

**AN ASSESSMENT OF THE TOTAL QUALITY MANAGEMENT
PRACTICES IN THE THERMAL POWER PLANTS IN KENYA**

BY:

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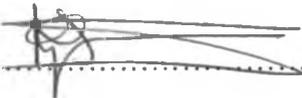
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**A Management Research Project Report Submitted in Partial Fulfilment of
the Requirements of the Degree of Master of Business Administration (MBA),
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DECLARATION

This research project is my original work and has not been submitted for a degree award in any other university.

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Approval

This research project has been forwarded for examination with my approval as the University Supervisor.

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DEDICATION

This research project is dedicated to my wife, Anne and my three daughters, Sandra, Angela and Vanessa for their support during my pursuit of the MBA degree.

ACKNOWLEDGMENTS

My first and foremost gratitude goes to The Almighty God for giving me the strength to complete my MBA program in spite of many challenges. Special thanks to my family for the patience they have demonstrated during the entire period during which I was unavailable.

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Profound thanks to all my fellow students and friends who through their enriching interaction, companionship, and experiences shared helped me widen my spheres in terms of my thinking which eventually led to success of this research work.

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EXECUTIVE SUMMARY

The generation process in thermal power plants has great effect on the quality of final product generated by each plant. This means that the emphasis of research and practice of TQM in power generation should shift from focusing on the final product to focusing on the generation process. Not only the high quality of product and service but also the high level of quality control of the whole energy generation process ensures the competitive advance. The essence of competitive advantage is not simply pursuing product quality and process quality, but the performance of the whole energy generation system.

The purpose of this paper was to explore application of the TQM principles in electrical energy generation management in thermal power plants in Kenya. The objective of the study was to assess the application of TQM principles in electrical energy generation management in thermal power plants in Kenya. Specifically, the study assessed the continuous improvement of systems, leadership and management practices, determined the extent to which quality culture entrenched in the organization; and established the level of focus on customers and involvement of staff in decision making.

The descriptive research design was adopted to assess the quality management issues affecting performance of thermal power plants in Kenya. The study targeted the five thermal power plants in Kenya. These are Kenya Electricity Generating Company (KenGen) which accounts for close to 70% of generation; Iberafrica Power (EA) Ltd; Tsavo Power Company Ltd; Mumias Sugar Company Ltd; and Rabai Power Ltd. Five representatives were randomly selected from each of the five power plants to make a total sample size of 25 respondents. A questionnaire was used to collect primary data.

Descriptive statistics in the form of pie charts, contingency tables and bar graphs were used to describe the data. The Mean helped to determine the average score for each variable in each thermal plant and that of the industry. Pearson correlation was used to determine if there is linear relationship between any of the tested variables in the thermal electrical power generation. The

results revealed that there is implementation of TQM principles which has a strong impact on the organisation's performance. From results of Pearson Product Moment Correlation Coefficients on TQM principles and quality there is a significant statistical relationship between TQM principles and quality and hence overall performance of thermal power plants in Kenya.

Further, it can be concluded that thermal power plants have embraced continuous improvement of systems, leadership and management practices principles of TQM. These have been effective in influencing performance of thermal power plants. This shows that employees are confident in the organizations leadership and that their leaders have skills to lead. In addition, the respondents reported that managers have earned employee respect and that they perceive fairness in participation and involvement. From these results, one can conclude that employees have confidence in the organization and its management.

Implementation TQM emphasizes on culture of quality and therefore it can be concluded that power plants have embraced culture of quality. However, there are certain sections of organization design that inhibits its quality. Finally the findings indicate that there is customer focus and staff involvement in decision making in thermal power plants in Kenya.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

The last few decades have witnessed a major transformation in how business is conducted. Organizations whether large or small, public or private, have been striving for high productivity with an emphasis on quality, innovation and value. Hence, those organizations developed and implemented approaches to optimally link the organization's work and employees for improved business results (Kafifi, 2006). Total Quality Management (TQM) has become the mantra of many reform-minded business leaders hoping to capitalize on the sources of competitive advantage embodied in the principles and practices of TQM (Sureshchandar, 2001; Hsieh, 2002).

TQM is a philosophy aiming at continuous improvement and involvement of the whole organization starting from the top of the hierarchy and ending at the bottom level of employees (Kafifi, 2006). Yang (2006) found that TQM practices including quality management, process management, employee empowerment and teamwork, customer satisfaction management, quality goal setting and measurement, supplier's cooperation and quality tools training have positive effects on customer satisfaction and that the adoption of TQM principles is an effective means by which companies can gain competitive advantage. The implementation of the TQM practices also helped companies to improve their image, employee's satisfaction and quality awareness. There has been myriad of research conducted on quality management in the manufacturing industry which investigated the various dimensions, techniques and organizational requirements for effective implementation of TQM (Sureshchandar et al., 2001). On the other side of the continuum there has not been a lot of research conducted on quality in Kenya and especially on electrical energy generation.

Empirical study done by Kamran, Ali, Rashid and Anwar (2010) in India found that TQM implementation is heavily dependent on various factors related to organizational

context and culture. It also identified that the end results and changes expected by organizations from TQM implementation are not only dependent on its own framework, but on many other culturally related 'Intermediate Impacts'. These intermediate impacts mostly concern organizational dynamics and culture, and are ignored in most firms, resulting in early failure of TQM.

The cost of electrical energy is vital to the cost of production for any economic entity such as Kenya. All electrical energy consumers in Kenya are dissatisfied with the high cost of energy in Kenya and they constantly question what could be done to lower it (Kenya Association of Manufacturers, 2009). Having worked in the Energy Sector in Kenya and specifically in electrical power generation, I am motivated to study the kind of quality management practices that have been implemented in thermal generating power plants and how they impact on their management.

Siddiqui and Rahman (2007) showed that customer orientation and support of top management constitute the key factors in achieving benefits like cost cutting on maintenance of applications, increased management control, improved quality of products and services, greater customer satisfaction, enhanced productivity, slashed time consumption on production, optimization of human resource use and flexibility in reaching out to customers.

Dale (2003) emphasizes that continuous improvement in the total business activities with a focus on the customer throughout the entire organization and an emphasis of flexibility and quality are some of the main means by which companies face up to competitive threats. This is why quality and its management and the associated continual improvement are looked upon by many organizations as the means by which they can survive and maintain a competitive edge over their rivals. Companies that do not manage change will fail. Dale points out that 'total quality is a major factor in the business quality revolution that has proven itself to be one of the 20th century's most powerful creators of sales & revenue growth, genuinely good new jobs, and soundly based and sustainable businesses expansion'.

Companies worldwide have adopted Total Quality Management (TQM) practices to meet the quality challenge. Traditionally, the word quality has been associated with the final product or service which is offered to a client (Bell, McBride and Wilson, 1994). The word quality has a variety of definitions (Dale, 2003). Among the definitions includes; 'fitness for use' (Juran, 1979), and 'conformance to specification' (Crosby, 1979). According to Bell, McBride and Wilson (1994), the above definitions relate to the final product or service. The underlying logic suggests that for a product or service to be delivered on time, at a cost and customer-desired level of quality, all primary and support processes which in effect produce the product or service, must be both efficient and effective. They further state that this expanded concept of quality includes aspects internal to the business rather than simply the external attributes of the organization.

According to Christos and Evangelos (2010), the main quality management factors are: quality practices of the top management, employee involvement, customer focus, process and data quality management and the use of quality tools and techniques. In other words, the company's top management supported by its employees, places customer at the center of the system and while using quality tools it manages processes and data based on quality. The result of this form of management is the company's quality improvement, customer satisfaction, its market consolidation and domination and the protection of natural and social environment.

In order to face the challenges, many organizations, including thermal power plants in Kenya, have implemented QMS. According to Bell, McBride and Wilson (1994), when QMS is properly implemented out of a strategic decision rather than from reaction to changing competitive circumstances, the benefits are, access to markets, organized form of communication, more precise specification means, greater control of suppliers, increased efficiency, less remedial work and scrap, and excellent feedback to customer problems. Other benefits also include; more rapid correction of inadequate production methods, meeting target delivery dates, improvement in the standard of workmanship, and improvement of the reputation of the organization.

Dean and Bowen (1994) have analyzed the Total Quality Management literature, claiming that its key points are customer focus, continual improvement, and teamwork. Raffio (1993) further includes the involvement of employees as well as management commitment as basic principles of TQM while Hart and Bogan (1992) identify the distinction of TQM as a penetrating customer oriented approach to managing quantity for competitive advantage. Oakland (1993) defines TQM as the way for the management to improve effectiveness, flexibility, and competitive advantages for the organization as a whole because it complies with the internal and external customer requirements.

To achieve the objective of least cost electric energy, application TQM principles is vital in the energy generation process in Kenya. This would entail developing a quality culture in which everyone working in the organization shares a commitment to continuously improve in order to reduce cost of energy and satisfy customers. But according to (IPM, 1993) research, despite increased attention to the culture issues, many organizations still devotes very little attention to the practical day-to-day process of changing the culture of the organization. Although TQM systems are being implemented in many electrical thermal power plants, there is need to assess the extent of TQM principles application in energy generation.

1.2 Statement of the Problem

Electricity as a source of energy is vital to the growth and development of any economy. Its significance arises from the impact it has on infrastructure, social-economic activities and consequently on the country's standard of living. This means that transportation, communication, construction and other facilities depend of electricity to function effectively. In Kenya, the electrical power generation is one of the fastest growing industries in energy sector of the economy after several years of stagnated growth. According to the Kenya National Bureau of Statistics (KNBS), the Average Electricity sector growth rate was at 0% from year 2000 to 2006, 9.7% in 2007, 5.2% in 2008 and about 14% in 2009.

Availability of reliable and affordable electrical energy is a key factor in the attainment of projected economic growth targets under the Vision 2030. Currently, the cost of energy is high due to various expensive modes of generation that are fuel dependent. While most people only focus on fuel as the main cause of high electrical bills, there are certain other underlying factors that may have been ignored, yet they have a substantial contribution to the cost of energy. One of these issues is the application of TQM principles in the electrical energy generation.

The generation process in thermal power plants has great effect on the quality of final product generated by each plant. This means that the emphasis of research and practice of TQM in power generation should shift from focusing on the final product to focusing on the generation process. Not only the high quality of product and service but also the high level of quality control of the whole energy generation process ensures the competitive advance. The essence of competitive advantage is not simply pursuing product quality and process quality, but the performance of the whole energy generation system. Therefore, the establishment of quality management system of energy generation in Kenya based on the management ideas of TQM will promote the involvement of all the members and facilitate the implementation of quality control of the electrical energy generation in thermal power plants.

A study done in the United Kingdom by McAdam and McLean in July 2002 in five electrical companies showed that the UK electricity companies are using TQM tools to help shape their businesses and to implement change processes. Hence, restructuring, re-engineering of processes, delivering customer requirements and meeting Electricity Regulation Commission (ERC) targets are all part of a holistic TQM approach (Parkinson et al., 2000). In Kenya, no research has been conducted yet to assess the TQM practices in the generation process of electrical energy in thermal power plants. Electrical energy is a standardized product with limited scope for differentiation, which leaves the Kenyan electricity generating companies with the option of only concentrating in improving service levels and reducing costs for their customers. Critical in the realization of these goals is the adoption of TQM philosophy.

Hansson (2001) conducted a study to evaluate the aspects of TQM implementation in a number of small organizations in Sweden. His study reemphasized the importance of committed leadership and employee participation. Small organizations were found to face hurdles towards process orientation. Specifically, small organizations were observed to be in considerable difficulty in implementing 'fact based decisions' and 'continuous improvement'. However, according to the researcher's findings 'leadership', 'employee commitment' and 'customer focus' have all permeated across the organizations surveyed.

In Pakistan, Alam and YeZhuang (2005) studied the trend, status and scope of ISO certification in Pakistani industry and made comparative analyses with Spanish industry and Chinese industry to highlight the differences in approaches and the hurdles encountered in implementation. They observed that maximum practice of quality management practices in ISO certified firms was in the production department, there was unawareness from usage of different quality tools for performance measurement and that TQM was properly practiced in only 5% of the firms. Jamshed H. Khan (2000) proposed that for successful implementation of TQM in Pakistani organizations commitment of both top and middle level management is compulsory, that a right approach towards TQM implementation should be made, that TQM tools should be used step by step and that workers fears should be removed and a reward system should be introduced for better performance.

The purpose of this paper was to explore application of the TQM principles in electrical energy generation management in thermal power plants in Kenya. The study sought to answer the following questions: the extent to which systems, leadership and management practices in the thermal power plants have been improved; the culture of quality in thermal power plant, and focus on customers and involvement of people/staff in decision making.

1.3 Objectives of the Study

The general objective of this study was to assess the application of TQM principles in electrical energy generation management in thermal power plants in Kenya.

The specific objectives were:

1. To assess the continuous improvement of systems, leadership and management practices.
2. To determine the extent to which quality culture is entrenched in the organization; and
3. To establish the level of focus on customers and involvement of staff in decision making.

1.4 Importance of the Study

This study provides the management of thermal power plants with better understanding of its processes and identifies tools for implementing continual improvement programs that can lead to improved profitability thereby increasing shareholder value. The study can assist the management of thermal power plants to encourage innovation, make the organisation adaptable to change, motivate people for better quality, and integrate the business as a result of common purpose. All these provide the organisation with a valuable and distinctive competitive edge.

The study may be used by energy regulator in Kenya, ERC, to improve the regulation of thermal power plants in ensuring that they implement TQM principles so that the benefits can be passed on the customers for more efficient services. The entire country could benefit from reduced cost to one of the primary ingredients of production which would accelerate economic growth.

This study adds to existing literature on TQM implementation in academic institutions. While students and lecturers may make references to this document, future researchers may decide to do more research based on the issues raised here.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This section reviews related literature with regard to Quality Management Systems (QMS) with special focus to power plants. First the chapter presents the overview of the thermal power plants in Kenya followed by literature on ISO9000 quality management standard and TQM. ISO 9000 and TQM Principles that need to be implemented to ensure operational efficiency in thermal power generation industry are highlighted. At the end of the chapter conceptual framework is presented.

2.2 Thermal Energy Generation in Kenya

Electrical energy is generated from various sources some of which are water, wind, solar, fuel and natural gas, nuclear power and geothermal. In Kenya, the main sources of electrical energy are water, fuel, geothermal and wind. Thermal electrical energy in this paper will refer to the electrical energy generated by use of fossil fuels. The energy sector in Kenya has been undergoing restructuring and reforms since the 1990s, which culminated in the enactment of the Energy Act, No 12 of 2006 (The Act). Under the Act, the Ministry of Energy (MoE) is responsible for formulation and articulation of policies through which it provides an enabling environment to all operators and other stakeholders in the energy sector (Ministry of Energy, 2004).

The principal operators in thermal electrical energy generation in Kenya are the Kenya Electricity Generating Company (KenGen) and the Independent Power Producers (IPPs), namely Iberafrica Power (EA) Ltd, Tsavo Power Company Ltd, Mumias Sugar Company Ltd and Rabai Power Ltd. All these companies have thermal power plants in their generation portfolio. The Kenyan Government long term energy plan ("Least Cost Power Development Plan" or LCPDP) includes thermal power plants using Heavy Fuel Oil (HFO) as a strategic development for the sector. Although HFO is considered expensive,

it is about 70% cheaper than the cost of Automotive Gas Oil (AGO). Thermal electrical generating power plants are generally used to ensure electrical power stability at the power load centers (Kenol, 2009).

Least cost of energy is considered a catalyst for new investments and plays a major role in retention of existing business as it contributes immensely to ensuring competitiveness of manufactured goods and services and guarantees low cost of manufacturing. In this respect, focus should be directed more in development of stable reliable and least cost energy infrastructure to attract investments rather than infrastructure development to serve growing demand as is the case today (Kenol, 2009).

2.3 Total Quality Management Principles

The ISO 9000, 2005 quality management standard is based on eight quality management principles. The first quality management principle is Customer Focus where organizations depend on their customers and therefore should understand current and future customer needs. They should also strive to exceed customer expectations. The next is Management and Leadership in which case Leaders should establish unity of purpose and direction of the organization, create and maintain the internal environment in which people can become fully involved in achieving the organization's objectives. Involvement of People is also another quality management principle. This means that people at all levels are the essence of an organization and their full involvement enables their abilities to be used for the organization's benefit.

Process and System Approach to management are other principles according to ISO 9000 which state that desired result are achieved more efficiently when activities and related resources are managed as a process and identifying, understanding and managing interrelated processes as a system contributes to the organization's effectiveness and efficiency in achieving its objectives. Another quality management principle relate to Continual Improvement of the organizations overall performance which should be a

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permanent objective of the organization followed by Factual Approach to Decision Making: Effective decisions are based on analysis of data and information. Lastly, Mutually Beneficial Supplier Relationships which implies that an organization and its suppliers are interdependent and mutually beneficial relationship enhances the ability of both to create value.

According to Martin Murray (2007), Total Quality Management (TQM) is an approach that seeks to improve quality and performance which will meet or exceed customer expectations. This can be achieved by integrating all quality-related functions and processes throughout the company. TQM looks at the overall quality measures used by a company including managing quality design and development, quality control and maintenance, quality improvement, and quality assurance. TQM takes into account all quality measures taken at all levels and involving all company employees. A number of key principles can be identified in defining TQM.

The first is Executive Management which means that top management should act as the main driver for TQM and create an environment that ensures its success. The management responsibilities are; management commitment, customer focus, quality policy, planning, and responsibility, authority and communication. Another one is Training meaning that employees should receive regular training on the methods and concepts of quality.

Customer Focus means that Improvements in quality should improve customer satisfaction. Complying with both internal and customer requirements. Customer expectations for a design or specifications must be transformed in order that the organization may adapt these expectations to activities required for production. Another principle is Decision Making where Quality decisions should be made based on measurements and factual information

Methodology and Tools is also an important principle which means that they are statistical process control (SPC) methods, to be used by all staff to simplify processes and

process reorganization. The most successful SPC tool is the control chart, originally developed by Walter Shewhart in the early 1920s. A control chart helps to record data and to detect when an unusual event, e.g., a very high or low observation compared with “typical” process performance, occurs. Control charts attempt to distinguish between two types of process variation. The first is common cause variation which is intrinsic to the process and will always be present. The second one is special cause variation which stems from external sources and indicates that the process is out of statistical control.

Continuous Improvement means to comply with customer requirements involves continuous improvements of products and processes. The most efficient method to create improvement is to let the staff performing the particular work identify and implement the particular improvement in their daily work. Even through continuous improvement involves all staff, this should be viewed from the angle that it is the management that has the responsibility for the development and the change in the organization.

Another principle is Company Culture, that is, the culture of the company should aim at developing employees ability to work together to improve quality. The last principle is Employee Involvement which means that Employees should be encouraged to be pro-active in identifying and addressing quality related problems.

The success of quality management is based on several quality models. Much of perspective and popular literature on TQM subscribes that TQM is “universal” in its application ability. This appears on many levels at the institutional, national and certification schemes. The formal evaluation models of quality management are developed, such as the Malcolm Baldrige National Quality Award model in USA, the European foundation for Quality Management (EFQM) model in Europe and Deming Application Prize model in Japan. These models have a number of common elements (Juan and Vincente 2004). That proposed TQM models can serve as a prototype for implementing quality improvement programs in manufacturing and service-sector settings.

The study of TQM effect on organizational performance most research has focused on analyzes the relationships between the implementation of different elements and several types of performance. The causal analysis results show that dynamism, munificence and complexity influence the degree of implementation of the main TQM principles. The most relevant effects emerge as a result of the environmental dynamism, and the least effects are due to munificence. Similarly, the dimensions of TQM have an impact on different types of performance. The model can be used by organizations to assess their level of TQM success depending on specific environmental characteristic (Fuentes 2004).

An empirical study was done to examine the correlation between TQM and technology/research and development (R&D) management in predicting organizational performance in terms of quality and innovation. TQM shows a strong predictive power against quality performance but no significant relationship against innovation performance. On the other hand, technology and R&D management shows a significant relationship with quality performance but at a lower level than that of TQM, and shows much stronger relationship with innovation performance. In addition, there is strong and positive correlation between TQM and technology/R&D management. The major implication of this study is that technology/R&D management is an appropriate resource to be used in harmony with TQM to enhance organizational performance, particularly innovation (Prajogo, 2004).

From the above principles, this research project deals with selected TQM principles in the electrical energy generation management in thermal power plants, namely; continuous improvement of management systems, leadership and management practices, quality culture; customer focus, and decision making.

2.3.1 Continual improvement of systems, leadership and management practices.

The goal of continuous improvement is common to many managerial theories. However, what differentiates TQM is that it specifies a specific step-by-step process to achieve this. This process consists of 4 steps illustrated in Deming's Plan-Do-Check-Action (PDCA) diagram shown below. The PDCA diagram stresses removing the root cause of problems and continually establishing and revising new standards or goals. (Deming 1986)

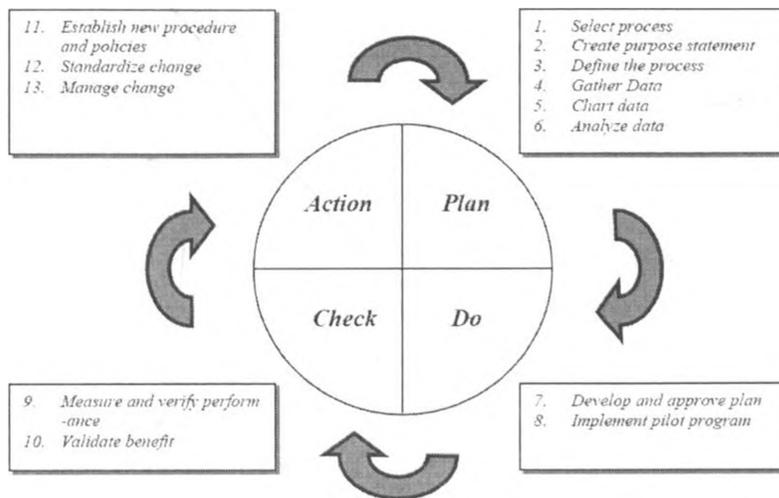


Figure: 2.1 PDCA diagram

Under TQM, management in the thermal power plants has two functions. The first is to maintain and improve current methods and procedures through process control. This is followed by directing efforts to achieve, through innovation, major technological advances in generation processes.

According to Zhang, Chang and Yu (2006) the effectiveness of quality management depends on the effectiveness of leadership because quality efforts can get actual effect only with the recognition and support of the leadership. In energy generation circumstances, the core enterprise plays as the leader since it establishes the development strategy. The operation targets of supply chain affect the actual efficiency and effectiveness of the quality effort of all the other members (Stanley and Wisner, 2001).

A study done by Taina and Arto (2007) in Finland showed that managerial commitment is the foundation for improving continuously and creating sustaining learning. The investments in executive training should be made on a continuing basis to overcome crucial barriers. Organizing and resource allocation are some of the key managerial responsibilities. Management should invest in, and allocate resources to staff training in order to promote learning and Continuous Improvement.

A power plant wishing to support and develop such a process needs to use quality management tools and techniques to measure improvement progress. Some of these techniques are:

Check-Sheet: Check-sheet is used to record events, or non-events (non-conformances). They can also include information such as the position where the event occurred and any known causes. They are usually prepared in advance and are completed by those who are carrying out the operations or monitoring their progress. The value of check-sheet can be retrospective analysis, so they help with problem identification and problem solving.

Histogram: Histogram provides a graphical representation of the individual measured values in a data set according to the frequency of occurrence. It helps to visualize the distribution of data and there are several forms, which should be recognized, and in this way they reveal the amount of variation within a process. It should be well designed so that people who carry out the operation can easily use them

Cause and effect Diagram: Cause and Effect Diagram, which was developed by Karoia Ishikawa, is useful in breaking down the major causes of a particular problem. The shape of the diagram looks like the skeleton of a fish. This is because a process often has a multitude of tasks footing into it, any one of which may be a cause. If a problem occurs, it will have an effect on the process, so it will be necessary to consider the whole multitude of tasks when searching for a solution

2.3.2 Organization culture of quality

Total quality management works with an open management style with a delegation of liability. The aim is to develop a quality culture in which everyone working in the organization will share a commitment to continuous improvements in order to satisfy customers. But according to (IPM, 1993) research, despite increased attention to the culture issues, still devotes very little attention to the practical day-to-day process of changing the culture of the organization.

Schein (2004) for instance views culture as something which, according to him, includes three levels. The first is artifacts which refer to the visible organization structure and processes. The second level is espoused values which refer to the strategies, objectives, and philosophies. The last level is the basic underlying assumptions and this refers to the unconscious, taken-for-granted beliefs, perceptions, thoughts, and feelings.

Schein (1992) argues that the pattern of basic underlying assumptions may act as a cognitive defense mechanism for individuals or groups, thus making culture changes difficult, time consuming, and anxiety provoking. Cultures are deep seated, pervasive and complex, and it may prove an extremely difficult experience to bring these assumptions to the surface. Schein (1992) identifies management as a subculture in every organization and argues that the management as an introduction to a change of the organization culture should discuss their own culture to a degree which would make it accessible to identify their subculture, and thus a lean new method to reflect and change their culture, as an unfreeze phase – cognitive restructure phase – refreeze phase of their shared culture before they try to implement the change in the organization culture.

Devanna, Fombrum and Tichy (1984) claim that attempt to develop a quality culture start with election of employees with the appropriate characteristics. Effective recruitment is consequently important and specific media for advertising and formulations should be selected with a view to hiring staff. Realistic and precise job should inspire candidates to reflect on their abilities in relation to the particular job while selective methods in the organization should test applicant abilities in problem-solving and teamwork (Bowen and Lawler, 1992).

Beckford (1998) further argues that these beliefs and values are expressed through rituals, stories and myths of the organization. He continues to state that these tend to be the guiding new entrants to the organization towards particular forms of behaviour and attitudes. Those not conforming are seen as radicals and remain outside the 'cultural web' Johnson and Scholes (1993). Entrenched norms of behaviour are difficult aspects of an

organization to change. If cultural aspects are well addressed in an organization then, its performance improves.

A study done by Farah (2010) showed that managers perceive discourses of organizational culture negatively in relationship to performance, and employees perceive discourses of organizational culture positively in relationship performance. The purpose of conducting two types of interviews among managers and employees was to compare different outcomes in a theoretical context and to find several discursive structures of organizational culture to see how it implies a perceived relationship to performance.

2.3.3 Customer focus and involvement of staff in decision making

Customer focus is the core principle and idea of TQM because quality effort is driven by customer's needs and ends with customer's acceptance (Chang and Yu, 2006). In power generation circumstance, customers include not only the end user but also many in-between users, such as suppliers, manufacturers, sellers, etc. However, more than half of the quality problems in supply chain originate specifications because of the inadequate communications between the members in whole system (Chang and Yu, 2006). In many cases, the procurement specifications released by buyers are equivocal while suppliers avoid going against buyers on the specifications in the bidding process. Therefore, the core enterprise must pay attention to the needs and expectation of end users, and all the members of supply chain must pay attention to the needs and expectation of their backward users. The needs and expectation of end users should be deployed layer upon layer in the whole process. The end users will be satisfied if all the members of energy generation process can satisfy the needs of their backward users, (Storey, 1992). Moreover, the operation efficiency of supply chain system can be improved through the satisfaction level of the end users.

The exertion of enthusiasm and creativity of all the employees is the precondition of the actual effect of quality management (Ma, S. and Tang, 2001). In energy generation process circumstance, an up-and-coming excelsior work atmosphere should be established to inspire the enthusiasm and creativity of the employees of all the members.

According to Chang and Yu (2006) each employee should understand his/her role and responsibility in the supply chain system, solve the problems forwardly as mastership, and learn the principles, skills and technologies of TQM and ISO9000.

2.4 Conceptual framework

Total quality management is considered to be an important management philosophy which supports the organizations in their efforts to obtain satisfied customers. The five principles once evaluated can be implemented by Kenyan thermal electrical generating companies. Each of these principles can be implemented through a number of practices, like gathering customer items of information and analyzing processes. TQM is best implemented in small continues steps that ensures that improvements are made at every stage.

All the thermal power plants in Kenya operate on Power Purchase Agreements (PPA) with Kenya Power Lighting Company where all terms of reference are agreed upon. Most contracts are also long term, for example, 25 years. This may kill the motivation for continuous improvement due to rigidity of these contracts. Problems can arise out of this type of system in that the procedures can be fixed such that pressure for change and adaptation encounters high resistance. Again, good performance is not directly rewarded. In such situations when change and continuous improvement are necessary to meet new customer challenges, it can be difficult to achieve. This is an example of how systems and procedures can be a barrier to the achievement of quality.

Barriers can be recognized when staff uses expressions such as 'we have always done that' or "we are simply following the PPA". Practices would be another barrier to quality. Beckford (1998) says that systems and procedures especially those involving performance measurement tend to determine which characteristics of the organization receive most attention. Discovering such barriers in an organization constitutes identifying the way in which performance is measured and can be improved. Clutterbuck and Crainer (1990) describe culture as 'a set of behavioural and attitudinal norms, to

which most or all members of an organization subscribe, either consciously or unconsciously, and which exert a strong influence on the way people resolve problems, make decisions and carry out their everyday tasks'. They cite Schein suggesting that culture describes the 'artefacts, values and underlying assumptions' that govern behaviour within the organization. These would be the values and beliefs of the organizations and they seem to express what senior management consider as important.

When the organizational structure chart is seen as revealing who to blame when things go wrong but not showing how the organization actually works, then this represents a barrier to achievement of quality (Beckford, 1998). He further emphasizes that the first error is what can be called "institutionalised conflict"; for example, having Quality Assurance function reporting into the production function. In such a situation, Beckford (1998) argues, the need to meet customer orders override the need to achieve quality. The quality function in this scenario is redundant as no value is added to the operation of the organization. Hence, organization design directly affects its performance either positively or negatively.

These three principles affect the thermal power plants quality management and performance and can be summarised as shown in the figure 2.2. Continuous improvement of systems, procedures and tools, quality culture, customer focus, involvement of people, and leadership and managements perspectives are independent variables which determines the plants performance, hence the performance is dependent variable determined within the conceptual framework;

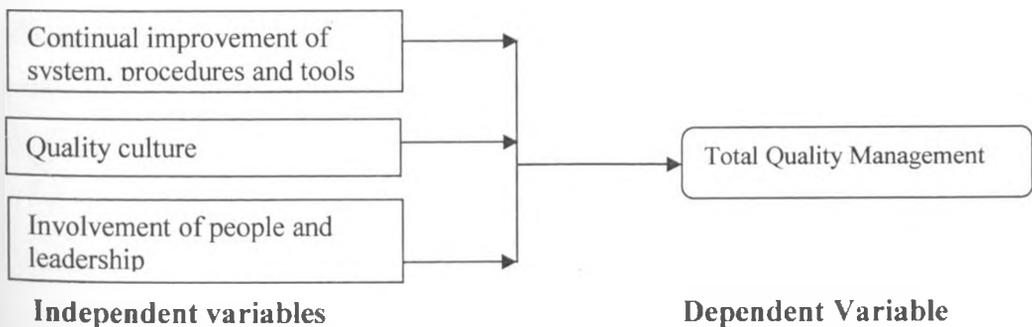


Figure 2.2: Conceptual framework

CHAPTER THREE: METHODOLOGY

3.1 Introduction

This chapter presents the research methodology and covers the research design, population and sample size, data collection methods, and data analysis.

3.2 Research Design

The descriptive research design was adopted to assess the quality management issues affecting performance of thermal power plants in Kenya. The descriptive design is a description of state of affairs as it exists at present (Herve, 1988). There are no internationally set benchmarks for TQM in thermal generation as there are no limits. This research determined the current state of each of the plant and the industry. It is from here that progressive improvements should be made. Generally this design deals with incidences of distribution and relationships of variables. A descriptive study was conducted covering the thermal power plants in Kenya.

3.3 Target Population

The study targeted the five thermal power plants in Kenya. These are Kenya Electricity Generating Company (KenGen) which accounts for close to 70% of generation, Ibrafrica Power (EA) Ltd, Tsavo Power Company Ltd, and Mumias Sugar Company Ltd. The fifth plant is Rabai Power Ltd, which commenced its operation in October 2009. The study focused on the generation process in these power plants because this is the level at which TQM is mainly applicable.

3.4 Sample and Sampling

This study covered the five major power plants in Kenya. In order to improve accuracy of results, five representatives were selected from each of the five power plants to make a total sample size of 25 respondents. The five respondents from each plant were randomly selected from the core departments and preferably from procurement, maintenance and operations. The five respondents must be people who have at least a diploma in their field of specialization so as to ensure good understanding of the questionnaire.

3.4 Data Collection

Primary data was used in this study. This is because there is no previous research on TQM that has been done on thermal power plants in Kenya and therefore secondary data may be limited. Secondary information that may have been required during the research was obtained from the company's present and historical technical records, available at each of the power plants achieves.

A questionnaire was used in this research in order to obtain objective facts and display results as summary statistics. The questionnaire was divided into two parts. Part one of the questionnaire gathered bio-data of the respondents while part two gathered information on continual improvement of systems, procedures and tools, organization culture, customer focus, people and leadership and management practice in thermal power plant.

Respondent were required to rate their responses using a 5-point Likert Scale designed questionnaire. This questionnaire design enables the researcher to capture both the positive and the negative responses from the respondents. Respondents were required to choose one level from several choices for every question in the questionnaire. The questionnaire was administered through face to face interviews in order to ensure high response rate from the respondents. The researcher sought help of trained research assistance to administer the questionnaire.

3.5 Data analysis

Descriptive statistics in the form of pie charts, contingency tables and bar graphs were used to describe the data. Data analysis results were represented in the following manner:

Bar and pie charts were used in defining or choosing the variable to analyzed, verifying causes, or judging solutions. This made it easier to understand data because they present the data as a picture, highlighting the results. By using Bar and pie charts to present results, it was easier to compare the different TQM variables and how they are implemented in each power plant.

Tables were used to group various categories of collected data from the questionnaire and their frequencies of occurrence in different power plants. They were used where summations and cumulative values were required.

Data was then analysed using the following data analysis tools

- a) The Mean helped to determine the average score for each variable in each thermal plant and that of the industry. This information was used to set the current position on which objectives can be set for continuous improvement.
- b) Standard deviation was used to determine how much variation there is from the mean for each of the variables being analyzed on TQM in order to develop recommendations for individual plants and the entire industry where applicable.
- c) Pearson correlation was used to determine if there is linear relationship between any of the tested variables in the thermal electrical power generation. If the variables are independent then the expected Pearson's correlation coefficient is 0 or negligible.

CHAPTER FOUR: DATA ANALYSIS AND INTERPRETATION OF THE RESULTS

4.1 Introduction

This section presents the data analysis and findings of the study. The study covered five thermal power plants in Kenya. These are Kenya Electricity Generating Company (KenGen), Ibrafrica Power (EA) Ltd, Tsavo Power Company Ltd, Mumias Sugar Company Ltd and Rabai Power Ltd. A total of 25 questionnaires were sent to the respondents, five respondents from each plant in core departments. These departments were procurement, maintenance and operations. However, only 23 questionnaires were returned dully completed. The survey therefore achieved a response rate of 92%, which was found to be adequate for the purpose of the study.

4.2 General information on TQM principles

Respondents were asked to rate their agreement with a 5-point Likert scale: 1= strongly disagree, 2= disagree, 3= undecided, 4= agree and 5= strongly agree. The means and standard deviations for the responses on the general information on TQM principles are presented in Table 4.1.

Table 4.1 indicates that the means of responses on general information on TQM principles ranged from a low of 1.57 to a high of 4.42, with a grand mean of 3.28. This indicates that respondents are in agreement that TQM is an important tool in improving the overall performance of an organisation.

Table 4.1: Mean and standard deviation of Responses on General information on TQM principles

Statement	Mean	Standard Deviation
In my view, quality is best defined by the price of the product.	3.53	0.69
Satisfying internal and external customers is one of the major principles of quality.	1.57	0.65
The appearance of a product defines determines its quality.	2.10	0.62
Quality is defined by the partnership between the organizations and the suppliers.	3.88	0.62
Increased profits determine if the organization is producing quality products.	3.34	0.72
For quality to prevail in an organization there should be teamwork between all the stakeholders.	3.86	0.63
I strongly believe that TQM works well or can work well for my organization.	3.23	0.64
Implementation of TQM can benefit or has benefited my organization.	4.42	0.69
I believe that TQM can be used to improve project design, cost estimation, warranty claims, market share, and reduced lawsuits.	3.53	0.69
My organization views quality as a tool for eliminating defects.	2.57	0.65
My organization views quality as a tool for increased profits.	3.10	0.62
My organization views quality as a tool for gaining competitive advantage.	4.23	0.66

4.3 TQM Implementation in Thermal Power Plants

Respondents were asked to give their opinion on how has been implementation of TQM in their organisations. Among them, 19 respondents (82.6%) said that the implementation has been effective while 4 (17.4%) said that it has been ineffective as shown in the figure 4.1. This result is a good indicator that respondents are aware of implementation of TQM and its benefits.

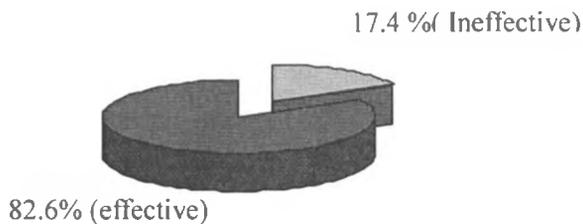


Figure 4.1: Effectiveness on implementation of TQM principles

Respondent were asked to rate the impact of implementation of TQM principles on performance of their organisation. Figure 4.2 shows that 47.2% of respondents agreed that the TQM implementation had a strong impact on the organisation's performance, 24.7% asserted that it has a minimal impact while 8% said it has no impact.

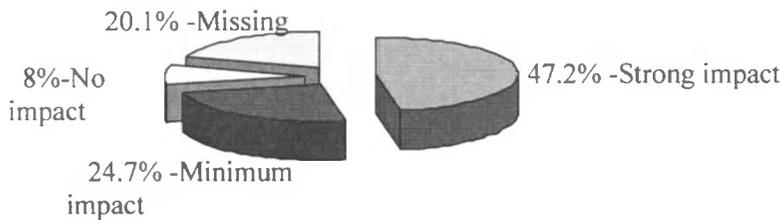


Figure 4.2: The impact of implementation of TQM principles on organisation performance

4.4 Continuous Improvement of Systems, Leadership and Management practices

In order to assess the continuous improvement of systems, leadership and management practices respondents were asked questions which they rated using 5-point Likert scale: 1= strongly disagree, 2= disagree, 3= undecided, 4= agree and 5= strongly agree. The means and standard deviations of continuous improvement of systems and management practices are presented in Table 4.2.

With respect to the continuous improvement of systems, leadership and management practices Table 4.2 indicates that the mean scores for the aspects ranged from a low of 1.57 to a high of 3.59, with a grand mean of 2.767. It therefore appears that respondents in the sample agree that thermal power plants have embraced continuous improvement of systems, leadership and management practices of TQM principles.

Table 4.2: Respondents' Responses on Continuous Improvement of Systems, Leadership and Management practices

Statement	Mean	Standard Deviation
My organization has already implemented quality improvement programs.	3.56	0.325
TQM is the quality improvement program that has been implemented on our organization	3.40	0.957
ISO 9000 is the quality improvement program that has been implemented on our organization	3.20	0.040
Quality Control/Quality assurance is the quality improvement program that has been implemented on our organization	2.56	0.960
My organization was motivated to implement a quality management system due to pressure from competitors.	2.52	0.357
My organization was motivated to implement a quality management system due to pressure from customers	3.59	0.650
My organization was motivated to implement a quality management system due to pressure from Senior Management.	2.10	0.620
My organization was motivated to implement a quality management system in order to reduce costs and improve performance.	1.88	0.620
The quality improvement program in my organization can be described as informal.	3.04	0.720
The quality improvement program in my organization is characterized by widespread employee awareness.	2.86	0.630
The Top Management has full support to the organizations quality improvement plan.	3.23	0.640
The major objectives for our quality improvement program are to increase productivity and to reduce costs.	3.42	0.690
Our improvement program has enabled us to comply with statutory, environmental and safety requirements.	1.57	0.650
After the implementation of our quality improvement program, there was a drastic improvement in our products/service.	2.10	0.620
After the implementation of our quality improvement program, the relationship with our customers and suppliers has drastically improved.	3.20	0.040
The potential for improvement after implementation of quality improvement programs is very high.	2.56	0.960
Employees are confident in the organizations leadership.	2.52	0.357
The leaders have all the necessary skills to lead.	2.88	0.013
Managers have earned employee respect.	2.56	0.325
Employees perceive fairness in participation and involvement.	2.40	0.957
The organization has adequate management systems since the implementation of the quality management system.	3.20	0.040
The adapted management practices have greatly improved organizations performance.	2.56	0.960

Respondent were asked their opinion on how organization design has affected the performance of thermal power plants. Figure 4.3 shows that 95% agreed that organization design has positively affected the organization while 5% did not agree.

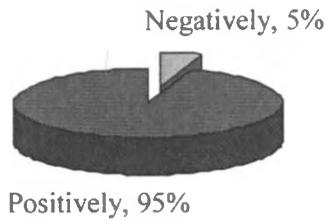


Figure 4.3: Respondents views on effects of thermal plants organization design on its performance

Respondents were asked for their opinion on several factors regarding management practices using a scale of 1 to 5 (where 1 means very important and 5 means not important at all). The mean and standard deviation of their responses were calculated and presented as in Table 4.3 below. All the statements recorded a mean of less than 2.5, showing that the respondents were in agreement that the management practices were important in its performance.

Table 4.3: Respondents views on management practices at thermal plants

Statement	Mean	Standard Deviation
Employees are confident in the organizations' leadership	2.3000	1.65503
The leaders have skills to lead	2.2233	1.19927
Managers have earned employee respect	1.5333	1.07053
employees perceive fairness in participation and involvement	1.9333	1.39116

When the respondents were asked their opinion about the management practices since implementation of TQM, 74% percent reported that they are adequate. However, 26% indicated that they are inadequate. This statistics are displayed in Table 4.4.

Table 4.4: Respondents opinion on management practices

Response	Frequency	Percent
Inadequate	6	16
Adequate	17	84
Total	23	100

Respondents were asked to comment on how management practices affected the thermal plant performance. Eighty four percent (84%) of them stated positively that management practices affected the performance of thermal power plants while 16% rated negatively as shown in the figure 4.4. There is therefore need for the organization to strengthen all the management practices that have positive impact to the performance of the plants.

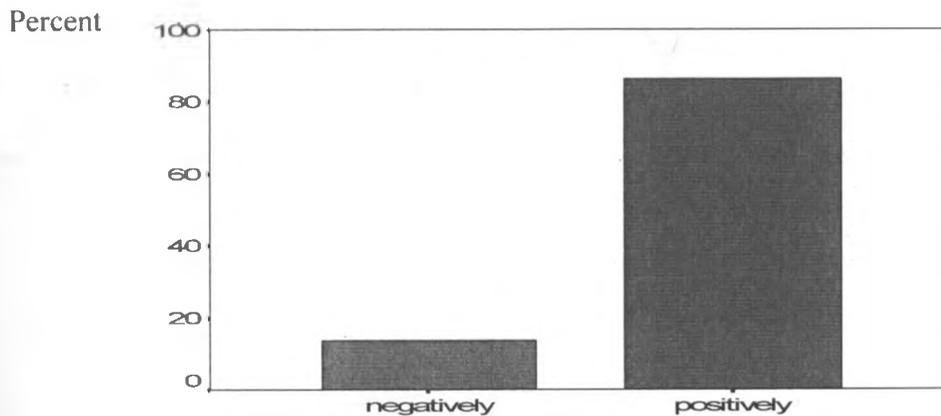


Figure 4.4: Management practices effect on the thermal power plants performance

The results shown on Table 4.5 indicate that 78% of respondents reported that systems and procedures outlined in ISO 9001 have been implemented at thermal power plants; 15% reported that they have not; while 7% were not decided. 90% of the respondents (100%) reported that the implementation of this systems and tools affect the performance of thermal power plants. Regarding audit checks, 68% of the respondents reported that there are regular audit checks for QMS at thermal plants, 22% reported that there are no such audit checks while 10% did not respond. These results indicate that employees are aware of systems, and that they have an effect on their organization performance.

Table 4.5: Summary of respondents views on systems and procedures

Statement	Strongly disagree	Disagree	Undecided	Agree	Strongly agree
Have systems and procedures outlined in ISO 9001 been implemented at your plant	5%	10%	7%	4%	38%
Implementation of these systems and procedures affect the performance of your plant	3%	5%	2%	5%	38%
Are there regular audit checks for systems at your plant	7%	15%	10%	4%	26%
Has your power plant implemented necessary tools for continual improvement?	6%	7%	-	8%	2%

Respondent were asked to rate the impact of continuous improvement of systems, leadership and management practices of TQM principles on performance of thermal power plants. The findings in Figure 4.5 show that a majority of the respondents (85%) reported that implementation of continuous improvement of system leadership and management practices of TQM principles are effective in influencing performance of thermal power plants. 2% reported that implementation is very effective; and 13% reported that implementation was ineffective.

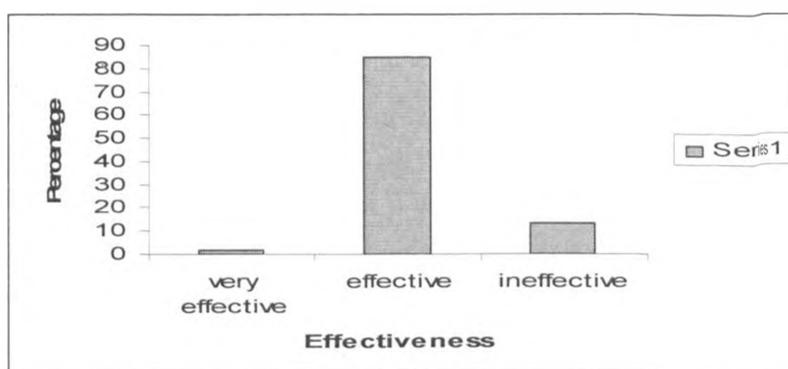


Figure 4.5: Effect of continuous improvement of systems, leadership and management practices of TQM principles on performance of thermal power plants

4.5 Culture of Quality

In order to assess the culture of quality respondents were given several statements which they rated using 5-point Likert scale (strongly disagree=1, fairly disagree=2, neither agree nor disagree=3, agree=4, and strongly agree=5). Most of the respondents (87%) indicated that formal training in TQM or other quality improvement philosophies has been given to the employees, 74% said it is easier to manage employees who have been trained on TQM or other quality management programs, 55% reported that a high percentage of managerial/supervisory staff has undergone quality improvement training and 42% indicated that a high percentage of non-managerial/technical staff has undergone quality improvement training. This indicates that thermal plants have embraced culture of quality. All the employees considered in this study believe that there are certain issues in thermal plants that inhibit their quality such as non-managerial/technical staff failure to undergo quality improvement training. However, all respondents reported that implementation TQM emphasises on culture of quality.

Table 4.6: Respondents' Responses on Quality culture

Statement	Percentage
Formal training in TQM or other quality improvement philosophies has been given to the employees.	87%
It is easier to manage employees who have been trained on TQM or other quality management programs	74%
A high percentage of managerial/supervisory staff has undergone quality improvement training.	55%
A high percentage of non-managerial/technical staff has undergone quality improvement training.	42%

4.6 Customer Focus and Staff involvement in Decision Making

To assess the customer focus and staff involvement in decision making, respondents were asked to rate their agreement with the statements using 5-point Likert scale: 1= strongly disagree, 2= disagree, 3= undecided, 4= agree and 5= strongly agree. The means and standard deviations of the customer focus and staff involvement in decision making are presented in Table 4.7.

Table 4.7: Customer Focus and Staff involvement in Decision Making

Statement	Mean	Standard Deviation
I believe that customer satisfaction is very important.	3.10	0.621
We have an elaborate system of gathering customer suggestions.	3.88	0.629
My organization has a system for measuring customer satisfaction.	3.04	0.724
Our products and services are dictated by the markets.	2.86	0.633
My organization greatly considers customer requirements in the delivery of services/products.	3.23	0.641
We always consider our customers when making power generation decisions.	2.10	0.523
We frequently make contacts to our customers in order to respond to complains.	1.88	0.508
We frequently make contacts to our customers in order to know their work related desires.	3.04	0.729
We frequently make contacts to our customers in order to request them to pay bills	3.86	0.656
We frequently make contacts to our customers during our audit of systems	3.23	0.641
We have a well elaborate system that captures employees' suggestions.	3.42	0.694
All employees are empowered to make significant changes to operations.	3.53	0.689
My organization values staff contributions to its well-being.	1.87	0.654
Management takes pride in staff accomplishments.	3.10	0.629
My organization strongly considers staff goals and values.	3.88	0.621
Staff are involved in organization decision.	3.34	0.723
There are consultations among staff before decision are made.	2.10	0.522
Staff appreciate their roles in decision making.	2.88	0.612
Working at this organization has a great deal of personal meaning to staff.	3.04	0.712
Staff feel a strong sense of belonging.	3.86	0.613
Staff are proud to tell others that they work at this organization.	2.23	0.604

Table 4.7 shows the means and standard deviations for the responses on customer focus and staff involvement in decision making. The means of scores ranged from a low of 1.87 to a high of 3.88, with a grand mean of 3.008. This indicates that respondents are in agreement that there is customer focus and staff involvement in decision making in thermal power plants in Kenya.

4.7 Summary of TQM Principles

Respondents were asked for their opinion on principles of TQM. Their opinions were rated using the 5-point Likert scale (i.e, strongly disagree=1, fairly disagree=2, neither agree nor disagree=3, agree=4, and strongly agree=5). Their responses were analyzed through calculating their means and standard deviations. Table 4.8 displays these descriptive statistics.

Table 4.8: Mean and Standard Deviation on Respondents Opinions on the TQM Principles

Statement	Mean	Standard Deviation
Do staff understand the TQM principles	2.6478	0.51499
Staff were involved decision making for the implementation of TQM	2.0000	0.51640
Our services and Products are of high quality as prescribed by TQM	4.0000	1.07497
Recently there has been quality of culture in our organisation	2.9565	1.22849
Implementation of TQM saw appropriate management practises adopted	2.5652	0.95806
Our organization design & structure conforms to TQM specification	2.9565	1.05318
There has been continual improvement of systems and tool, audit checks at our organisation to ensure the efficient operations	4.8478	0.51499
Introduction of TQM has positively influenced industry to customer focus	4.7174	0.58359

Table 4.8 that the statement “products of organisation are of high quality” scored highest mean score of 4, whereas the statements that “organizations design conforms to TQM specification” and “implementation of TQM saw quality of culture” scored a mean of 2.9565. “Implementation of ISO9001 saw appropriate management practices being adopted at plants” scored a mean of 2.5652. However, “staff were involved in decision making for the implementation of TQM” scored a mean of 2 indicating that respondents disagreed with the statement. The grand mean score was 3.7364 with means ranging between 3 and 4, implies that respondents agreed with the statements. Therefore it can be concluded that there is adoption and implementation of TQM principles by thermal power plants in Kenya.

4.8 Relationship between Quality and TQM practices

In order to test the relationship between the quality and TQM practices, the Pearson Product Moment Correlation Coefficient was calculated. Based on the results of mean scores obtained in previous sections, the mean of TQM principles were paired with quality and relationship evaluated. The strength of relationship between Quality and TQM principles are presented in Table 4.9.

Table 4.9: Correlations coefficients between Quality and TQM Principles

TQM Principles	Quality	
	Pearson correlation	Significance (2-tailed)
Continuous improvement of systems	0.66**	0.000
Leadership and management practices	0.86**	0.000
Organization design & structure conforms to TQM specification	0.74**	0.000
Culture of quality	0.61**	0.000
Customer focus and staff involvement in decision making	0.65**	0.000

* Correlation is significant at the 0.05 level (2-tailed)

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

The results indicate that continuous improvement of systems correlates significantly with Quality ($r = 0.66$, $p < 0.01$). This supports the hypothesis that there is a significant relationship between continuous improvement of systems and quality. A significant correlation is shown to exist between leadership and management practices and TQM ($r = 0.86$, $p < 0.01$), supporting the hypothesis that there is a significant relationship between leadership and quality. There was also a significant relationship between "Organization design and structure conformance to TQM specification" and quality ($r = 0.74$, $p < 0.01$). Hence, this supports the hypothesis that organization design and structure are significantly related to quality. A significant correlation also exists between culture of quality and TQM ($r = 0.61$, $p < 0.01$), supporting that culture of quality has significant influence on quality. There was a significant relationship between customer focus and staff

involvement in decision making and TQM ($r = 0.65, p < 0.01$), supporting the hypothesis that customer focus and staff involvement in decision making improves quality.

The results depicted in Table 4.9 indicate that there is a significant statistical relationship between TQM principles and quality and hence overall performance of thermal power plants in Kenya.

CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENADCTIONS

5.1 Introduction

This chapter presents a summary of the findings of the study, conclusions and recommendations.

5.2 Summary of the findings

This study sought to assess the application of TQM principles in electrical energy generation management in thermal power plants in Kenya. Specifically the study assessed the continuous improvement of systems, leadership and management practices, determined the extent to which quality culture entrenched in the organization and established the level of focus on customers and involvement of staff in decision making.

5.2.1 Application of TQM principles in electrical energy generation management in thermal power plants

Respondents (82.6%) reported that the implementation TQM principles has been effective while 4 (17.4%) has been ineffective. Respondent were asked to rate the impact of implementation of TQM principles on performance of their organisation. 47.2% of respondents agreed that the TQM implementation had a strong impact on the organisation's performance, 24.7% asserted that it has a minimal impact while 8% said it has no impact. This is a good indicator that respondents are aware of implementation of TQM and its benefits.

5.2.2 Continuous improvement of systems, leadership and management practices

In order to assess the continuous improvement of systems, leadership and management practices respondents were given statements which they rated using 5-point Likert scale: 1= strongly disagree, 2= disagree, 3= undecided, 4= agree and 5= strongly agree. The means and standard deviations for the responses on the statements were calculated. The mean is a measure of central tendency, and provides an arithmetic average for the distribution of scores. The standard deviation, on the other hand, is a measure of variability which is calculated as the square root of the variance. With respect to the continuous improvement of systems, leadership and management practices mean scores ranged from a low of 1.57 to a high of 3.59, with a mean of 2.767. It therefore appears that respondents in the sample agree that thermal power plants have embraced continuous improvement of systems, leadership and management practices principles of TQM.

Ninety five percent (95%) agreed that organization design has positively affected the organization performance while 5% did not agree. When the respondents were asked their opinion about the management practices since implementation of TQM, 74% percent reported that they are adequate. However, 26% argued that they are inadequate. Respondents were asked to comment on how management practices affected the thermal plant performance. Eighty four (84%) of them stated positively while 16% rated negatively. All the respondents (100%) reported that the implementation of this systems and tools affect the performance of thermal power plants. Regarding audit checks, 70% of the respondents reported that there are regular audit checks for QMS at thermal plants, 26% reported that there are no such audit checks while 4% did not respond. These results indicate that employees are aware of systems, and that they have an effect on their organization performance.

Respondents (85%) reported that implementation of continuous improvement of systems; leadership and management practices principles are effective in influencing performance of thermal power plants. This shows that employees are confident in the organizations leadership and that their leaders have skills to lead. In addition, the respondents reported that managers have earned employee respect and that they perceive fairness in

participation and involvement. Based on this, one can conclude that employees have confidence in the organization and its management.

5.2.3 Culture of quality entrenchment in the organization

Most of the respondents (87%) indicated that formal training in TQM or other quality improvement philosophies has been given to the employees, 74% said it is easier to manage employees who have been trained on TQM or other quality management programs, 55% reported that a high percentage of managerial/supervisory staff has undergone quality improvement training and 42% indicated that a high percentage of non-managerial/technical staff has undergone quality improvement training. This indicates that thermal plants have embraced the culture of quality.

All the employees considered in this study believe that there are certain issues in thermal plants that inhibit its quality, such as, non-managerial/technical staff failure to undergo quality improvement training. However, all respondents reported that implementation TQM emphasises on culture of quality. They identified lack of training as a major constrain toward full understanding of TQM principles and its implementation. One can conclude that lack of staff training is a major limitation towards implementation of TQM principles. This affirms Dale and McQuarter (1998) findings that education and training requirements underpin the effective use of the ISO 9001 tool and technique, hence they ought to be given due care and attention.

Although, most (87%) respondents reported that power plants have embraced culture of quality, all of them believe that there are certain sections of it organization design that inhibits its quality. Sixty percent (60%) of respondents reported culture of quality in an organization affects its performance positively while 40% reported it affects negatively. This indicates that employees are aware and willing to adopt the culture of quality. However, there is need to entrench some aspects of quality/ standards in organization design. The results support remarks by Beckford (1998) that in order for an appropriate attitude to be developed to quality, it must be recognised as a cause for concern. That is, recognition of lack of quality in service or product. More often than not poor

performance will be blamed on other reasons, mainly market changes other than quality. Failure to do so constitutes a barrier to achieving quality, which hinders the organization performance.

5.2.4 Focus on customers and involvement of staff in decision making

To assess the customer focus and staff involvement in decision making respondents were asked their opinion on several aspects. Means and standard deviations for the responses on customer focus and staff involvement in decision making were calculated. The mean scores ranged from a low of 1.87 to a high of 3.88, with a grand mean of 3.008. This indicates that respondents are in agreement that there is customer focus and staff involvement in decision making in thermal power plants in Kenya.

5.3 Conclusions

From the findings above, it can be concluded that thermal power plants in Kenya have adopted and implemented TQM principles which has strongly impacted on the organization's performance. From results of Pearson Product Moment Correlation Coefficients on TQM principles and quality there is a significant statistical relationship between TQM principles and quality and hence application of TQM principles impacts on the overall performance of thermal power plants in Kenya.

Further, it can be concluded that thermal power plants have embraced continuous improvement of systems, leadership and management practices principles of TQM. These are effective in influencing performance of thermal power plants. This shows that employees are confident in the organizations leadership and that their leaders have skills to lead. In addition, the respondents reported that managers have earned employees respect and that the employees perceive fairness in participation and involvement. From this, one can conclude that employees have confidence in the organization and its management. Implementation of TQM emphasizes on culture of quality and therefore it can be concluded that power plants have embraced culture of quality. However, there are

certain aspects of organization design that inhibits its quality. Finally the findings indicate that there is customer focus and staff involvement in decision making in thermal power plants in Kenya.

5.4 Recommendations

Based on the results, one may conclude that although thermal power plants in Kenya have implemented and continues to maintain TQM principles, there are areas that may have room for improvement. Recommendations for improvement for the overall implementation include:

- ❖ Human Resource should develop a standardized training and orientation programme for staff on TQM and its implementation and maintenance (including other systems and their integration).
- ❖ There is need to harmonise and strengthen the department involved in implementation of quality standards.
- ❖ There is need for clarification or interpretation of some parts of the standard so that employees can understand the requirements of the standards better. This calls for further training.
- ❖ There is need for the organization to use the right systems, tool and techniques for organization's products, services, processes etc.
- ❖ Provide more information to staff on systems and tools as well as techniques, emphasizing importance of their use in work place.

5.5 Limitations to the Study

This study is confined to thermal power plants in Kenya and a convenient sample was used. The number of firms in the sector is relatively small compared to the number of firms in the energy sector in country. It would have been interesting to determine the implementation of TQM principles in different type of power plants.

There are several principles of TQM; however this study assessed implementation of four principles. Therefore, the study was confined to only four principles. This was mainly based on the believe that these three principle are the most important for power plants

Finally, this study was an event study, and all the limitations of the analysis tool of an event study are applicable to this study.

5.6 Suggestions of Areas for further research

This study was done only on the generating thermal power in Kenya. Therefore similar studies can be done for other companies in the country. Further research could also be done on other TQM principles and in other type of power plants in the country.

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APPENDICES

Questionnaire

Number.....

Date.....

Section A: Plant data

Name of the company: _____

Size of the company (no. of persons): _____ (admin) _____ (technical)

Age of the company: _____

Section B:

Please use a tick (✓) to select the most appropriate answer as listed in the following category.

1. = strongly disagree
2. = disagree
3. = undecided
4. = agree
5. = strongly agree

(i) General

No.	Statements	1	2	3	4	5
1	In my view, quality is best defined by the price of the product.					
2	Satisfying internal and external customers is one of the major principles of quality.					
4	The appearance of a product defines determines its quality.					
5	Quality is defined by the partnership between the organizations and the suppliers.					
6	Increased profits determine if the organization is producing quality products.					
7	For quality to prevail in an organization there should be teamwork between all the stakeholders.					
8	I strongly believe that TQM works well or can work well for my organization.					
9	Implementation of TQM can benefit or has benefited my organization.					
10	I believe that TQM can be used to improve project design, cost estimation, warranty claims, market share, and reduced lawsuits.					
11	My organization views quality as a tool for eliminating defects.					
12	My organization views quality as a tool for increased profits.					
	My organization views quality as a tool for gaining competitive advantage.					

(ii) Continuous Improvement of Systems, Leadership and Management practices

No.	Statements	1	2	3	4	5
13	My organization has already implemented quality improvement programs.					
14	TQM is the quality improvement program that has been implemented on our organization					
15	ISO 9000 is the quality improvement program that has been implemented on our organization					
16	Quality Control/Quality assurance quality improvement program that has been implemented on our organization					
17	My organization was motivated to implement a quality management system due to pressure from competitors.					
18	My organization was motivated to implement a quality management system due to pressure from customers					
19	My organization was motivated to implement a quality management system due to pressure from Senior Management.					
20	My organization was motivated to implement a quality management system in order to reduce costs and improve performance.					
21	The quality improvement program in my organization can be described as informal.					
22	The quality improvement program in my organization is characterized by widespread employee awareness.					
23	The Top Management has full support to the organizations quality improvement plan.					
24	The major objectives for our quality improvement program are to increase productivity and to reduce costs.					
25	Our improvement program has enabled us to comply with statutory, environmental and safety requirements.					
26	After the implementation of our quality improvement program, there was a drastic improvement in our products/service.					
27	After the implementation of our quality improvement program, the relationship with our customers and suppliers has drastically improved.					
28	The potential for improvement after implementation of quality improvement programs is very high.					
29	Employees are confident in the organizations leadership.					
30	The leaders have all the necessary skills to lead.					
31	Managers have earned employee respect.					
32	Employees perceive fairness in participation and involvement.					
33	The organization has adequate management systems since the implementation of the quality management system.					
34	The adapted management practices have greatly affected organizations performance.					

(iii) Quality culture

No.	Statements	1	2	3	4	5
35	Formal training in TQM or other quality improvement philosophies has been given to the employees.					
36	It is easier to manage employees who have been trained on TQM or other quality management programs					

37	A high percentage of managerial/supervisory staff has undergone quality improvement training.					
38	A high percentage of non-managerial/technical staff has undergone quality improvement training.					

(iv) Customer Focus and Staff involvement in Decision Making

No.	Statements	1	2	3	4	5
39	I believe that customer satisfaction is very important.					
40	We have an elaborate system of gathering customer suggestions.					
41	My organization has a system for measuring customer satisfaction.					
42	Our products and services are dictated by the markets.					
43	My organization greatly considers customer requirements in the delivery of services/products.					
44	We always consider our customers when making power generation decisions.					
45	We frequently make contacts to our customers in order to respond to complains.					
46	We frequently make contacts to our customers in order to know their work related desires.					
47	We frequently make contacts to our customers in order to request them to pay bills					
48	We frequently make contacts to our customers during our audit of systems					
49	We have a well elaborate system that captures employees' suggestions.					
50	All employees are empowered to make significant changes to operations.					
51	My organization values staff contributions to its well-being.					
52	Management takes pride in staff accomplishments.					
53	My organization strongly considers staff goals and values.					
54	Staffs are involved in organization decision.					
55	There are consultations among staff before decision are made.					
56	Staffs appreciate their roles in decision making.					
57	Working at this organization has a great deal of personal meaning to staff.					
58	Staffs feel a strong sense of belonging.					
59	Staffs are proud to tell others that they work at this organization.					

(v) Summary of TQM Principles

No.	Statements	1	2	3	4	5
60	Do staff understand the TQM principles					
61	Staff were involved decision making for the implementation of TQM					
62	Our services and Products are of high quality as prescribed by TQM					
63	Recently there has been quality of culture in our organisation					
64	Implementation of TQM saw appropriate management practises adopted					
65	Our organization design & structure conforms to TQM specification					
66	There has been continual improvement of systems and tool, audit checks at our organisation to ensure the efficient operations					
67	Introduction of TQM has positively influenced industry to customer focus					