challenge facing the oil industry followed by high operational costs. The third challenge in significance rating was the legal requirement to process crude oil at KPRL with inefficient KPRL performance and pipeline (KPC) throughput limitations equally ranked fourth. Other significant challenges from the study include requirements of KRA for releasing products from bonded warehouses and volatility of crude oil prices. The challenges were found to be largely independent of the size of company.

The storage facilities at KOSF are used by all the oil marketers and are not sufficient to accommodate the requirements of the country for a reasonable period of time. The private storage mostly owned by the major oil companies is also limited. Allocation of ullage (storage space) at KOSF for each marketer has been a contentious issue. The finding from this study ranking storage capacity limitation at KOSF as the biggest challenge facing the industry and is in line with Amolo’s (2002) findings who identified the major constraints facing most oil companies as shared infrastructure and government legislations.
High operational costs comprised of finance and operational costs were ranked as second biggest challenge. Finance costs would be high considering the cost of a crude cargo of 80,000 tons (about Kshs.4.5billion), long lead time of at least 2 months from crude cargo order to delivery of products from the refinery and upfront payment of duties. The operational costs includes refinery processing fees, pipeline transportation and storage, transportation from depots to retail outlets and staff among several others.

The statutory requirement to process crude oil at KPRL effectively removes flexibility of the oil marketers from competitively sourcing their products from elsewhere and is further compounded by the inefficiency of the refinery. This is in line with Karuri (2007) research findings which ranked refinery’s production and operations as one of the top factors which was constraining cost as a competitive priority.
5.1 Summary

This research study sought to find out the operations improvement practices which are being applied in the oil industry in Kenya and to establish the challenges facing the industry that constrains its performance.

The findings were based on primary data collected from seventeen respondent oil importing and marketing companies in Kenya, the Kenya Petroleum Refineries (KPRL) and Kenya Pipeline Company (KPC). The data was collected by use of structured questionnaires with both closed and open ended questions. The target respondents comprised of operations, engineering managers or other senior managers. Data was analyzed using descriptive statistics of frequencies, proportions and arithmetic means.

The findings indicated that 70.6% of the respondent companies held under 5% each of the local market share of petroleum as of third quarter of 2010, 5.9% of respondent companies held between 5 and 9.9% of the market and 23.5% of the respondent companies held over 10% each. 41% indicated that they only do bulk distribution while 59% do both bulk and retail distribution.

Among the large oil companies, the findings indicated that benchmarking, SCM strategies and TQM were ranked as the most important improvement practices respectively in that order. The medium sized company indicated that SCM strategies, benchmarking and lean operations were ranked as the most important improvement practices in that order. The small sized companies ranked lean operations, SCM strategies and TQM as the most important improvement practices in that order.

The study showed that storage capacity limitations at Kipevu Oil was the biggest challenge facing the oil industry followed by high operational costs, legal requirement to process crude oil at KPRL and inefficient refinery performance. Pipeline (KPC) throughput limitations were also ranked high. Other significant challenges from the study include KRA requirements for releasing products from bonded warehouses and volatility of crude oil prices.
5.2 Conclusions

The choices which lead companies to pursue certain improvement paths rather than others are conditioned, by among other things, their business environment (Porter, 1980). The business environment the Kenyan oil industry operates in has statutory controls which constrain full market forces from taking place. The infrastructure in terms of the refinery, pipeline and storage and the jetty are shared among all the oil marketers.

The study concluded that the improvement practices adopted by the companies are largely dependent on its size. In this study, the companies were classified by their market share and were categorized as small (upto 5%), medium (5-9.9%) or large (over 10%). However, the challenges facing the industry that constraints performance were found to be largely independent of the size of the companies.

Among the large oil companies benchmarking, SCM strategies and TQM were ranked as the most important improvement practices. The large companies were found to outsource more services than the small companies including services such as transportation and operation of service stations. The medium sized company attached most importance on SCM strategies, benchmarking and lean operations. The small sized companies attached most importance on lean operations and SCM strategies. The nature and complexity of reengineering projects carried was dependent on the size of the company. Some of the large companies had carried out business reorganization and restructuring while the medium size company was investing in depots. Some of the small companies were investing in retail network. KPRL was planning major projects to provide cleaner fuels, increase efficiency, create new business streams and cut costs while KPC had carried out capacity enhancement project, automation of processes and organizational restructuring.

Storage capacity limitations at KOSF was ranked as the biggest challenge facing the oil industry followed by high operational costs in distribution, legal requirement to process crude oil at KPRL, inefficient refinery performance and pipeline (KPC) throughput limitations followed in the rank. These findings are in line with Amolo (2002) who found out that most oil companies were constrained in achievement of operations objectives; the major constraints identified being the shared infrastructure and government legislations.
5.3 Recommendations

The oil industry operates in a rather challenging environment mainly due to the statutory requirements, constrained shared infrastructure and high operational costs as concluded from the study. On their part, the industry players should continuously adopt operations improvement practices which have significant impact on their performance by prioritizing from the available options. They should continue exerting pressure on the government to relax the stifling statutory requirements. Further, they should continue lobbing for upgrading of the refinery and improvement of pipeline efficiency.

There is room for lean practices and the study recommends that companies should be constantly reviewing their operations. They should evaluate the need and method of carrying out their activities and cut out any waste. The companies should be constantly evaluating whether it is more efficient for them to carry out various activities or to outsource them.

5.4 Limitations of the Study

The survey was based on the data from seventeen respondent companies representing about 53% of the targeted population of 32 active licensed oil marketing companies. Time and cost constraints limited the researcher in pursuing all the targeted population to get their feedback on the questionnaires sent out. The research was also limited on the attributes of each of the improvement practices listed on the questionnaire, to make conclusions on whether a company was practicing SCM strategies, TQM, lean operations among other practices, which were not exhaustive. Further, many employees were found averse to research oriented studies and showed lack of interest in spending time to answer the questionnaires. However, despite the above limitations, the researcher took utmost precautions to minimize the effects of the limitations.

5.5 Suggestions for Further Research

The study revealed the need for further research on a number of areas which this study did not get into depth, these include:
a) Detailed study on the current criteria of allocating storage space at Kipevu Oil Storage Facility and proposals for better allocation.

b) Analysis of Supplies Chain Management practices in the oil industry under the Open Tender System.

c) Critique of the factors used in determining the price in the proposed price regulation of petroleum in Kenya.

d) A study of the lean practices in the oil industry (or individual companies).
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APPENDICES

Appendix 1: Questionnaire

Declaration

This research is aimed at identifying the operations improvement initiatives in the Kenyan oil industry and also the challenges being experienced in the industry.

All the answers will be treated objectively; there will be no right or wrong answers to the questions. Information obtained from the survey shall be confidential and is strictly for academic purposes.

Your honest participation will be highly appreciated and will go a long way in contributing to the success of this dissertation.

Part A

1. What is the name of your company .................................................................

2. How long has the company been in the oil business? .................................

3. What is the scope of business in Kenya? (Please tick relevant box).

   a) Importation:
      i. Crude [ ]
      ii. White products [ ]
      iii. Others (specify) [ ]

   b) Distribution:
      i. Bulk [ ]
      ii. Retail [ ]

   c) Other (specify) [ ]

4. What percentage local market share of petroleum products does your company currently (Q3 2010) hold?

   0-0.9% [ ] 1-4.9% [ ] 5-9.9% [ ] 10-20% [ ] >20% [ ]
Part B (1)

Please apply the following score when rating the importance of improvement practices your company attaches to each of the initiatives:

**Importance of an improvement practice – applicable scores**

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Not important</td>
</tr>
<tr>
<td>2</td>
<td>Slightly important</td>
</tr>
<tr>
<td>3</td>
<td>Important</td>
</tr>
<tr>
<td>4</td>
<td>Very important</td>
</tr>
</tbody>
</table>

**Performance Improvement Practices**

Please indicate a score on the importance you assign to the operations improvement practices your company is employing to enhance performance from the list given. If an improvement practice is not applicable in your company, indicate N/A.

a. Supply Chain Management

i. Scale economies by importing bigger cargoes

ii. Collaboration with other oil marketers (e.g. pool cargo purchase)

iii. Flexible and responsive physical distribution of products to customers

iv. Leaner and efficient logistics by eliminating/minimizing non-value adding activities, agents

v. Enhanced Information technology application – networking with suppliers and other service providers

vi. Other optimization techniques (please elaborate)

b. Lean operations

i. Optimal inventory holding

ii. Optimal transportation model

iii. Eliminate non-value adding activities (Give examples)

iv. Lean staff

   Others (specify)

v. ..........................................................

C. Benchmarking

i. Competitor benchmarking
ii. External (non-competitor) benchmarking
   [ ]

iii. Within the global oil industry
    Others (please specify)
    [ ]

iv. .................................................. [ ]

d. Total quality Management (TQM) & certification

i. Entire organization focused on customer satisfaction
   [ ]

ii. Top management involvement in TQM process
    [ ]

iii. Adoption of quality philosophy
    [ ]

iv. TQM-oriented training, company-wide TQM culture
    [ ]

v. Continuous improvement of processes, products and services
   [ ]

vi. Empowerment of employees, teamwork
    [ ]

vii. ISO 9001 certification
     Others (specify)
     [ ]

viii. ........................................................ [ ]

e. Total Productive Maintenance

i. Thorough preventive maintenance program developed
   [ ]

ii. More proactive maintenance and less reactive (breakdown) work
    [ ]

iii. Operations and maintenance organized as single entity (e.g. under one manager)
     [ ]

iv. Operators involved in routine maintenance work
   [ ]

v. Every employee from top management to workers involved in equipment management
   [ ]

Others

vi. ........................................................ [ ]

f. Business Process Outsourcing (BPO). (Please tick if not outsourced, partially outsourced or fully outsourced)

<table>
<thead>
<tr>
<th>Service</th>
<th>Not outsourced</th>
<th>Partially</th>
<th>Fully</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. Transportation of petroleum</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>ii. Operation of service stations</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td></td>
<td>Not outsourced</td>
<td>Partially</td>
<td>Fully</td>
</tr>
<tr>
<td>iii. Maintenance of facilities</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
</tbody>
</table>
iv. Depot facilities [ ] [ ] [ ]
v. LPG bottling [ ] [ ] [ ]
vi. Luboil blending [ ] [ ] [ ]
Others (please specify)
vii. ......................... [ ] [ ] [ ]
viii. ......................... [ ] [ ] [ ]
g. Diversification
Please indicate any diversification businesses your company may have established in the recent past (last 5 years) and put a score on the significance of the additional revenue resources. Where the service is mainly to support the core business rather than a resource centre, please indicate as supportive service (S). Select the score of the significance from 0 to 3 as follows: Supportive Service (0) - less than 1% of total revenue; Slight Significant (1) - upto 2.5% of total revenue; Quite Significant (2) - 2.5-10%; Substantially Significant (3) - over 10% of total revenue.

Alternative business centre

Significance
i. ......................................................... [ ]
ii. ..................................................... [ ]
iii. ..................................................... [ ]
iv. ..................................................... [ ]

h. Business Process Reengineering (BPR)
Please indicate the BPR (redesigning the process as a whole in order to achieve the greatest possible benefits to the organization and their customers) projects your company has undertaken or is planning to transform the organization. These may be radical changes in business strategy, organizational restructuring and technological investments among others.

Planning Done
i. ......................................................... [ ] [ ]
ii. ..................................................... [ ] [ ]
iii. ..................................................... [ ] [ ]
The oil industry experiences various challenges that impact its performance. In a scale of 0 to 4, please indicate the extent to which you consider the following items as challenges in your company. Indicate by ticking (✓) the appropriate box where 0 is no issue, 1 is a slight challenge with 4 being a major challenge.

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Challenge</th>
<th>Rating of challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Legal requirement to process a percentage of a firm’s oil market share as crude oil at KPRL</td>
<td>0 1 2 3 4</td>
</tr>
<tr>
<td>2</td>
<td>Inefficient KPRL performance</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Storage capacity limitations at KOSF</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Pipeline (KPC) throughput limitations</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Volatility of international crude oil prices</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Inefficient &amp; narrow network of Railways service leading to the more costly road transportation of oil products</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Consistent products quality offered to the customers</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Long lead time from crude oil order to delivery of products to customers</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>High operational costs (distribution, financing, administrative, etc)</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Inadequate tax incentives for capital investments</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Large oil tankers (over 80,000 tons) cannot be handled at the port of Mombasa</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>KRA requirements for release of products from bonded warehouses (delays and upfront payment of duties)</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix II – List of Respondent Oil Companies

1. Bakri International Petroleum (K) Ltd.
2. Dalbit Petroleum Ltd.
3. Engen Petroleum Ltd.
4. Galana Petroleum Ltd.
5. Gapco Kenya Ltd.
7. Hass Petroleum Ltd.
8. Hashi Empex Petroleum Ltd.
9. Intoil Petroleum Ltd.
10. Jade Petroleum Ltd.
11. KenolKobil Petroleum Ltd.
12. Kenya Shell Ltd.
13. Metro Petroleum Ltd.
14. Oilcom Petroleum Products
15. Oilibya Kenya Ltd.
16. Runway Products Ltd.
17. Total Kenya Ltd.

Other Category
1. Kenya Petroleum Refineries Ltd.
2. Kenya Pipeline Company Ltd.