UGANDA MANAGEMENT INSTITUTE

TOTAL QUALITY MANAGEMENT AND OPERATIONAL PERFORMANCE IN THE UTILITY POLE TREATMENT INDUSTRY:

A CASE OF UGANDA ELECTRICITY DISTRIBUTION COMPANY LIMITED

BY

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15-MBA-00-KLA-WKD-0016

A DISSERTATION SUBMITTED TO THE SCHOOL OF MANAGEMENT SCIENCE IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OFA MASTERS' IN BUSINESS ADMINISTRATION OF UGANDA MANAGEMENT INSTITUTE

JANUARY 2018

DECLARATION

I, Alphonse Kasange hereby declare that this submission is my own work and that, it contains no material previously published by another person nor material which has been accepted for the award of any other degree of a university or institution of higher learning before.

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ACKNOWLEDGEMENT

My special thanks go to my supervisors, Miss Pross Nagitta Oluka and Professor Gerald Kagambirwe Karyeija of Uganda Management Institute for sparing time out of your busy schedules to guide me from day one of this research.

I would also like to thank Mr. Bogere Martin of Uganda Electricity Distribution Company Limited Pole Plant and Stores for the opportunity given to me to carry out the study at the plant and to all the respondents who accorded me their cooperation, thank you very much.

To everyone who by virtue of your contribution has seen me through this work to the end, I say, am very pleased and will always remember the gesture. God bless you abundantly.

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LIST OF ABBREVIATIONS

BFC	Busoga Forestry Company
BSC	Balanced Score Card
CVI	Content Validity Index
DV	Dependent Variable
EAS	East African Standard
EFQM	The European Foundation for Quality Management
ISO	International Standards Organization
IV	Independent Variable
KPI	Key Performance Indicator
MBNQA	Malcolm Baldrige National Quality Award
NFC	New Forest Company
PDSA	Plan Do Study Act
QMS	Quality Management System
SD	Standard Deviation
SoPK	System of Profound Knowledge
SPSS	Statistical Package for Social Scientists
TQM	Total Quality Management
UEDCL	Uganda Electricity Distribution Company Limited
UNBS	Uganda National Bureau of Standards

ABSTRACT

The aim of the study was to examine the relationship between TQM and operational performance in the utility pole treatment industry with reference to UEDCL's pole plant and stores. TQM was operationalized into three dimensions: top management commitment, process management and quality data reporting. Specifically, the study sought to examine the relationships between: top management commitment and operational performance; process management and operational performance, and quality data reporting and operational performance. A cross-sectional survey design was used and both quantitative and qualitative data were collected using questionnaires and interviews from a sample of 32 respondents, in addition to documentary reviews. Descriptive analysis revealed a lot of variations in responses with regard to: visible leadership, timely recognition and appreciation, authority to correct problems, sharing of quality data and motivation as shown by the SD of: 1.044, 1.012, 1.167, 1.020 and 1.029 respectively. Inferential analysis revealed positive and significant correlations among the TQM dimensions and operational performance ($r = .728$, $p < .05$ for top management commitment; $r = .851$, $p < .05$ for process management and $r = .763$, $p < .05$ for quality data reporting). The above mentioned dimensions explained 74.6% variance in operational performance. The study recommended a well-built mechanism for recognition, appreciation and motivation; the need for continuous training and provision of a certain degree of autonomy to personnel in correcting problems deemed to affect achievement of set standards and targets. To increase operational performance, the TQM dimensions should be applied simultaneously, with careful allocation of resources if systems are to be optimized. Within the scope of this study, generalizability of findings would be higher if there was a larger sample size, with more respondents possibly from several other plants.

CHAPTER ONE

INTRODUCTION

1.1: Introduction

Operations management as a management discipline involves the effective and efficient transformation of inputs into outputs hence a conversion process. The process mainly involves management of people, products, parts and programs (Kumar & Suresh, 2009). Presently, unless a firm creates a competitive advantage on the market, surviving competition is an uphill task. This turn of events can be attributed to the competitive environment as a result of globalization and the increased adoption of operations management discipline (Suri, 2010). As a result, many firms have sought to create that competitive edge over the rest by establishing a set of operational management objectives based on quality, speed, dependability, flexibility and cost. These collectively define operational performance. Additionally, over the years, many firms have sought to improve their performance and one of the ways through which this has been done is by adoption of total quality management (TQM) practices.

The study examined the relationship between TQM and operational performance in the utility pole treatment industry with reference to Uganda Electricity Distribution Company Limited's (UEDCL) pole plant & stores.The independent variable was TQM, with constructs of: top management commitment, process management and quality data reporting while the dependent was operational performance, with constructs of: overall waste, efficiency and health & safety. This chapter presented the background to the study, statement of the problem, purpose of the study, specific objectives, research questions and hypotheses, conceptual framework, scope of the study, significance of the study and the operational definitions.

1.2: Background to the study

Under this section, a review of the historical background, the theoretical background, the conceptual perspective and the contextual background as proposed by Amin (2005) was discussed.

1.2.1: Historical background

Over time, many organizations have continuously faced the challenge of having to accurately measure performance. This has always been complicated by the fact that performance is a major contributing factor both in strategic planning and in gauging the level of attainment of objectives. According to Duarte, Brito, Di Serio, & Martins (2011), the quest for perfect operational practices in an effort to attain better performance has constantly surfaced in management literature since Taylor's early days of scientific management. Even then, Ittner & Larcker (2003) noted that many managers no longer consider the traditional accounting-based measurement systems adequate for performance measurements, a fact which has prolonged the quest. The measures have thus ranged from those covering economic value to the elements of the balanced scorecard. Along with these, several other approaches, notable among which is just in time, supply chain management and quality management (Žeželj, 2013), have been adopted in an effort to improve operational performance in recent years. Today's dynamic business demands have only rendered the traditional financial performance measurements unsatisfactory and hence the need to consider operational measurements of management (Kaplan & Norton, 2005) when dealing with customer satisfaction, internal processes and activities. Demirbag, Tatoglu, Tekinkus & Zaim (2006) too, emphasized the importance of operational performance measurement by organizations and the role this plays in effective management and attainment of optimal efficiency and performance.

Globally, the ability and need to sustainably compete has driven organizations to use all avenues available to produce context appropriate outstanding performance. It is on that basis that performance measurement has gained increasing attention given its influence (Hwang, Han, Jun, & Park, 2014). The need to manage performance has thus resulted into adoption of such tools as the Balanced Score card (BSC), the Malcolm Balbridge National Quality Award (MBNQA), Business Process Re-engineering (BPR) and the quest for ISO (International Standards Organization) certification common among many firms across the globe. Dick (2000) pointed to the need to satisfy and keep customers as being the main driving force behind and those companies which have acquired ISO certification, for example, hold a competitive advantage over those without. This has basically been through their superior operational performance in terms of less waste, high efficiency and health & safety levels.

1.2.2: Theoretical Background

The study was guided by Deming's theory of 'profound knowledge'. Although commonly referred to as the system of profound knowledge (SoPK), it points to the need for any prevailing style of management to undergo transformation, which, according to the scholar can only be possible with a new map of theory the scholar refers to as profound knowledge (Deming, 1993). According to the Deming Institute (2015), *appreciation for a system, knowledge of variation, theory of knowledge and knowledge of psychology* are all but interrelated elements of the theory as further illustrated in chapter two, under the theoretical review.

1.2.3: Conceptual Background

In defining the concepts under study, both TQM and organizational performance literature informed the conceptual background and a narrative of conceptualization of variables was given as below:

Total quality management as a management concept is premised on quality, involving everyone's participation with the ultimate aim being long term success through customer satisfaction. The concept thus necessitates company-wide efforts to continuously improve performance in such aspects as costs, quality, schedule and service to customers. Several TQM critical success factors have empirically been identified by many scholars including Salaheldin (2009), Dermiberg *et al*. (2006), Flynn *et al*. (1995), Saraph *et al*. (1989) among others. From a review of literature, it was possible to identify a group of TQM dimensions to which many scholars had consensus, given the type of industry under study and the focus on operations within the plant setting. On that basis therefore, the constructs of top management commitment, process management and quality data reporting were chosen as the underlying elements of TQM for the study.

Top management commitment is cited as one of the most important factors in the success of any TQM intervention. Given the fact that top management plays a large part in influencing the overall attitude of workers and the strategic direction of an organization, its importance cannot be overlooked. Additionally, top management is charged with communicating an organization's mission and vision, and properly aligning both the quality and operational objectives with the overriding organization vision. Above all, the role of cultivating a corporate culture to support continuous improvements in line with a given business strategy primarily lies with top management.

Process management is based on the idea that organizations are sets of interrelated processes whose never ending improvements contribute towards performance enhancements across an organization. The underlying idea in processes is the transformation of inputs into outputs, combined into a quality chain, making all processes interdependent upon each other. In the TQM philosophy, a process oriented approach is cited as being vital in meeting quality requirements and the identification and support of all core processes are emphasized. The focus on process management thus embraces continuous improvements and process optimization.

Quality data reporting elements, both reporting and integrating quality data in strategic planning ought to be in continuation of never-ending improvement and process mapping. Central to quality data reporting are: documentation, tracking, feedback and the ready availability of all information to all workers. All of these are argued to be important factors underlying organizational success (Kaynak, 2003). Furthermore, quality data reporting is an enabler of employee evaluation, performance monitoring, quality management and a problem solving and prevention tool.

Operational performance points to a company's ability to reduce its management costs, order cycle time, and improve material efficiency usage and its distribution capacity (Heizer *et al*., 2008). All companies view operational performance as being critical in production, determination of product quality, customer satisfaction and in increasing revenues. Operational performance is thus a company's internal reflection of its operating performance in terms of reducing costs and waste, improving product quality, developing new products, improving delivery and increasing the overall productivity. It thus relates to the output of a company's operations in achieving its goals.

1.2.4: Contextual Background

Uganda Electricity Distribution Company Limited (UEDCL) is categorized as a medium sized entity and is a limited liability company incorporated under the companies Act. Upon the conclusion of the concession process of the distribution business to Umeme, the entity's mandate changed .Notable in this context was the entity's role of electricity distribution and managing of the pole treatment plant at Lugogo.

World over, there have been concerns over the operations of various companies. Such concerns underscore the importance of having a 'fool-proof' quality management system to help guide operations, if satisfactory performance in terms of low wastes, high efficiency, and health & safety levels are to be achieved. The pole plant at UEDCL has been no exception to the challenges that come with managing manufacturing operations. Despite its efforts, the plant still experiences some cases of wastes, mainly of poles owing to damages from handling procedures. In addition, the plant's overall efficiency and that in the treatment process (UEDCL LPTP Quality and Production Report, 2016), are yet to reach the desired mark. Nonetheless, the plant has embarked on a quality management system (QMS) in an effort to try and address some of its operational challenges. This has been evident with the documentation and establishment of a quality manual and the implementation of a quality policy.

1.3: Statement of the problem

For many manufacturing plants, the desired operational performance levels are still elusive and processes still face a number of challenges. For a plant like UEDCL's that holds 50 years' experience in the pole treatment industry, a high level of operating efficiency, health and safety with minimal overall waste would be highly expected. However, this has not always been the case. A case in point is the recurring mismatches between the retention levels and creosote oil consumption, where in some cases the trend of retention does not reflect the consumption rate. For example, during two separate months with the same number of charges, retentions of 170 kg/m^3 and 123 kg/m^3 were registered following oil consumption of 1,105.8 and 1,555.5 liters respectively, and retentions of 127 kg/m^3 and 121 kg/m^3 were registered following oil consumption of 1,000 and 1,392.2 liters respectively, for an identical number of poles on both occasions (UEDCL LPTP Quality and Production Report, 2016). Furthermore, the several cases of retreatments after failure to achieve desired penetration levels reflect a lapse in the running of processes at the plant. Additionally, the plant is yet to fully address a number of environmental issues ranging from water pollution, soil contamination to air pollution from the use of creosote oil, which poses life threatening effects to human health. The use of more oil for fewer charges and poles coupled with write-off of poles in some cases due to preventable damages both amount to wastage. In an effort to try and address the challenges, therefore, management at the plant instituted a quality management system and implemented a quality policy with clearly laid out objectives pertaining to operational performance (UEDCL LPTP Quality Policy, 2017). Nonetheless, success is yet to be fully achieved with the interventions. If these operational gaps are not fully addressed, it is highly possible that the plant risks its reputation as a leader in the industry and faces a threat of grave competition from other players like Busoga Forestry Company (BFC) and New Forest Company (NFC) pole plants among others. Furthermore, the increased need for quality wooden utility poles to support rural electrification in the country and for export ought to provide motivation for the plant to maintain the highest levels of operational performance as an industry leader. This is so if the plant is not to lose out on some of its already established markets. It is on that basis therefore that the study seeks to investigate TQM and its relationship with operational performance in the utility pole treatment industry.

1.4: General objective

To examine the relationship between TQM and operational performance in the utility pole treatment industry with reference to Uganda Electricity Distribution Company Limited's pole plant and stores.

1.5: Specific Objectives of the study

i. To examine the relationship between top management commitment and operational performance at UEDCL's pole plant and stores.
ii. To examine the relationship between process management and operational performance at UEDCL's pole plant and stores.
iii. To examine the relationship between quality data reporting and operational performance at UEDCL's pole plant and stores.

1.6: Research Questions

i. What is the relationship between top management commitment and operational performance at UEDCL's pole plant and stores?
ii. What is the relationship between process management and operational performance at UEDCL's pole plant and stores?
iii. What is the relationship between quality data reporting and operational performance at UEDCL's pole plant and stores?

1.7: Hypotheses of the study

i. H_1: There is a significant relationship between top management commitment and operational performance at UEDCL's pole plant and stores.

ii. H_2: There is a significant relationship between process management and operational performance at UEDCL's pole plant and stores.

iii. H_3: There is a significant relationship between quality data reporting and operational performance at UEDCL's pole plant and stores.

1.8: Conceptual framework

Figure 1.1 conceptualises the relationship between the independent and the dependent variables.

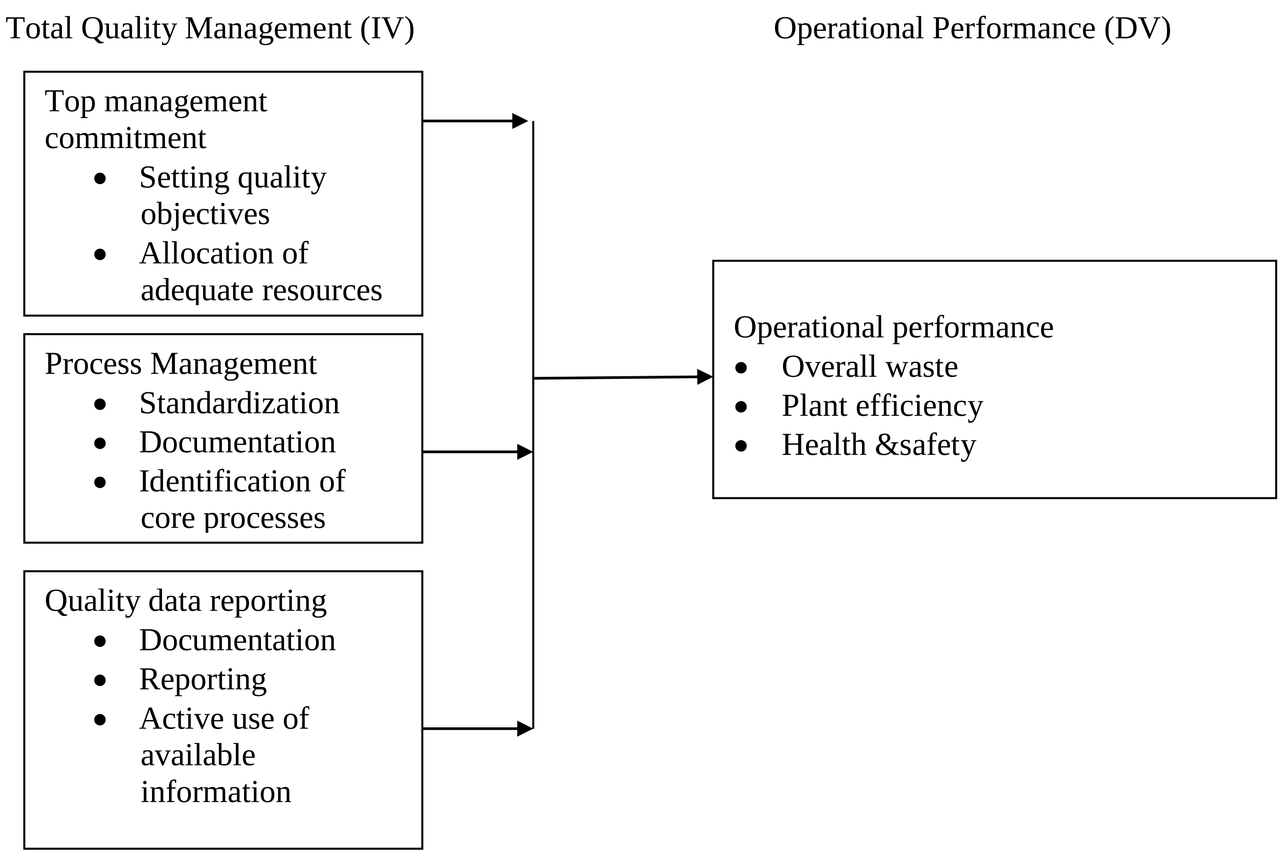

Figure 1.1: Conceptual framework showing how TQM relates to operational performance

Source: Adopted from Demiberg *et al*. (2006) and modified by the author.

The independent was conceptualised as TQM practices and the dependent was conceptualised as operational performance. TQM was measured in terms of: top management commitment, process management and quality data reporting while operational performance was measured in terms of: overall waste, plant efficiency and health & safety. The adoption of TQM by pole treatment plants may affect their operational performance levels.

1.9: Significance of the study

The study may be relevant to management of utility pole treatment plants in the country in implementation of TQM and its impact on and recommendations for operational performance. Additionally, the study may enable prospective plant operators and owners come up with strategies to alleviate challenges associated with change in the future with adoption of TQM practices. The study may also be useful to students who wish to carry out further research on TQM implementation and operational performance through increasing the knowledge base. To the researcher, the study is a partial fulfillment of the requirements for the award of a masters' degree in business administration of Uganda Management Institute.

1.10: Justification of the study

Implementation of the TQM practices has been enhanced to compete with new challenges in business and to satisfy the emerging pattern (Yusof & Aspinwall, 2000). The need for any player in a given industry to adopt proper quality implementation and practices is thus important and clear so as to jump to a better level of global competition. The rising level of competition is one such factor driving organizations towards formulating and implementing competitive strategies. TQM is one such strategy being employed in an effort to move towards business excellence through attaining a competitive edge over other industrial players. TQM hence helps create an atmosphere of teamwork, quality mindedness, a passion for continuous learning and improvement, all of which are crucial for organizational existence and success (Yusof & Aspinwall, 2000).

Due to its wide recognition and successful implementation in many organizations, TQM has been identified as a distinguishing factor in both local and international competition through production of high quality products to meet customer needs and the subsequent impact on profitability. According to Paris (2008), organizations can only be able to realize improved performance if they embrace a QMS (Quality Management System) and this is supported by Lakhal, Pasin, & Limam (2006) who pointed out that higher industry standards for returns on investments are promised for such organizations. Paris (2008) further stated that a QMS enables identification, measurement and improvement of the various core processes. Under the ISO 9001 standard, QMS is considered as an enabler of quality products following a continuous improvement process and that it is a key component of an organization's management system. The main focus of which is attainment of results in line with set quality objectives and satisfaction of customer needs and expectations. A company is thus better placed to demonstrate its ability to meet customer and regulatory requirements and to enhance customer satisfaction only when it has a working QMS (Amyx, 2005). Additionally, a good knowledge of TQM in an industry is vital to improve such factors as quality, delivery and lead-time, and a clear focus of human resources to enhance employee satisfaction hence higher levels of customer loyalty.

1.11: Scope of the study

Under the scope of the study, the geographical, content and time scopes were highlighted as below.

1.11.1: Geographical scope

The study was carried out at UEDCL's pole plant and stores located at plot 5A, Fourth Street Industrial Area, Kampala, Uganda, East Africa.

1.11.2: Content scope

The study specifically focused on the relationship between total quality management and operational performance. Specifically, total quality management was measured in terms of: top management commitment, process management and quality data reporting. Operational performance was measured in terms of overall waste, plant efficiency and health & safety.

1.11.3: Time scope

The study focused on information pertaining operational performance at the plant from the year 2014, when the plant first adopted the ISO certification standards of operation, to the year 2016.

1.12: Operational Definitions of Terms and Concepts

Total quality management: According to the study, it was defined as a management approach whose ultimate aim was ensuring quality of poles, from the participation of every personnel.

Top management commitment: The study defined it as the degree to which top level leaders at the plant set quality related objectives and the subsequent allocation of adequate resources. The provision of necessary resources for processes, participation in quality improvement processes and the review of quality related issues all characterized the dimension.

Process management: The study defined it as the standardization, documentation and identification of core processes. It therefore entailed a step-wise approach of using resources in such ways that are effective and efficient, all the actions undertaken to plan, implement, control and continuously improve both processes and the output quality.

Quality data reporting: This was the degree to which data pertaining processes, operations and products was documented and exhibited, in addition to its availability, active use and subsequent feedback to all employees.

Operational performance: The study measured operational performance in terms of overall waste, plant efficiency and health & safety at the plant.

CHAPTER TWO

LITERATURE REVIEW

2.1: Introduction

This chapter reviewed available literature in relation to the guiding theory, TQM, operational performance and the effects of TQM on operational performance. Analysis of the literature involved a thematic review guided by the study objectives to give insight into the gaps therein.

2.2: Theoretical Review

Deming's theory of 'profound knowledge' guided the study. According to Deming (1993), it is important to guide the change to come and there is always need for transformation to a new style of organizational management based on greater cooperation between management and employees. The transformation, as the scholar cited, can only be possible with a new map of theory as illustrated by profound knowledge, which essentially bundles four theories addressing: *systems, variation, knowledge* and *psychology*. From profound knowledge, quality is determined by management, variability is a rule of nature and there is a chain reaction from improvement of processes. Profound knowledge further cites adoption of a system and the need for reinforcement among the different components in accomplishing the system's aim as being the ultimate aim of any organization (Deming, 1993).

The basis of Deming's theory of 'profound knowledge' as a management philosophy, is system thinking, premised on the principle that organizations as systems, are made up of interrelated processes and people as components as shown by the appreciation for a system element. The theory is critical to understanding Deming's approach to quality and it highlights the importance of knowledge in quality management as depicted in the knowledge of variation element. The element emphasizes but is not limited to the effects the system may have on performance of personnel and the overall implications for management. ‘Profound knowledge’ recognizes the existence and embedment of ‘actors’ who could be individuals, organizations or the state, in a social environment. The theory suggests that organizational actions and processes are driven by those actors in order to justify and explain their actions. Being a theory of management therefore, it lays a framework of thought and action for top management to transform and create organizations which stand the test of time with victory for everybody as the ultimate aim (Deming Institute, 2015). According to Deming (1993), hard work and best efforts are not the ultimate solution to organizational problems. This therefore calls for profound knowledge if management efforts are not to cause ruination. The scholar further notes the importance of top management’s capability in crafting the delicate balance between the components as a determinant of success in the quest for quality. The theory points out that all organizations take the shape they do because they draw from the culture around them and the value-based notions of how things should be organized. To that effect, the theory affects TQM and hence performance in that ‘actors’ are seen to be influenced by those cultures. This is due to the fact that TQM is by itself a culture. Furthermore, the scholar emphasizes the importance of understanding human behavior in an effort to motivate, coordinate and manage people if systems are to be optimized as shown by the knowledge of psychology element. The theory of knowledge is equally important as the scholar points out because system improvements depend on a continuous study of an organization to learn and develop new knowledge about a system. This therefore underscores the importance of system based thinking as justified by the fact that without theory, experience has no meaning and there is no learning (Deming Institute, 2015).

Systems cannot understand themselves and thus profound knowledge comes in handy to provide an avenue of judging decisions and optimizing performance (Evans and Lindsay, 2008). However, central to profound knowledge is effective leadership, which is critical in building good organizations and the cooperative relationship between managers and workers (Deming, 2000) to strengthen the four elements of the theory.

The Deming Institute (2015) cites the system of profound knowledge as being important in helping organizations reduce waste, rework and ultimately improve product quality and gain knowledge through adoption of the PDSA cycle. The cycle, as highlighted by the theory, is a systematic and dynamic process involving both theory and applied science to generate important information which can be used for continued development of both processes and products. From the review of 'profound knowledge', therefore, the theory was found applicable to the current study given the visualized contributions (Table 1.1).

Table 1.1: Summary of underpinning theory

Theory	Authorities	Elements	Contribution to the current study	Weakness of the theory
Deming's theory of profound knowledge	Deming (1993); Langley *et al.* (2009); Perla *et al*. (2013)	Appreciation for a system	Importance of system thinking in optimization	No consideration for situations that are coercive
		Knowledge of variation	Ability to identify and eliminate special cause variation	Vague action plan and methodological principles
		Theory of knowledge	Focus on continual improvement (PDSA)	Individual approach to leadership and motivation
		Understanding of psychology	Ability to work well with people	

Source: Adopted from Deming (1993) and modified by the author

2.3: Top Management Commitment and Operational Performance

The importance of top management commitment in successful TQM implementation has been emphasised by many scholars and numerous studies have been done examining its relationship to operational performance (Demirbag *et al*., 2006). Top management commitment has been directly linked with the participation of high level executives in given critical aspects of an organisation (Gaspersz, 2008) and it has been identified as a major 'driver' in the implementation of TQM. It has also been alluded to in literature as a critical success factor and its ability to improve performance by influencing other TQM factors underscores its importance. According to Flynn *et al*. (2009), it is crucial in providing leadership, persuading the overall attitude and influencing the strategic direction of an organisation. Deming (1993) concurs that a dedicated and well-built leadership is vital for thriving and long-lasting operational programs and that it positively influences performance. This is through the provision of direction for achievement of operational related goals. Given that top leadership facilitates quality management programs for effective performance through setting performance related goals, it is hence better placed to direct the organisation towards enhanced performance and to determine the measures that are most critical in ensuring that an organization moves in the desired direction. Its role in ensuring performance and the success of an organization can therefore not be underestimated (Connor, 2012). Sila & Ebrehimpour (2008) point out that this has to be depicted in the way the importance of meeting given requirements, both customer and regulatory, is done. Additionally, the establishment of quality objectives, publication of a policy on quality, execution of performance reviews and the provision of suitable resources for the production process are also important. Top management commitment, according to Samson and Terziovski (1999, p.5) "examines senior executives' leadership and personal involvement in setting strategic directions and building and maintaining a leadership system that facilitates high organisational performance, individual development, and organisational learning." This is based on the fact that well-built leadership is needed in crafting thriving and long-lasting operational programs, providing direction for achievement of operational related goals that are specific, measurable, achievable, realistic and timely in a favourable atmosphere.

However, successful implementation of TQM can only be possible with a QMS and an educational transformation, which can best be executed by top leadership with a commitment and emphasis towards continued improvement. It is thus important that top leadership ensures employee participation in quality improvement and development of a quality related culture with changed perception and attitudes (Connor, 2012) on both top leadership's and employees' sides. With this, top management holds the responsibility of creating and subsequently communicating the organization's vision in line with operations and setting baseline indicators and the avenues of achieving the vision.

In all literature related to top management commitment and operational performance, top leadership support, employee empowerment, encouragement and appropriate support to technical and human processes are all vital for operational performance. Demirbag *et al*. (2006) was in agreement by pointing out that top management support is critical in improving the overall performance of organizations. Continued improvement, open communication and organization cooperation, all of which are essential for effective and efficient operational performance can be possible with the involvement of top level management (Kanji & Wallace 2009).

As with most studies pertaining TQM and operational performance, a positive relationship was expected to prevail in the current study. This was due to the fact that top management commitment was seen as a solid foundation within TQM and a highly critical determinant of performance at all levels in any organization. The realization of desired operational performance with TQM is hinged upon strong leadership and commitment of all in the organization. The acceptance of responsibility by top management is clearly vital in determining the level of performance of many organizations given the role played in setting quality objectives, the subsequent communication of these to all and the allocation of needed resources in attaining those objectives. As pointed out in earlier studies examining the effects of TQM implementation on operational performance, a concentrated effort by top management is essential for the performance of an organization (Zakuan, Yusof, Laosirihongthong and Shaharoun, 2010). As with most prior studies, a positive relationship was expected to prevail between top management commitment and operational performance. Consequently, it was proposed that top management commitment had a positive relationship with operational performance at UEDCL's pole plant and stores.

2.4: Process Management and Operational Performance

The aim of process management is to manage and improve those processes which produce outputs and in so doing combines the methodological approaches with human resource management (Anderson *et al*., 2012). It thus involves both the technological and human aspects. The importance of properly managing processes is clearly outlined by Juran (1998) as the scholar states that to the customer, if a process is not providing value, then it is producing waste. The scholar further emphasizes the importance of determining the exact value added by each step in the process. According to the scholar, because organizations operate multiple inter-linked business processes, it is important to focus on those deemed to be crucial. Kaplan & Norton (2005) identify internal process performance measurement as being crucial in their BSC model.

Garvin (2007) cites reduction of variation through building quality into the production system as a goal of process management. Juran (1998) points out that variability in processes is inevitable and the scholar thus emphasizes the importance of Statistical Process Control (SPC) such as the Shewart charts in minimizing variations and assessing process stability. According to Ahire *et al*. (2006), a reduction in variation of processes carries with it the advantages of increasing output quality and decreasing the occurrences of preventable costs of rework and wastes through finding and correcting quality problems instantly thereby enhancing operational performance. As further highlighted by Motwani (2001), process management emphasizes the value adding to a process thereby increasing every employee's productivity and consequently improving an organization's quality and performance. An inferior quality management process results into higher rates of scrap and rework and subsequently more resource use, all in a bid to produce quality outputs (Ahire & Drefus, 2000). It has been argued that one of the avenues of increasing product quality and decreasing the unnecessary costs of rework and waste is through reducing process variation and by quickly solving quality problems once these are identified. In process management, companies are argued to design 'fool-proof' systems so as to cut down on worker error because then, operations will be performed the right way. Alarms and controls are two ways of 'fool-proofing' where both of these work in helping to perfect the process so as to ensure good quality products (Slack *et al*., 2010). Additionally, Juran (1998) advises organizations to embark on process analysis and in this the scholar puts focus on the need to: assess processes for their effectiveness & efficiency, identification of causes of performance inadequacies, the avenues for improvement and finally effecting such improvements.

Central to process management is the ability to meet production requirements and the measured inherent variation of the outputs (Juran, 1998) and one of the differentiating factors of process management is the focus on the needs of both internal and external customers and those of the business such as costs, waste elimination among others. Flynn *et al*. (2009) emphasizes the importance of process management in ensuring that operations proceed as expected with no shortcomings. In that regard, maintenance of equipment is important in ensuring that variations are kept within acceptable limits if processes are to run smoothly for enhanced operational performance. This thus calls for institution of a preventive maintenance program within process management.

According to Kruger (2010) process management in an organization finds practical application in the implementation of the plan-do-study-act (PDSA) cycle, making it an essential scientific method vital for continuous improvement. This makes it useful in both prevention of errors and improvement of operational performance. Deming (1993) highlights the fact that organizations are sets of interlinked processes and points to the importance of process management in performance improvement. According to the scholar, sets of interlinked processes are systems which are very much in existence in organizations. The importance of process management, according to Mentzer *et al.* (2009), is in the fact that it allows personnel to use top of the range methods in enhancing operational performance. As further supported by Powel (2013), it finds application in producing machined parts to support a timely production and the most efficient processes so as to reduce costs but with the desired level of quality. Hence, the effectiveness of a process approach with emphasis on identification of core processes and the subsequent standardization and documentation of these is one key factor in operational performance determination.

The interlinked nature of processes in organizations underscores the importance of system thinking and the adoption of a process approach in making sure that there is standardization, documentation and identification of those processes identified as being core. Based on the above review, and in an effort to have a deep understanding of the correlation between TQM and operational performance, the study therefore proposed a positive relationship between process management and operational performance at UEDCL's pole plant and stores.

2.5: Quality Data Reporting and Operational Performance

Quality data reporting ought to be in continuation of process management, and should be treated as a critical aspect by all companies, irrespective of their sizes (Ahire & Golhar, 1996). In the dimension, a high degree of documentation, reporting and feedback ought to characterize reporting. Jorgensen and Nielsen (2003) note that the contribution of quality data reporting towards the quality objective can be gauged by the active role played in strategic oriented decisions and its use in assessment of personnel. Eriksson (2002) also points to the importance of basing decisions on facts, after analysis of data and information, and not just on random factors if continuous improvement is to be realized. Basing decisions on facts, therefore, enforces the importance of using efficient statistical tools in gathering data, especially data related to operational performance. In the MBNQA criteria, management by fact is listed as one of the core values and the concept underscores the importance of reliable data, information, and analyses in decision making. Among the areas of emphasis is that of being able to accurately reflect the performance of products and organizational performance levels. In an effort to try and determine results, it is advisable to carry out a self-examination exercise, which works as a control mechanism and emphasis is placed on the importance of evaluating performance against internationally recognized standards. The evaluation is geared towards establishing the degree of compliance towards particular standards and provides a basis for understanding the amount of deviation from these, those areas requiring attention and a base for improvement of quality management practices. The role of benchmarking is also cited as being crucial in comparing performance with that of competitors or even those best-in-class organizations. The importance of evaluations in operational performance management is emphasized by the fact that the main source of quality problems in most processes is uncontrolled variance. This thus necessitates organizations to adopt performance indicators known to all, for example data about products, processes and operations and which can subsequently be used to track, evaluate, and improve performance (MBNQA, 2010). The award criterion further emphasizes the need for clear interrelationships among the chosen indicators if they are to depict the relationships between the strategic goals and the organizational activities. If any organization is to realize successful management and a system founded on facts for performance improvement and competitiveness, reporting on quality data is highly critical as these serves as a foundation for performance of a management system (Juran, 1998).

From the review, it can be seen that the elements of quality data reporting ought to be in continuation of process management, which tackles continuous improvement and process mapping through standardization, documentation and identification of core processes. Quality data reporting thus involves the importance of reporting and the subsequent use of data in strategic planning. From the above review therefore, the importance of quality data reporting in determining operational performance was emphasized and it was on that basis that the current study proposed a positive relationship between the two constructs at UEDCL's pole plant and stores.

2.6: Summary of Literature Review

The relationship between TQM and operational performance has been studied by many scholars (Gharakhani, Rahmati, Farrokhi, & Farahmandian, 2013) and many have suggested improvements of the latter through adoption of TQM. Seven aspects have been identified as critical success factors of TQM: top management commitment, worker relations, supplier quality management, training, quality policy, process management and quality data reporting (Demirbag *et al.*, 2006). However, in investigating the relationship between TQM and operational performance, different dimensions have been used hence differing results, and still not all dimensions strongly influence performance (Samson & Terziovski, 1999). Kaynak (2003) and Terziovski (2006), for example, studied and proved the existence of a relationship between process management and performance and yet according to Tarí, Molina & Castejón (2007), process management does not impact performance. Nonetheless, the categories of top management commitment, human resource management and customer centeredness were identified as having the strongest impact on organizational performance (Mehmood, Qadeer & Ahmad, 2004). Talib (2013) claimed that no such study clearly explains the key dimensions of TQM. The differing findings can be attributed to the focus on differing TQM dimensions, differing populations, and the use of varying methods in measuring operational performance. Furthermore, when it comes to the impacts of TQM on organizational performance, there are diverging views on whether all the improvements can be tied to TQM and which dimensions actually impact performance. The areas of divergence thus posed the question of whether a combination of top management commitment, process management and quality data reporting can impact operational performance of a medium-sized entity like UEDCL's pole plant and stores. To address some of the gaps therefore, triangulation was used in collecting the data.

CHAPTER THREE

METHODOLOGY

3.1: Introduction

In this chapter, the research design, study population, sample size, techniques, methods and instruments used in sampling and collection of data were presented. The chapter also covered the procedures used, in addition to the data analysis techniques and measurement of variables. Finally, the chapter briefly made mention of the ethical issues relevant to the study.

3.2: Research Design

A cross-sectional survey design was used for the study. According to Babbie (2010), this type of design comes in handy when targeting information on a small sample population at a single point in time. The design was helpful in providing a quantitative description of trends and opinions of participants by studying a sample of the population. The scholar also cites the purpose of the design as being generalisation from a sample to a population so as to make inferences. Preference for the design was based on its time saving nature, the ability to cover a wide area in terms of respondent numbers hence a faster data collection rate and provision of more information (Babbie, 2010). Additionally, because of its inexpensive means, it was economical and had rapid turnaround in data collection. The design is also accurate, efficient and flexible in collecting data at any point in time once properly done (Creswell, 2014).

Triangulation was adopted in collecting both primary and secondary data. The ability to better understand the research problem than with either the quantitative or qualitative approaches alone (Creswell, 2007) formed the main basis for adopting the approach. In the approach, a survey was used to generalise results to a population and focus was on qualitative open-ended interviews to collect detailed views from participants to help explain initial quantitative survey (Creswell, 2007). The quantitative and qualitative data collected concurrently were then integrated.

3.3: Study population

The study targeted the top leadership, quality assurance, production and stores personnel. The choice of personnel was based on the fact that they were believed to be at the forefront in the pole treatment processes hence had major influence on operational performance. Additionally, they were believed to be a major influence on pole quality, given their constant encounters with both systems and processes. The study population was 34 personnel.

3.4: Determination of sample size

Determination of the sample size was in accordance with the Krejcie & Morgan (1970) table for determining sample size from a given population, as cited by Amin (2005) and included several categories as shown in Table 3.1 below.

Table 3.1: Showing the population, sample and sampling techniques

Respondent Category	Study Population	Sample size	Sampling Technique
Top leadership	1	1	Purposive
Quality Assurance section	4	4	Purposive
Stores section	5	5	Purposive
Production section	24	22	Purposive
Total	34	32	

Source: UEDCL pole plant & stores (2017).

3.5: Sampling techniques and procedure

The study adopted identical concurrent sampling, where both quantitative and qualitative data was collected from the same people at approximately the same time. The purposive sampling technique was used.

3.5.1: Purposive sampling

In the technique, there was a deliberate attempt to use a particular sample which was deemed qualified for the purpose of the study (Creswell, 2014) and vital in providing qualitative information. Participant selection was based on experience in relation to the key concepts under study. According to Creswell (2014), the technique is economical in terms of time and cost. Furthermore, the technique avoids irrelevant and unnecessary items entering into the sample per chance thereby creating chance for intensive study of any selected items with the desired characteristics.

3.6: Data collection methods

Three methods were used in collecting data. These included: questionnaire surveys, key informants interviews and documentary reviews.

3.6.1: Questionnaire Survey Method

Questionnaires were used to collect primary data. The method was vital in obtaining key information about the population and ensured wide coverage within a short time (Mugenda & Mugenda, 2009). The method also offered a great deal of anonymity (Amin, 2005). Furthermore preference for the method was based on its flexibility and ability to produce both quantitative and qualitative information depending on how questionnaires were structured and analyzed.

3.6.2: Key Informants Interview Method

Interviews mainly consist of unstructured and open-ended questions, intended to obtain opinions from respondents. The method involved identifying top leaders and quality personnel from the sample, who were interviewed to get in-depth opinions about the study variables. Interviews are relevant in getting historical information from respondents, when control over the line of reasoning is needed and once the respondents cannot be directly observed (Creswell, 2014). Interviews provide vital information on individual perspectives and experiences through direct discussions. The method gave an avenue for interpersonal contact and opportunities for follow up on interesting comments, especially where the topic of discussion was complex and required explanation and interaction. In addition, the method was useful in cases where there were language and educational barriers.

3.6.3: Documentary Review Method

A review of relevant documents including policies, quality management manuals, and performance and production reports was done with the aim of collecting information in relation to the study variables. The method served to cross validate primary data, provide a basis for explaining certain concepts and as a source of secondary data. In the method, documents were accessed at any time, making it a convenient and an unobtrusive source of information since it was a source of data that the respondents had given attention to (Creswell, 2012). Additionally, the method enabled the researcher to get the words and language of the participants. As written evidence, it also saved the researcher time and the expense of transcribing.

3.7: Data collection instruments

Collection of data was done using three instruments. A questionnaire, an interview guide and a documentary review checklist guided the process.

3.7.1: Questionnaire

A researcher-administered structured questionnaire was used to collect primary data. The items on the questionnaire were measured using a five-point Likert scale ranging from 1 (Disagree) to 5 (Strongly Agree) in an effort to ensure consistency and for easy computation of data (Sekaran, 2003). The Likert-scale type questionnaire was preferred given the study's rationale of proving the extent of the proposed hypotheses. The instrument was thus designed to establish the extent of the respondents' level of agreement with given statements.

Questionnaires were distributed to a sample of respondents; completed and prepared for analysis. As the instrument of choice, it was easy to formulate, administer, and gave a straightforward and simple way of studying attitudes, beliefs and motives. The instrument was also quick and made it easy to categorize, quantify and generalize information. Besides, it was cheap, had standardized answers making it simple to compile data and allowed respondents to supply answers that were confidential to them (Sekaran, 2003).

3.7.2: Interview Guide

The guide included unstructured questions which helped in obtaining in-depth information about operational performance from the respondents. The tool allowed the researcher to probe and extract any other unknown information from respondents (Creswell, 2014).

3.7.3: Documentary Review Checklist

The instrument guided in collecting secondary data from identified documents about the variables under study. The documents studied included: quality management manuals and both performance and production reports**.**

3.8: Data Quality Control

This was ensured through establishing both validity and reliability of the instruments used in collecting data. Pre-testing of instruments was done in both cases.

3.8.1: Validity

Validity was determined through pre-testing. This helped to ensure clarity and accuracy of the results so that the data collected gave meaningful and reliable results representing the variables under study (Mugenda & Mugenda, 2009). The instrument also included a number of items with a link to the study objectives. Content validity was determined using two raters (Table 3.2).

$$CVI = \frac{\text{Number of items considered relevant}}{\text{Total number of items rated}}$$

The content validity index helped to gauge the degree of relationship between the instrument and the theoretical concepts measured (Amin, 2005). A CVI of 0.7 and above was adequate.

Table 3.2: Content Validity Indices of Questionnaire items

Dimension	Rater 1	Rater 2	Status
Top management commitment	0.9	0.7	Valid
Process management	0.8	0.9	Valid
Quality data reporting	0.88	0.88	Valid
Operational performance	0.78	0.89	Valid

Source: Primary Data (2017)

3.8.2: Reliability

Reliability of the instruments was denoted by the degree to which the tools gave dependable results after repeated trials (Amin, 2005). Pre-testing being the surest way of guarding against mistakes and determining how respondents answered questions before the main study (Babbie, 2010; Neuman, 2006), it was done on 5 respondents, who were workers of Busoga Forestry Company Limited. Reliability of the data was checked by applying Cronbach's Alpha, which measured the instruments' internal consistency. The obtained coefficients of more than 0.7 indicated that the instruments were reliable (Table 3.2).

Table 3.2: Reliability Coefficient Statistics

Item	Cronbach's Alpha	Number of items
Top management commitment	0.805	10
Process management	0.844	10
Quality data reporting	0.838	8
Operational performance	0.770	9

Source: Primary Data (2017)

3.9: Procedure of Data Collection

Upon approval of the proposal, the researcher proceeded to the field for data collection. Administering of questionnaires was done by the researcher with the help of a research assistant. For the technical personnel, a drop and pick later method was adopted whilst for other personnel, the researcher was present to guide the process.

3.10: Data Analysis

Preliminary analysis was done to check for normality and linearity. A Shapiro-Wilk test for normality was done and the independent variables were normally distributed as the significant values were all greater than 0.05. Linearity of the data set was tested using scatter plots. The data was cleaned to ensure it was acceptable, understandable, and complete within the acceptable ranges. The data was then coded and entered into the Statistical Package for Social Scientists (SPSS 16) program for analysis.

3.10.1: Quantitative Analysis

In the quantitative technique, data was analyzed using percentages, means and standard deviation. Correlation analysis using Pearson's correlation coefficient was used to determine whether a relationship existed between TQM and operational performance at a 95% confidence interval, including its magnitude and direction (Saunders *et al.,* 2007). A regression model was used to determine the effects the multiple predictors had on the outcome as per the adopted general model:

$Y= \alpha+ \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + e$……………………………………………………………Equation 1

Where: Y = Operational performance

α = Constant of Proportionality

X_1 = Top management commitment

X_2 = Process management

X_3 = Quality data reporting

e = Error Term

3.10.2: Qualitative Analysis

Qualitative data was summarized, categorized into themes and analyzed based on the study variables. Where consistencies existed, generalizations were made and content analysis was used to edit the data and reorganize it into shorter meaningful sentences. Findings from the analysis were consequently used to reinforce quantitative data so as to draw meaningful sound conclusions and recommendations.

3.11: Measurement of Variables

Both nominal and ordinal scales were used to measure data. The nominal scale was used on gender and age while the ordinal scale was used in ranking the data. Additionally, the 5-point Likert-scale i.e. strongly disagree (1), disagree (2), not sure (3), agree (4) and strongly agree (5) was used in rating respondents' opinions.

3.12: Ethical Considerations

In carrying out research, there are standards to do with the rights and welfare of the people being researched and the researcher's obligations. Much as research is primarily done to add to the body of knowledge, it is likely to violate the rights and welfare of those being researched hence the existence of ethical codes to guide the process as below.

Voluntary participation: Prior to conducting the study, the researcher got permission from authorities and even with this; participants were not pressured into taking part in the study. Voluntary participation was therefore explained and participants gave their permission through signing consent forms.

Informed Consent: The researcher made sure the participants had a clear idea of what they were agreeing to, including all the possible consequences of taking part in the study. This was through informing prospective participants of their prospective roles, the procedures and risks involved. Participants thus granted their participation in the knowledge of all the possible consequences.

Participants were also told of their freedom to withdraw from the study at any time, irrespective of the reason, without any negative consequences for them.

Confidentiality and Anonymity: According to Wiles, Crow, Heath and Charles (2008), in the confidentiality principle, no information from an interviewee is supposed to be disclosed, deliberately or accidently, in ways that might identify an individual. The researcher therefore protected participants' identities by omitting such identifiers as names from questionnaires and interview guides so as to create 'clean' data sets. The use of anonymous questionnaires also served as a guarantee of privacy in addition to not discussing information provided by way of presenting findings in ways that ensured individuals could not be identified.

Plagiarism: The study guarded against plagiarism by fully acknowledging other scholars' works reviewed in relation to the study. The researcher also guarded against falsification of information by making sure that what the respondents had given is what was reported. Finally, all the questionnaires were destroyed after data was captured for analysis.

CHAPTER FOUR

PRESENTATION, ANALYSIS AND INTERPRETATION OF RESULTS

4.1: Introduction

The study examined the relationship between TQM and operational performance at UEDCL's pole plant and stores. Top management commitment, process management and quality data reporting were the independent variables while operational performance was the dependent variable. The data collected was presented, analyzed and interpreted to derive meaning. The chapter initially considered the demographic characteristics of respondents and subsequently examined the relationships between the independent variables and dependent variable.

4.2: Response Rate

According to Table 4.1, the overall response rate was 94.6% and was above the average. This was good enough to generalize the study findings to the entire population (Amin, 2005; Sekaran, 2003).

Table 4.1: Response Rate

Tool	Target response	Actual response	Percentage
Questionnaire	32	31	96.9%
Interviews	5	4	80%
Total	37	35	94.6%

Source: Primary Data (2017)

4.3: Demographic Characteristics of Respondents

Table 4.2: Demographic characteristics of Respondents

Item	Category	Number	Percentage
Gender	Male	28	90.32
	Female	3	9.68
Age	21-30 years	13	41.94
	31-40 years	13	41.94
	41-50 years	5	16.12
	51+ years	0	0
Length of service	Less than 1 year	6	19.35
	1-3 years	7	22.58
	4-6 years	8	25.81
	7+ years	10	32.26
Highest level of education	Primary	3	9.68
	Secondary	8	25.81
	Certificate	8	25.81
	Diploma	7	22.58
	Bachelor's degree	5	16.13
	Master's degree	0	0

Source: Primary Data (2017)

From Table 4.2, male respondents had the highest percentage of 90.32% (28) and the females were 9.68% (3). The higher male percentage can be attributed to the fact that the plant being mostly in production, with most operations being manual, there is need for personnel for such works and thus males are more suitable for the physical work the female counterparts.

The age distribution of the respondents was as shown in Table 4.2. Most respondents fell in the categories of 21-30 years and 31-40 years, representing 41.94% (13) each. Given the manual type of operations at the plant, these age categories are characteristic of youths believed to be more energetic and suited for physical work. This could be one probable explanation for the plant's preference for the age groups. The 41-50 years category had 16.13% (5) of the respondents while no respondents indicated to be 51+ years.

From the Table, 32.26% (10) of the respondents have served at the plant for more than 7 years. This is vital in any organization given the level of experience that comes with a long length of service hence such a work force is perceived to be adequately knowledgeable about most of the operations hence able to contribute towards a desired level of performance. For the study, this was advantageous because these respondents were believed to be knowledgeable about the different operations and hence in better positions to give informed views. 25.81% (8) had served the plant for between 4-6 years, 22.58% (7) had served between 1-3 years and only 19.35% (6) had served for less than a year.

The table also shows that most of the respondents' highest level of education were seconadry and certificate with each level having 25.81% (8). Diploma holders were 22.58% (7), 16.13% (5) had studied upto bachelors level and 9.68% (3) had only studied upto primary level.

4.4: Descriptive Statistics

The section presents results from the data collected through survey questionnaires administered to personnel at UEDCL's pole plant and stores. Using a Likert scale where 1-1.499 was Strongly Disagree, 1.5-2.499 was Disagree, 2.5-3.499 was Not Sure, 3.5-4.499 was Agree and 4.5-5.00 was Strongly Agree, respondents were asked to indicate their level of agreement with a number of elements under TQM. A total of 32 questionnaires were administered and 31 were returned. The data collected was then categorized, quantified, coded and arranged as per the research objectives and cleaned. All the different items under the questionnaire sections were analyzed separately; under the broad categories of Agreed, Disagreed and Not Sure. The subsequent tables present the analyzed descriptive data from the study.

Table 4.3: Respondents' Opinions on Top Management Commitment

	Statement	n	SD	D	N	A	SA	Mean	SD
1	Top management provides visible leadership in maintaining an environment that supports operational performance.	31	2	0	3	14	12	4.097	1.044
2	Top management has set clear quality objectives for the company.	31	0	0	2	14	15	4.419	.620
3	Top management provides training on how to achieve the set objectives.	31	0	0	1	19	11	4.322	.540
4	Top management provides timely recognition and appreciation of workers' efforts and successes.	31	0	6	4	15	6	3.677	1.012
5	Top management allocates enough organizational resources (e.g., finances, people, time, and equipment) to improving operational performance.	31	0	1	1	18	11	4.258	.681
6	Top management consistently participates in activities to improve operational performance at the plant.	31	0	1	3	21	6	4.032	.657
7	Top management is involved with customers and suppliers.	31	0	0	6	14	11	4.161	.735
8	Top management acts on suggestions to improve operational performance at the plant.	31	0	2	3	18	8	4.032	.795
9	Top management ensures that every worker knows the company's mission and objectives.	31	0	0	3	18	10	4.226	.617
10	Top management strongly promotes staff involvement in quality management and improvement activities.	31	0	0	3	20	8	4.161	.583

Source: Primary Data (2017)

From Table 4.3, majority, 83.9% (26) of the respondents agreed that top management provides visible leadership that supports operational performance at the plant (mean = 4.097, SD = 1.044). 6.5% (2) of the respondents disagreed with the statement while 9.7% (3) of the respondents were not sure. The general agreement with the statement was supplemented by information from key informant interviews where it was discovered that leaders' influence is evident in *ensuring equipment is available and policies are instituted.* However, the high standard deviation (SD = 1.044) was an indication of varied responses pertaining the element, an expression of the broad views respondents had about visible leadership.

About setting clear quality objectives for the company, 93.5% (29) of the respondents agreed that top management does this (mean = 4.419, SD = .620). This trend was supported by the quality and performance objectives pinned up on noticeboards at the premises. Only 6.5% (2) of the respondents were not sure of the statement. None of the respondents disagreed with the statement though.

Furthermore, the majority 96.8% (30) of respondents agreed that top management provides training on how to achieve the set quality objectives (mean = 4.322, SD = .540) while only 1 respondent was not sure about this. The general agreement was in line with discoveries from interviews as it was noted that a serious of quality management related workshops had been organized during the previous months.

When asked whether top management provides timely recognition and appreciation of workers' efforts and successes, 67.7% (21) of the respondents agreed (mean = 3.677, SD = 1.012), 12.9% (4) were not sure about this happening at the plant while 19.4% (6) of the respondents disagreed. Additionally, the high SD of 1.012 is an indication of the varied nature in the responses thus respondents expressed mixed views about this element.

About allocating enough organizational resources to improving operational performance, the majority 93.5% (29) of respondents agreed as shown by mean of 4.258, SD of .681, that top management provides these and as discovered from interviews, top leadership ensured that *personal protective equipment and manpower* were readily availed, especially during periods of many orders. Only 1 respondent was not sure if this really happened at the plant and 1 also disagreed with the statement.

When asked whether top management consistently participates in activities to improve operational performance at the plant, still majority 87.1% (27) agreed (mean = 4.032, SD = .657), 9.7% (3) were not sure about this and only 1 respondent disagreed that this happens at the plant.

Majority, 80.6% (25) of the respondents agreed when asked whether top management is involved with customers and suppliers (mean = 4.161, SD = 735), 19.4% (6) respondents were not sure about this and none disagreed with the statement.

About top management acting on suggestions to improve operational performance at the plant, 83.9% (26) of the respondents agreed that this was true (mean = 4.032, SD = .795), 2 respondents disagreed while 3 were not sure about this.

When asked whether top management ensures that every worker knows the company's mission and objectives, 90.3% (28) of the respondents agreed (mean = 4.226, SD = .617) and only 3 were not sure this was the case at the plant. The general consensus from the questionnaire was further proved by a presence of the plant's objectives on several notice boards. This means that top management understands the danger if personnel were to 'blindly' operate with no driving forces hence the need to get everyone on board.

About top management strongly promoting staff involvement in quality management and improvement activities, 90.3% (28) were in agreement (mean = 4.161, SD = .583) and still only 3 were not sure about this. No respondent expressed disagreement with the statement, an indication that at least top management understands the value personnel can add to the efforts to attain high levels of operational performance.

Table 4.4: Respondents' Opinion on Process Management

	Statement	n	SD	D	N	A	SA	Mean	SD
1	The plant has clearly documented procedures for managing its processes.	31	0	1	1	8	21	4.581	.720
2	All the processes at the plant follow some known standard.	31	0	1	1	10	19	4.516	.724
3	The procedures for quality assurances are implemented at the plant.	31	0	0	5	13	13	4.258	.729
4	All processes at the plant are clearly defined so that all workers understand how they work.	31	0	3	7	15	6	3.774	.884
5	All processes are designed to meet the set quality standards.	31	0	1	0	19	11	4.290	.643
6	Workers have enough training on achieving the set quality objectives.	31	0	3	4	18	6	3.871	.846
7	The workers involved in different processes know how to evaluate those processes.	31	1	0	8	19	3	3.742	.773
8	Workers have the authority to correct problems in their areas when quality standards are not being met.	31	3	6	7	12	3	3.194	1.167
9	The causes of all possible mistakes in the processes are identified and informed to all workers.	31	0	6	7	13	5	3.548	.995
10	Continuous improvement tools (brainstorming, check sheet and other statistical process control) are applied on regular basis.	31	0	5	9	13	4	3.516	.926

Source: Primary Data (2017)

The study also sought to find out the respondents' level of agreement with process management at the plant and 93.5% (29) of the respondents agreed that the plant has clearly documented procedures for managing its processes (mean = 4.581, SD = .720). This finding revealed the level of importance attached to processes at the plant. This was proved by the clearly written work procedures and work instructions for each section as was discovered from documentary reviews. 1 respondent was not sure this was the case and only 1 disagreed with the statement.

When asked whether all the processes at the plant follow some known standard, still the majority 93.5% (29) of respondents agreed that this was the case (mean = 4.516, SD = .724) and the standard was the ISO 9001: 2015 Quality Management Standard and that the company had a product certificate issued by UNBS, as it was discovered from interviews and documentary reviews. Identical to the previous element, only 1 respondent disagreed and still 1 expressed uncertainty.

About the plant implementing the procedures for quality assurance, 83.9% (26) of the respondents agreed that this was being done (mean = 4.258, SD = .759) while 16.1% (5) of the respondents were not sure about this. This level of uncertainty may be a reflection and wake up call for the plant to make such things as the work procedures and work instructions more readily available to all personnel at all times.

When asked whether all the processes at the plant are clearly defined so that all workers understand how they work, 67.7% (21) of the respondents were in agreement (mean = 3.774, SD = .884) and this was supported by the *presence of work instructions for all the jobs*. 22.6% (7) were not sure about this, an aspect which should be taken seriously by the plant to continuously train personnel and evaluate the level of understanding of these instructions. 9.7% (3) of the respondents disagreed that this was not the case.

Majority 96.8% (30) of the respondents agreed that all processes are designed to meet the set quality standards (mean = 4.290, SD = .643) while only 1 respondent disagreed with the statement. This was an indication of personnel's understanding of the important link that exists between achieving set standards and effectively managing processes.

About workers having enough training on achieving the set quality objectives, 77.4% (24) respondents agreed with the statement (mean = 3.871, SD = .846) however, 9.7% (3) of the respondents disagreed and 12.9% (4) were not sure if the training was really enough. The level of uncertainty among respondents therefore points to the need to increase training durations for personnel and even explore the option of having refresher sessions after a given period.

When asked whether the workers involved in different processes know how to evaluate those processes, 71% (22) of the respondents agreed with the statement (mean = 3.742, SD = .773), 25.8% (8) of the respondents were not sure this was the case while only 1 respondent disagreed.

Upon being asked whether workers have the authority to correct problems in their areas when quality standards are not being met, 48.4% (15) of the respondents agreed that this was true, nonetheless, 29% (9) of the respondents were in disagreement and 22.6% (7) were not sure whether this was the case. This particular element raises concern about the level of autonomy personnel have in making decisions on their own. As shown by the mean of 3.194 and high SD of 1.167, there were also a lot of variations among the responses.

About all possible mistakes in the processes being identified and informed to all workers, 58.1% (18) of the respondents were in agreement with this (mean = 3.548, SD = 995), 22.6% (7) of the respondents were not sure and 19.4% (6) of the respondents disagreed. This particular finding also points to the need to continuously reorient personnel with all processes and their functionality.

When asked whether continuous improvement tools are applied on a regular basis, 54.8% (17) of the respondents were in agreement as shown by a mean of 3.516 and SD of .926. Nevertheless, this statistic reveals the need to engage personnel more in the use of continuous improvement tools during daily operations as shown by the 29% (9) that were not sure about this. 16.1% (5) of the respondents disagreed with the statement.

Table 4.5: Respondents' Opinion on Quality Data Reporting

	Statement	n	SD	D	N	A	SA	Mean	SD
1	The plant collects data about its operations on time	31	0	1	2	17	11	4.226	.717
2	The data collected is documented and shared with the rest of the team at the plant.	31	0	6	6	13	6	3.613	1.02
3	The plant continuously tries to improve the accuracy of data collected.	31	0	0	15	10	6	3.710	.783
4	The effective use of data is of an advantage to improving operational performance at the plant.	31	0	0	2	21	8	4.194	.543
5	The plant uses the data collected in decision making and planning.	31	0	0	10	12	9	3.968	.795
6	Workers are actively involved in determining what data are collected for the purpose of improving operational performance.	31	1	2	8	14	6	3.733	.980

7	The data collected is readily available to all the workers at the plant.	31	0	8	11	9	3	3.226	.956
8	The plant compares data about its operations to that of other plants.	31	1	1	23	5	1	3.129	.670

Source: Primary Data (2017)

Table 4.5 shows respondents' opinion with quality data reporting at the plant. When asked whether the plant collects data about its operations on time, 90.3% (28) of the respondents agreed with the statement as shown by a mean of 4.226 and SD of .717. 6.45% (2) of the respondents were not sure this was the case and only 1 respondent disagreed. The level of agreement is an indication of the importance attached to managing both operational performance and quality at the plant through documenting, reporting and the active use of such kinds of data.

When asked whether the data collected is documented and shared with the rest of the team at the plant, 61.3% (19) of the respondents agreed that this was always done as shown by a mean of 3.619. However, 19.4% (6) of the respondents disagreed and still an equal percentage expressed uncertainty about the statement. The high SD of 1.020 reveals the level of variations among the responses, an indication that however much data may be collected and documented; it may not be readily available for everyone.

About the plant continuously trying to improve the accuracy of the data collected, 51.6% (16) of the respondents agreed that this was always done (mean = 3.710, SD = 783). However, 48.4% (15) of the respondents were not sure about this but none of the respondents disagreed.

The majority 93.5% (29) of the respondents agreed that the effective use of data is of an advantage to improving operational performance at the plant (mean = 4.194, SD = .543), 6.5% (2) were not sure whether this was of an advantage and no respondents disagreed though.

When asked whether the plant uses the data collected in decision making and planning, 67.7% (21) of the respondents agreed that it did, as shown by a mean of 3.968 and SD of .795, and 32.3% (10) were not sure about this. No respondents expressed disagreement.

Asked whether the workers are actively involved in determining what data are collected for the purpose of improving operational performance, 64.5% (20) of the respondents agreed that indeed they were (mean = 3.733, SD =.980), 25.8% (8) were not sure and only 9.7% (3) of the respondents disagreed.

Upon being asked whether the data collected is readily available to all workers at the plant, only 38.7% (12) of the respondents agreed with the statement as shown by a mean of 3.226 and SD of .956. The level of agreement was less than half as 25.8% (8) of the respondents disagreed and 35.5% (11) were not sure whether it really was the case at the plant. This statistic complements the finding in two above, which sought to find out if data collected was documented and shared with the rest of the team at the plant.

On the element of the plant comparing the data about its operations to that of other plants, majority 74.2% (23) of the respondents were not sure this happened. This is shown by a mean of 3.129 which indicated uncertainty and by SD of .670. Only 19.4% (6) of the respondents agreed that this was being done and 6.5% (2) of the respondents disagreed.

Table 4.6: Respondents' Opinion on Operational Performance

	Statement	n	SD	D	N	A	SA	Mean	SD
1	Measurement of operational performance is based on defined standards.	31	0	2	1	11	17	4.387	.844
2	The plant has set objectives known to everybody.	31	0	4	3	17	7	3.871	.922
3	The plant uses the extent to which its objectives are achieved to measure its efficiency levels.	31	0	1	9	17	4	3.774	.717
4	The quality program has improved the plant's operational performance in general.	31	0	0	5	20	6	4.032	.605
5	Efficiency of operations is used to measure performance at the plant.	31	0	1	8	18	4	3.807	.703
6	The quality program has helped reduce overall waste at the plant.	31	0	1	8	15	7	3.903	.790
7	Workers are motivated and give their best capabilities resulting in high levels of operational performance.	31	0	8	4	15	4	3.484	1.029
8	The plant has had zero lost time accidents due to adoption of a "safety first" culture.	31	0	0	5	12	14	4.290	.739
9	There have been few customer complaints with the quality program.	31	0	2	16	12	1	3.387	.667

Source: Primary Data (2017)

From Table 4.6, 90.3 % (28) of the respondents agreed that measurement of operational performance at the plant is based on defined standards as shown by a mean of 4.387 and SD of .844. This is a clear indication of how management makes an effort to create awareness about the adopted standards at the plant. However, 6.5% (2) of the respondents disagreed with the statement and only 1 respondent expressed uncertainty.

When asked whether the plant has set objectives known to everybody, 77.4% (24) of the respondents agreed (mean = 3.871, SD = .922). From the interviews, this was also evident as stipulated in the quality manual; *satisfy customers, improve staff competence, achieve operational efficiency* among others. 9.7% (3) were not sure about the objectives and 12.9% (4) of the respondents disagreed with the statement.

Upon being asked whether the plant uses the extent to which its objectives are achieved to measure its efficiency levels, 67.7% (21) of the respondents agreed with the statement (mean = 3.774, SD = .717) and 29% (9) of the respondents were not sure it was the case. Only 1 respondent disagreed.

Majority 83.9 % (26) of the respondents agreed that the quality program has improved the plant's operational performance (mean = 4.032, SD = .605). 16.1% (5) of the respondents expressed uncertainty and none was in disagreement.

Asked whether efficiency of operations is used to measure operational performance and whether the quality program has helped reduce overall waste at the plant, respondents equally answered on both statements and 71% (22) agreed with the both statements, 25.8% (8) of the respondents were not sure about both statements and only 3.2% (1) respondent disagreed in each case. The level of agreement was as shown by means of 4.032 and 3.807, and SD of .605 and .703 respectively.

Asked whether workers are motivated and give their best capabilities hence resulting into high levels of operational performance, 12.9% (4) of the respondents expressed uncertainty, 61.3% (19) of the respondents agreed (mean = 3.484). However, 25.8% (8) of the respondents disagreed with the statement. The high SD of 1.029 indicates a lot of variance in the responses to this element.

In regard to the plant having had zero lost time accidents due to the adoption of a safety first culture, majority 83.9% (26) of the respondents agreed (mean = 4.290, SD = .739). From the key informants' interviews, it was also discovered that there had been no life threatening accidents in the past 3 years, something management attributed to the strict policy of 'safety first.' 16.1% (5) expressed uncertainty about the statement.

In terms of the number of complaints since the adoption of the quality program, 41.9% (13) of the respondents agreed that indeed these were few, 51.6% (16) were not sure about this, as shown by a mean of 3.387 and SD of .667. Even so, 6.5% (2) of the respondents were in disagreement.

4.5: Quantitative Analysis and Interpretation

This stage of the study involved application of Pearson's moment of correlation analysis. This helped to examine the strength of the relationship between the independent and the dependent variables.

4.5.1: The Relationship between Top Management Commitment and Operational Performance

The relationship between top management commitment and operational performance was investigated using Pearson product moment correlation coefficient as shown in (Table 4.7). Findings revealed a strong positive relationship between top management commitment and operational performance ($r = .728$, $p < .05$), indicating a positive correlation. Therefore, top management commitment supported total quality management practices in an effort to improve operational performance at the plant.

Table 4.7: Correlation between Top Management Commitment and Operational Performance

Correlations			
		Top management commitment	Operational performance
Top management Commitment	Pearson Correlation	1	0.728**
	Sig. (2-tailed)		0.000
	N	31	31
Operational performance	Pearson Correlation	0.728**	1
	Sig. (2-tailed)	0.000	
	N	31	31
** Correlation is significant at 0.01 level (2-tailed).			

Source: Primary Data (2017).

In order to determine the effect of top management commitment on operational performance, regression analysis was conducted and the results summarized (Table 4.8).

Table 4.8: Regression results showing the effect of Top Management Commitment on Operational Performance

R-Square = .514, F = 32.777, p = .000		
	Standardized Coefficients Beta	Sig.
Top management commitment	.728	.000

Source: Primary Data (2017)

The resulting model explained 51.4 percent variance in operational performance, which was revealed to be statistically significant ($F = 32.777$, $p < .05$). Inspection of the predictor revealed top management commitment ($\beta = .728$, $p < .05$) to be a significant predictor of operational performance.

4.5.2: The Relationship between Process Management and Operational Performance

The relationship between process management and operational performance was investigated using Pearson product moment correlation coefficient as shown in (Table 4.9). Findings revealed a very strong positive relationship between process management and operational performance ($r = .851$, $p < .05$), indicating a positive correlation. Findings thus showed that for total quality management to result in operational performance, process management is very critical.

Table 4.9: Correlation between Process Management and Operational Performance

Correlations			
		Process Management	Operational performance
Process Management	Pearson Correlation	1	.851**
	Sig. (2-tailed)		.000
	N	31	31
Operational performance	Pearson Correlation	.851**	1
	Sig. (2-tailed)	.000	
	N	31	31

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

Source: Primary Data (2017).

In order to determine the effect of process management on operational performance, regression analysis was also done and the results summarized (Table 4.10).

Table 4.10: Regression results showing the effect of Process Management on Operational Performance

R Square = .715, F =76.428, p = .000

	Standardized Coefficients Beta	Sig.
Process management	.851	.000

Source: Primary Data (2017)

The resulting model explained 71.5 percent variance in operational performance, which was revealed to be statistically significant (F =76.428, $p < .05$). Inspection of the predictor revealed process management ($\beta = .851$, $p < .05$) to be a significant predictor of operational performance.

4.5.3: The Relationship between Quality Data Reporting and Operational Performance

The relationship between quality data reporting and operational performance was investigated using Pearson product moment correlation coefficient as shown in (Table 4.11). Findings revealed a strong positive relationship between quality data reporting and operational performance ($r = .763$, $p < .05$), indicating a positive correlation thus quality data reporting as a construct of total quality management was capable of positively impacting operational performance at the plant.

Table 4.11: Correlation between Quality Data Reporting and Operational Performance

Correlations			
		Quality Data Reporting	Operational performance
Quality Data Reporting	Pearson Correlation	1	.763**
	Sig. (2-tailed)		.000
	N	31	31
Operational performance	Pearson Correlation	.763**	1
	Sig. (2-tailed)	.000	
	N	31	31

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

Source: Primary Data (2017).

In order to determine the effect of quality data reporting on operational performance, regression analysis was done and the results summarized (Table 4.12).

Table 4.12: Regression results showing the effect of Quality Data Reporting on Operational Performance

R Square = .582, F =40.429, p = .000		
	Standardized Coefficients Beta	Sig.
Quality data reporting	.763	.000

Source: Primary Data (2017)

The resulting model explained 58.2 percent variance in operational performance, which was revealed to be statistically significant ($F = 40.429$, $p < .05$). Inspection of the predictor revealed quality data reporting ($\beta = .763$, $p < .05$) as a significant predictor of operational performance.

4.6: Regression Results

4.6.1: Model Summary

Multiple regressions were done to determine the extent to which the total quality management constructs affected operational performance. The R squared value represented the amount of variability in the outcome accounted for by the predictors. This value was .746, which showed that the proportion of variation in operational performance explained by the TQM dimensions was 74.6% (Table 4.13). The remaining 25.4% could be attributed to factors beyond the study.

Table 4.13: Model Summary

Model summary				
Model	R	R Square	Adjusted R Square	Std. Error of Estimate
1	.864[a]	.746	.718	.24903

a. Predictors: (constant), Quality data reporting, Top management commitment, Process management

Source: Primary Data (2017)

4.6.2: Analysis of Variance

This was used to test whether the model could significantly fit in predicting the outcome than with the use of means. The overall model explained a significant proportion of variance in operational performance, hence all three predictors had a significant combined effect on the outcome, $F(3, 27) = 26.425$, $p < .05$ (Table 4.14).

Table 4.14: Analysis of Variance

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	4.917	3	1.639	26.425	.000a
Residual	1.674	27	.062		
Total	6.591	30			

a .Predictors: (Constant), Top Management commitment, Process Management, Quality Data Reporting
b .Dependent Variable: Operational Performance

Source: Primary Data (2017)

4.6.3: Coefficients of the Total Quality Management Practices

From Table 4.15, the estimates of β values and contributions of the individual predictors to the model are given. The β values explained the relationship between operational performance with each total quality management construct, with the positive values indicating the positive relationship that existed between the predictors and the outcome. The regression model is as indicated: $Y = .809 + .088X_1 + .527X_2 + .172X_3$; where Y is operational performance, X_1 is top management commitment, X_2 is process management and X_3 is quality data reporting.

Table 4.15: Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients
		B	Std. Error	Beta
1	(Constant)	.809	.421	
	Top management commitment	.088	.173	.084
	Process management	.527	.162	.619
	Quality Data Reporting	.172	.139	.207

Source: Primary Data (2017)

4.6.4: Hypothesis Testing

Hypothesis 1: (H_1) there is a significant relationship between top management commitment and operational performance at UEDCL's pole plant and stores. Results showed that top management commitment had a coefficient of estimate which was significant (β =.084, p =.000), where $p < .05$. Therefore the null hypothesis was rejected in favour of the alternative hence there was a positive and significant relationship between top management commitment and operational performance at the plant.

Hypothesis 2: (H_2) there is a significant relationship between process management and operational performance at UEDCL's pole plant and stores. Results showed that process management had a coefficient of estimate which was significant (β =.619, p =.000), where $p < .05$. Therefore the null hypothesis was rejected in favour of the alternative. A positive and significant relationship existed between process management and operational performance at the plant.

Hypothesis 3: (H_3) there is a significant relationship between quality data reporting and operational performance at UEDCL's pole plant and stores. Results showed that quality data reporting had a coefficient of estimate which was significant (β =.207, p =.000), where $p < .05$. Therefore the null hypothesis was rejected in favour of the alternative. Findings thus showed existence of a positive significant relationship between quality data reporting and operational performance at the plant.

4.7: Qualitative Analysis and Interpretation

The qualitative approach was used to supplement quantitative findings, fill gaps left by the questionnaire and due to the likelihood of giving more substance and revealing more detailed information. Information was gathered through key informant interviews and presented in a narrative form, including analysis and interpretation of the findings. Findings were discussed under the categories of top management commitment, process management, and quality data reporting and operational performance.

4.7.1: Top Management Commitment

Findings from the interviews gave insight into the possible explanations for the high association observed between top management commitment and operational performance from the correlation analysis. From the interviews, it was noted that *top management* was synonymous with: policy making, creating system awareness and ensuring that the adopted quality management system was working properly. A Proper working system was illustrated to mean: presence of personal protective equipment, the availability of labour (especially during busy periods), training of personnel to promote system awareness and ensuring that equipment functioned well at all times. As one respondent pointed out *"our bosses understand that the* *heart of most operations here is the machinery, so once something breaks down, it is fixed as soon as possible".* From the above, there is an indication that top management is committed to making the quality system work so as to better operational performance levels at the plant. When asked how top leadership has influenced operational performance, respondents cited the examples of how the heating system at the plant was improved and how there have been workshops to create system awareness and to keep personnel up to date with new developments in the industry.

Nonetheless, some respondents indicated the need for top management to exhibit more visible leadership and the need to consider recognizing and appreciating workers' efforts and successes. As one respondent pointed out *"the company is always announcing profits but we never get any extra monetary form of appreciation."* This therefore points to the need for top management to appreciate all elements of the system, especially personnel, as emphasized by one of the elements of Deming's theory of profound knowledge.

4.7.2: Process Management

In line with process management, findings also showed that respondents viewed this as being critical in determining operational performance levels at the plant. These also supplemented the high association observed from the correlation analysis.

All the respondents interacted with acknowledged that indeed all activities at the plant followed known standards: the ISO 9001: 2015, EAS 322: 2002, and BS 144, and that the plant is also certified by the Uganda National Bureau of Standards (UNBS) body. It was further revealed that in addition to having a quality policy and an operational quality manual, there are also work procedures and work instructions. These, as it was pointed out, *"outline the actual activities to* *be followed for every section and personnel at the plant".* From the high association between process management and operational performance, this means that the importance of system thinking, as stipulated in the theory of profound knowledge is understood and held in high regard by personnel at the plant. It was also discovered that owing to efforts towards process management, there has been improved system performance. This has been realized in terms of improved power and water usage, fewer delays in fulfilling orders and the decreasing cases of customer complaints in recent years. This can be attributed to the fact that operations are guided by clearly spelt out instructions and not just based on hearsay.

4.7.3: Quality Data Reporting

The high association of quality data reporting with operational performance as was revealed by correlation analysis was further explained by findings from interviews. Respondents pointed out that this was critical if operations were not to be carried out *'blindly'*. This was equated to "*operating but without knowing how the plant performed in the past and therefore unable to make comparisons so as to better the performance."* The importance of this dimension was also revealed in the fact that the plant has invested in acquiring equipment to help in collecting accurate and timely data about both its operations and products, with future plans to establish an independent laboratory for analysis and management. Improvements have also been through such avenues as trainings. The implication therefore is that top management understands the need to maintain a well-functioning system through utilizing the theory of knowledge, and the eminent need to focus on continuous improvement as pointed out in the guiding theory of this study. However, findings also revealed varied responses about sharing of data across teams at the plant and this raised a red flag whether all personnel are free to access data pertaining operations or this is limited to only a few individuals. If not addressed, this could ruin all efforts to better performance levels as all sections ought to be interconnected and dependent on one another.

4.7.4: Operational Performance

All responses indicated that the operational performance at the plant has generally improved with the adoption of the quality management system. This, as was pointed out, is evident from the improved system performance in terms of less wastage of materials, efficient usage of power and water, and the zero cases of lost time accidents registered in recent years. Most respondents attributed the positive results to the adoption of the quality management system.

Nevertheless, interviews also revealed that despite the successes registered, the plant is yet to address some environmental issues resulting from operations. These included pollution of both air and water, and soil contamination at the premises. Additionally, the constant contact and inhalation of creosote oil fumes, given the life threatening nature, are more concerns yet to be fully addressed in regard to health and safety.

CHAPTER FIVE

SUMMARY, DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1: Introduction

The study examined the relationship between total quality management and operational performance in the utility pole treatment industry with reference to UEDCL's pole plant and stores. This chapter included a summary of findings and a discussion of the results, detailing the impacts of the multiple predictors on the outcome. The chapter also presented conclusions, recommendations, limitations of the study and finally suggestions for further research.

5.2: Summary of Findings

Based on the study objectives and analysis of collected data, the results supported the following summary findings:

5.2.1: Top Management Commitment and Operational Performance

The first objective of the study was to examine the relationship between top management commitment and operational performance at UEDCL's pole plant and stores. From the findings, a positive and significant relationship existed between top management commitment and operational performance ($r = .728$, $p < .05$) at the plant. Respondents agreed that commitment by top management was vital in enhancing the level of operational performance at the plant and this therefore meant that any increase in the level of commitment by top management was most likely to increase the operational performance levels. However, there was a lot of variation in responses pertaining to top management's exhibition of visible leadership in maintaining an environment that supported operational performance (mean = 4.097, SD = 1.044).

5.2.2: Process Management and Operational Performance

The second objective of the study was to examine the relationship between process management and operational performance at UEDCL's pole plant and stores. From the findings, a positive and significant relationship was found to exist between process management and operational performance ($r = .851$, $p < .05$). This implied that any increase in process management at the plant was most likely to positively increase operational performance levels. Much as respondents agreed with the constructs under process management, the construct of workers having authority to correct problems in their respective areas when quality standards were not being met had a lot of variation in the responses (mean = 3.194, SD = 1.167).

5.2.3: Quality Data Reporting and Operational Performance

The third objective of the study was to examine the relationship between quality data reporting and operational performance at UEDCL's pole plant and stores. From the findings, a positive and significant relationship existed between quality data reporting and operational performance ($r = .763$, $p < .05$). Respondents were in agreement with the quality data reporting items and believed that quality data reporting was a big determinant of operational performance. Nonetheless, when it came to documenting and sharing data collected across teams at the plant, there was agreement but with a lot of variation in the responses received (mean=3.613, SD = 1.022).

5.3: Discussion of Results

5.3.1: Influence of Top Management Commitment on Operational Performance

The study revealed a positive significant relationship between top management commitment and operational performance ($r = .728$, $p < .05$). Findings from the study are much in agreement with those from earlier studies investigating the effect of top management commitment on operational performance. Many scholars have investigated the effect of TQM on operational performance

(Kaynak, 2003) and most of these have been in agreement as to what the effects and the roles of top management are in determining performance in organizations. From literature, the commitment of top management has always been cited as a fundamental starting point for the adoption of TQM.

The positive link of operational performance to top management commitment stems from the acceptance of responsibility by top management to determine a well-adapted and quality focused organizational culture, vision, and an overall quality policy (Prajogo & Sohal, 2003). Furthermore, the organization-wide efforts by top management to both design strategies and effectively communicate quality objectives have proved a central role in influencing operational performance. Coupled with allocation of enough resources, with an aim of fulfilling set objectives, both avenues were discovered to be an important determinant of operational performance. According to the Baldrige model, top management is the major driver of a quality system where it affects organizational performance and profitability. This thus emphasizes the fact that the success of TQM employment hinges on top management commitment and strong leadership, both of which must be initiated by top management. In that regard therefore, the results from this study confirm the role top management plays in enhancing operational performance.

5.3.2: Influence of Process Management on Operational Performance

As was anticipated and stated in chapter two, the results from the study showed a positive and significant correlation between process management and operational performance ($r = .851$, $p < .05$). From previous studies, process management has been cited as emphasizing activities as opposed to results through a set of methodological and behavioral activities (Demirbag *et al.*, 2006). It has also been emphasized that preventive and proactive approaches to quality management are vital in reducing variations in processes and consequently improving product quality (Zu, 2009). The contribution of process management towards enhanced operational performance lies in the fact that there is improved ability to monitor data on quality, and to effectively manage operations. Furthermore, the link between process management and operational performance can be traced from the fact that mistakes in processes can be traced and corrected on time hence a proactive stance. Through the periodic on time control and monitoring of processes, data on both quality and operational performance can thus be improved. As it may be expected, an effective process management design minimizes the negative effects on the environment, reduces costs and subsequently improves profits. Findings from the study therefore further proved the importance of process management in enhancing operational performance and are much in line with findings from prior studies.

5.3.3: Influence of Quality Data Reporting on Operational Performance

Findings of this study showed that quality data reporting has a positive and significant relation to operational performance ($r = .763$, $p < .05$), which is consistent with findings by Demirbag *et al*. (2006) and Salehaldin (2009).

According to Flynn *et al*. (2009), effective operations require a wide range of information ranging from customer needs, raw materials, supplier capacity to production and distribution processes. This thus underscores the importance of timely and accurate collection of data. Furthermore, quality data reporting not only aids in design efficiency but also supports cross-functional teams in their tasks (Ou *et al*., 2010). As Ho *et al*. (1999) points out, quality data displayed in control charts, histograms and other continuous improvement tools is central to helping organizations improve operational performance through timely identification of potential issues in their processes. This is hinged on the fact that quality data provides historical information about manufacturing processes and operations. This, as the scholar further cites, allows for quick corrective action before products are off the production line. The quick detection of potential problems and smooth running of operational activities all culminate into improved operational performance. Therefore, findings from the study further proved the positive influence quality data reporting has on operational performance.

5.4: Conclusions

5.4.1: Top Management Commitment and Operational Performance

As pointed out by several earlier studies, performance in any organization can best be driven and directed by top management. Findings from the study showed a positive and significant relationship between top management commitment and operational performance and from the relationship, it was concluded that top management commitment was important in enhancing the level of operational performance at the plant. Given its influence in setting up a company-wide culture encompassing all objectives and the strategic direction of the organization, it thus means that managers should be concerned about this dimension because by impacting other TQM practices, it is most likely to enhance operational performance levels.

5.4.2: Process Management and Operational Performance

Findings from the study indicated a significant and positive relationship between process management and operational performance. Process management literature reveals that most of quality related problems are associated with processes and very few are caused by employees and that these problems can best be mitigated by good process management. This entails the use of systematic processes to pursue high levels of quality and operational performance. Given that many of the operations are process centered, respective management teams are thus charged with the responsibility of revising and continuously improving the processes with which individuals work.

5.4.3: Quality Data Reporting and Operational Performance

Study findings showed that a positive and significant relationship exists between quality data reporting and operational performance. It can therefore be concluded that timely collection of data on processes and operations is useful in identifying problems in production processes. Based on the data collected, it can then be possible to take a proactive stance on most operations thereby improving operational performance levels.

5.5: Recommendations

5.5.1: Top Management Commitment and Operational Performance

There is need for top management to exhibit more visible leadership in all operations at the plant and consider the option of having a well built in mechanism for providing timely recognition and appreciation of workers' efforts and successes. This will help serve as motivation for personnel. However, the adopted mechanism ought to be well defined for both individuals and teams, relevant, meaningful and in line with the TQM philosophy.

5.5.2: Process Management and Operational Performance

There is need to provide continuous training for personnel in their respective operations and enhance capacity to understand that process management is a collective effort as is quality management, and not just for the quality department alone. Additionally, the provision of a certain level of autonomy regarding correction of problems once personnel judge that standards are not being achieved ought to be considered. However, exercising of such autonomy should be guided. To further address the different processes and the effects these may have on the environment as a whole, there is need for the company to consider adopting an integrated management system.

5.5.3: Quality Data Reporting and Operational Performance

Following the findings of the study, there is a need to share data collected from operations across teams, given the interdependent nature of operations. This could be done through frequent workshops which can also double as training platforms for all personnel across the board, irrespective of the perceived level of impact on operational performance.

5.6: Limitations of the Study

It is important to point out that this study is subject to some methodological limitations among which are the limited scopes of the sample size and a single plant being studied. Thus generalizations of the findings may be affected to some extent.

Another limitation was in the use of unstructured questions and the analytical process of the notes as there was a time constraint. The use of qualitative analysis to supplement quantitative data was limited as interviews were in some cases conducted simultaneously as the questionnaires were being completed.

According to the EFQM (2013) and the MBNQA (2010), the minimum recommended time period for reliably determining whether a TQM intervention has had any sustainable impact on an organization's performance is five years. This was a limitation as the period of consideration for this study was only three years hence conflicting with the general agreement.

5.7: Contributions of the Study

Findings from the study have shown that the relationships between the different TQM dimensions and operational performance differ in terms of strength. The implication therefore is that organizations need not put equal emphasis on all the dimensions but carefully allocate resources to improve weak relationships and further maintain what is already strong and working towards enhancing operational performance.

5.8: Areas Recommended for Further Research

For enhancement of this work, the researcher recommends future studies to test the TQM dimensions identified in two or more separate plants with a larger sample size, so as to validate the influence on and the relationship with operational performance.

Further studies should seek to complete the subjective nature of the current study with more objective data on the TQM dimensions so as to help improve the reliability of the findings.

It would be vital for future studies to consider developing a framework exploring the level of implementation of TQM in view of the technical aspects while considering the type of industry. The current study was mainly to examine if a relationship existed between TQM and operational performance.

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APPENDICES

Appendix 1: Questionnaire for Quality, Production and Stores personnel

Dear Sir/Madam,

I am Alphonse Kasange, a student of UMI carrying out a study on "Total Quality Management and Operational Performance in the Utility Pole Treatment Industry: A Case of UEDCL" as prerequisite for the award of a Master's in Business Administration of Uganda Management Institute. Kindly complete the questionnaire by ticking the most appropriate option. All the information provided will be for academic purposes and will be treated with utmost confidentiality. Your cooperation will be highly appreciated.

Thank you.

Please tick the option you think is the most appropriate.

SECTION A: Personal Data

DATE……………………………………..

1. Gender:
   a. Male [ ] b. Female [ ]
2. Age of the respondent
   a. 21 – 30 years [ ] b. 31 – 40 years [ ] c. 41 – 50 years [ ] d. Above 51 [ ]
3. How long have you been working at UEDCL?
   a. Less than one year [ ] b. 1-3 years [ ] c. 4-6 years [ ] d. Above 7 years [ ]
4. Highest level of education
   a. Primary [ ] b. Secondary [ ] c. Certificate [ ] d. Diploma [ ]
   e. Bachelor's Degree [ ] f. Masters [ ]

SECTION B: Top Management Commitment

Please use the following response scale by ticking the number you think is the most appropriate.

Strongly Disagree (**1**), Disagree (**2**), Not Sure (**3**), Agree (**4**) and Strongly Agree (**5**)

	Statement	1	2	3	4	5
1	Top management provides visible leadership in maintaining an environment that supports operational performance.					
2	Top management has set clear quality objectives for the company.					
3	Top management provides training on how to achieve the set objectives.					
4	Top management provides timely recognition and appreciation of workers' efforts and successes.					
5	Top management allocates enough organizational resources (e.g., finances, people, time, and equipment) to improving operational performance.					
6	Top management consistently participates in activities to improve operational performance at the plant.					
7	Top management is involved with customers and suppliers.					
8	Top management acts on suggestions to improve operational performance at the plant.					
9	Top management ensures that every worker knows the company's mission and objectives.					
10	Top management strongly promotes staff involvement in quality management and improvement activities.					

SECTION C: Process Management

Please use the following response scale by ticking the number you think is the most appropriate.

Strongly Disagree (**1**), Disagree (**2**), Not Sure (**3**), Agree (**4**) and Strongly Agree (**5**)

	Statement	1	2	3	4	5
1	The plant has clearly documented procedures for managing its processes.					
2	All the processes at the plant follow some known standard.					
3	The procedures for quality assurances are implemented at the plant.					
4	All processes at the plant are clearly defined so that all workers understand					

	how they work.					
5	All processes are designed to meet the set quality standards.					
6	Workers have enough training on achieving the set quality objectives.					
7	The workers involved in different processes know how to evaluate those processes.					
8	Workers have the authority to correct problems in their areas when quality standards are not being met.					
9	The causes of all possible mistakes in the processes are identified and informed to all workers.					
10	Continuous improvement tools (brainstorming, check sheet and other statistical process control) are applied on regular basis.					

SECTION D: Quality Data Reporting

Please use the following response scale by ticking the number you think is the most appropriate.

Strongly Disagree (**1**), Disagree (**2**), Not Sure (**3**), Agree (**4**) and Strongly Agree (**5**)

	Statement	1	2	3	4	5
1	The plant collects data about its operations on time.					
2	The data collected is documented and shared with the rest of the team at the plant.					
3	The plant continuously tries to improve the accuracy of data collected.					
4	The effective use of data is of an advantage to improving operational performance at the plant.					
5	The plant uses the data collected in decision making and planning.					
6	Workers are actively involved in determining what data are collected for the purpose of improving operational performance.					
7	The data collected is readily available to all the workers at the plant.					
8	The plant compares data about its operations to that of other plants.					

Section E: Operational Performance

Please use the following response scale by ticking the number you think is the most appropriate.

Strongly Disagree (**1**), Disagree (**2**), Not Sure (**3**), Agree (**4**) and Strongly Agree (**5**)

	Statement	1	2	3	4	5
1	Measurement of operational performance is based on defined standards.					
2	The plant has set objectives known to everybody.					
3	The plant uses the extent to which its objectives are achieved to measure its efficiency levels.					
4	The quality program has improved the plant's operational performance in general.					
5	Efficiency of operations is used to measure performance at the plant.					
6	The quality program has helped reduce overall waste at the plant.					
7	Workers are motivated and give their best capabilities resulting in high levels of operational performance.					
8	The plant has had zero lost time accidents due to adoption of a "safety first" culture.					
9	There have been few customer complaints with the quality program.					

Thank you very much for your cooperation

Appendix 2: Interview Guide for Officers

i. Please tell me about the roles of a leader in the quest for quality in pole treatment.

ii. In which ways has top leadership influenced operational performance at the plant?

iii. What can top leadership do to improve operational performance at the plant?

iv. Are there standardized guidelines for all operations at the plant? If yes, may I have a copy?

v. Do you think all workers at the plant can identify the core processes in pole treatment? If yes, how has this influenced the operational performance levels at the plant?

vi. Does the plant use any continuous improvement tools on a regular basis? If yes, which ones are those?

vii. What do you think is the impact of taking data on operational performance?

viii. How would you rate the plant's operational performance in terms of overall waste, plant efficiency, health and safety for the last three years?

ix. Do you have any further remarks?

Appendix 3: Interview Guide for Quality Personnel

i. Does UEDCL have a quality policy? If yes, please specify.

ii. Do you have any documented quality performance procedures? If yes, are they readily available to users?

iii. Do the documented procedures address the requirements of any Quality Management System Standard or International Standard? If yes, please indicate the standard. ISO 9001: 2001, others (please specify)

iv. Is the standard being implemented according to plan? If yes, is it yielding the expected results?

v. What are the plant's quality objectives for the next 3 years?

vi. How important is quality performance documentation in your plans for the achievement of set goals or objectives?

vii. Has the documentation been useful in realizing your objectives?

viii. Do you have a safety and health management system in place?

ix. Does management commit enough resources into health and safety?

x. Do you have any recommendations or additional remarks?

Appendix 4: Documentary Review Checklist

i. Performance reports

ii. Production reports

iii. Quality management manuals

iv. Audit reports

v. Quality policy

Appendix 5: Table for determining sample size from a given population

N	*S*	*N*	*S*	*N*	*S*
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Note.—*N* is population size.
S is sample size.