Determinants of Effective Implementation of Total Quality Management in Thermal Power Plants in Kenya: A Case of Iberafria

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ABSTRACT

In today’s highly competitive market, the demand for quality is the single most critical fact for companies to survive in the ever-expanding global marketplace. Quality is vital in determining the economic success of organizations where they achieve competitive edge and greater market share through extraordinary levels of performance by providing quality products with competitive prices as required by demanding customers. This study therefore sought to fill the existing research gap by establishing the determinants of effective implementation of total quality management in thermal power plants in Kenya as the main purpose of the study. The study reviewed management style, staff motivation, training and technology as the study variables. The target population was the 50 staff members of Iberafria, specifically the senior, middle, lower management and the support staff. The researcher also sought to get information from some subordinate staff because they normally have extra information on what is actually happening on the ground. This study utilized a questionnaire as used in various previous research projects of similar approach. Data collected was both quantitative and qualitative and it was analysed using ANOVA and content analysis techniques respectively. The collected data was then coded to enable the responses to be grouped into categories. Content analysis was used to
analyse the respondents’ qualitative views and included percentages and frequencies. Statistical Package for Social Sciences (SPSS version 20) was employed aided by Microsoft Excel to generate tables, pie charts and graphs appropriately to present the data collected for ease of understanding and analysis. The study concludes that the most significant factor is management followed by staff motivation. The study also recommends that in order to be able to deliver the desired quality, top management should provide the necessary input to the people that are directly involved in producing products and providing services.

**Keywords:** Customer satisfaction, Organization, Quality, Service Quality and Total Quality Management

**INTRODUCTION**

In today’s highly competitive market, the demand for quality is the single most critical fact for companies to survive in the ever-expanding global marketplace. Quality is vital in determining the economic success of organizations where they achieve competitive edge and greater market share through extraordinary levels of performance by providing quality products with competitive prices as required by demanding customers. Hulbert and Sprouster (2008) contended that firms have responded by using quality-based strategies, as these are associated with gains in productivity and profitability, and can provide a competitive advantage. The concept of total quality management has been developed as a result of intense global competition. Organizations with international trade and global competition have paid considerable attention to Total Quality Management philosophies, procedures, tools and techniques (Crosby, 2011).

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Quality is a customer’s determination and is certainly not a manufacturer’s determination. The modern view of quality is that products should totally satisfy the customer’s needs and expectations on a continuous basis. This new concept of quality calls for: (i) well designed products with functional perfection – right the first time (ii) prompt satisfaction of customer’s expectations, (iii) excellence in service and (iv) absolute empathy with customers (Zairi, 2008).
Total Quality management therefore is a management system for customer focused organizations that involve all employees in continual improvement of all aspects of the organization. Organizations that adopt total quality management benefit through improved quality, employee participation, teamwork, working relationships, customer satisfaction, employee satisfaction, productivity, communication, profitability and market share. Smith (2007) found that the links between total quality management and organizational strategy are well established. As a result, Harber & Aosa, (2002) maintained that total quality management has moved beyond being an important operational-level element, to being a vital strategy for all organizational aspects and disciplines. As such, the fundamental performance of a firm can be enhanced through lowering production costs and providing exceptional customer satisfaction Pride (Kapoor, 2010).

Statement of the Problem

Sessional Paper No.4 of 2004 and the Energy Act No.12 of 2006 show that energy sector is a major contributor to the GDP in Kenya (ROK, 2012). The institutional arrangement in the electricity sub sector in Kenya comprises - the Ministry of Energy (MOE), Energy Regulatory Commission (ERC), Kenya Generating Company (KenGen), Kenyan Power and Lighting Company (KPLC), the Rural Electrification Authority (REA), Kenya Electricity Transmission Company (KETRACO), Geothermal Development Company (GDC) and Independent Power Producers (IPPs). Independent Power Producers (IPPs) inlcude IberAfrica, Tsavo, Mumias Sugar Company and the OrPower who contribute approximately 30% of electricity to the national grid (World Bank, 2011)

IberAfrica is the major Independent Power Producers in Kenya which contributes to 10% of the electricity to the national grid (MOE, 2012). IberAfrica was awarded the best Independent Power Producers by Electricity Regulatory Commission in the year 2011 (ERC, 2012). In performance, IberAfrica has decreased from 20 billion in 2011 to 15 billion in 2012 (ERC, 2012). One of the key issues that hindered the growth of IberAfrica is the poor implementation of total quality management. Statistics available from World Bank (WB) shows that successful implementation rate should be at least 60%. IberAfrica has achieved TQM implementation at 40 % according to annual report of the IberAfrica (ERC, 2012). Although IberAfrica has embraced TQM, its profitability has declined in recent years resulting from not meeting the set ERC standards like poor management styles, lack of training and use of out-dated technologies (ERC, 2012). The question that begs is what determines effective implementation of total quality management in thermal power plants in Kenya with reference to IberAfrica. The study therefore sought to explore the determinants of effective implementation of total quality management in thermal power industry in Kenya with specific reference to IberAfrica Ltd.
Study Objectives

The general objective of the study was to explore the determinants of effective implementation of total quality management in thermal power plants in Kenya with reference to Iberafrika. Specifically, the seeks to:

i. Find out how management style influences effective implementation of total quality management at Iberafrika Ltd.
ii. Establish how staff motivation influences effective implementation of total quality management at Iberafrika Ltd.
iii. Examine the effect of training on effective implementation of total quality management at Iberafrika Ltd.
iv. Determine the effect of technology on effective implementation of total quality management at Iberafrika Ltd.

Theory D

There are two generally accepted behavioural approaches to quality management. First, Deming's (1982) Theory D offers 14 managerial prescriptions and proscriptions describing general ways that managers should act and what they should do to improve individual and team performance, job organization, and managing external groups.

Second, the less popular organizational behavior modification (O.B.Mod.) approach (Luthans and Kreitner, 1985) is a behavioral approach to performance improvement grounded in the work of Skinner (1938, 1966). While both approaches share the same end, the difference between them is their level of specificity (Dickinson, 2009).

Theory D is more of an organization-wide approach to cultural changes, while O.B.Mod. focuses on altering simple behaviours of individuals within organizations. Recently, there have been efforts to merge the two approaches by extending the O.B.Mod. approach with social learning theory (Luthans & Thompson, 2009). This adds the recognition of cognitive processes to the operant processes of O.B.Mod. When this is done, there are no major differences between the two approaches. However, a criticism has been that neither approach is sufficiently specific for managers to operationalize (Luthans and Thompson, 2009). Forker and Mendez (2001) note that the collapse of many quality management programs hinged on breakdowns in execution.

Deming (1982) has promulgated a philosophy of management which includes SPC as a central component. While SPC is the sine qua non of Deming's approach to quality control and productivity, his philosophy goes beyond SPC to suggest what managements must do to successfully implement his program. What managements must do is outlined in his 14 points. The 14 points have been called Deming's Theory D (Gruska, 2004).
Although some of his points may seem contradictory in view of common sense ideas of motivation and reinforcement principles, his "theory" has effectively captured the attention of several large U.S. manufacturers (Ford and General Motors) concerned with improving productivity and product quality (Kuzela, 1984). Deming's (1982) Theory D is worthy of attention for several reasons. First, it provides a means to address the questions which arise in OBM concerning the relationship among peoples' behaviours, productivity, and product quality. Second, it includes prescriptions which call for training people and OBM includes well developed technologies of teaching and training. Third, some of its prescriptions and proscriptions appear contrary to some OBM methods and reinforcement principles,(Redmon,2008).

Total Quality Management (TQM) theory

Most organizational management theories descend either from Frederick Taylor's scientific management theory or from Elton Mayo's human relations model. Total Quality Management (TQM) theory grew out of existing organizational management theories, in part, as a response to the problems in those theories. Edwards Deming and Joseph Juran are most responsible for the development of TQM. Deming and Juran began work on TQM in the 1930s and continued shaping the management model into the 2011s.

During the 1930s, Deming and Juran studied with Walter Shewhart who developed Statistical Quality Control (SQC) theory. SQC argued that “as quality improves, costs go down and productivity increases.” SQC provided for continuous improvement of quality and productivity by using statistics to identify areas for improvement. As a theory of organizational effectiveness, Total Quality Management (TQM) theory hold that “performance is enhanced by designing products and services to meet or exceed customer expectation by empowering workers to find and eliminate all factors that undermine product or service.” TQM promotes organizational effectiveness through 1) promoting stakeholder satisfaction; 2) pursuing continuous improvement; and 3) fostering proactive leadership.

This essay will introduce these principles and assess the relevance of TQM as a theory of organizational effectiveness for the School of Information Systems Admissions Office (IS Admissions), an organization committed to excellence. TQM theory holds that “quality can only be defined by those who receive the product or service, including stakeholders.” Accordingly, public managers should engage their staff in identifying the organization’s internal and external stakeholders and by determining the criteria that each uses to judge the organization to be successful.
Social Learning Theory

According to DeSario et. al. (1994), training “refers to learning experiences designed to enhance the short-term and/or long-term job performance of individual employees”. In this respect, training is viewed as part of an on-going developmental process. Training needs to be linked with the organizational mission (Burke, 1995; Bartlett, 2001; Barrett and O’Connell, 2001). When organizations plan their training activities, they need to provide the link with the organizational mission, budget and implementation. Some authors suggest considering training as investment decisions (Eurich, 1985), and they should be made after careful consideration. It is usually advised that training activities should be examined from the perspective of their ability to influence individual job performance, rather than isolated experiences that may or may not contribute to the organization’s success. Accordingly, organizational analyses focus on the organization’s ability to support training. Task analyses focus on the knowledge, skills, abilities, and other personal characteristics required to perform the agency’s task.

Research on learning process continues, and it is impossible to give an integrated summary of them. Therefore, some authors gave them a common name of "Current Learning Theories School" (This & Lippitt, 1966, Hilgard & Bower, 1975). Most of the more recent research on learning is carried out in such a manner that they transcend the boundary of one particular discipline. Some of the learning theories, especially the Social Learning Theory of Bandura and Double Loop Learning of Argyris, have been found to have great relevance in the context of training and development. Bandura's social learning theory got the widest acceptance because of its complete but parsimonious interpretation of social learning (Davis & Luthans, 1980; Manz & Sims, 1981). Bandura’s theory explains human behavior in terms of a continuous reciprocal interaction between cognitive, behavioral, and environmental determinants. Learning takes place both as a result of experienced responses (i.e, operant view of learning) and vicariously through observing the effects on the social environment of other people's behavior. In explaining his theory of modeling, Bandura (1969, 1976, 1977) considers four distinct components or sub-processes: attention, retention, motor reproduction, and motivational processes. These processes explain the acquisition and maintenance of observational learning or modeling (Davis & Luthans, 1980).

Social learning theory plays an important role in training and development. First, the manager, by becoming a role model for his/her coworkers, can improve their behavior. In fact employees are more likely to imitate their superiors than their peers because of their status, experience and reward power. Second, modeling has a considerable role to play in implementing a self-managed approach through self-observation and self-monitoring (Davis & Luthans, 1980). Third, for improving the effectiveness of training, a vicarious or modeling principle has been proposed to be used in four stages, namely, 1) presentation of models displaying the desired behaviors, 2) imitation or rehearsal by the observer of the modeling behaviors; 3) social reinforcement or
favorable recognition for adoption of the modeled behaviors by the observer; and 4) transfer of training to encourage the use of learned behaviors back on the job (Goldstein & Sorcher, 1974; Manz & Sims, 1981).

Argyris (1976) proposes double loop learning theory, which pertains to learning to change underlying values and assumptions. The focus of the theory is on solving problems that are complex and ill-structured and which change as problem-solving advances. In single loop learning members of an organization respond to environmental changes by detecting and correcting errors which permit the organization's underlying norms, policies and objectives (Argyris, 1978). In recent years Argyris has focused on a methodology for implementing action theory on a broad scale called "action science" and the role of learning at the organizational level (Argyris, 1993). The double-loop learning theory of Argyris is especially relevant to management education and training. Individuals must learn to discriminate the difference between their perceptions and reality (espoused Vs theory-in-use). Such learning primarily takes place through social interactions.

Because of the importance in human interaction in management, social learning theory (particularly modeling and role-playing) provides general framework for many aspects of management education. Coaching and monitoring are commonly used management development techniques that attempt to harness social learning in the work place (Rossett, 1990).

Technology Diffusion Theory

Rogers' Diffusion of Innovation Theory tries to explain how adoption was made to new ideas as well as to innovations by suggesting in the theory, five innovation attributes through which adoption is effected, which are: “observability, compatibility, trial ability, relative advantage and complexity” (Rogers, 1995). An attribute is said to have a relative advantage when the new innovations is seen to be better than the previous idea that it is replacing. Rogers' theory emphasizes that it is easier to implement innovations that show an improved advantage over that which was there before, making it easier to adopt. Greenhalgh et al, 2004) adds that users would not adopt innovations that they did not see any relative advantage in them. The ability of an innovation to be easily adopted is that it has to be compatible with a previous idea, meet their experience in the past and fulfill existing values, meaning that there is a higher chance for an innovation to be adopted if it is more compatible (Rogers,1995). An innovation that is seen to be difficulty to use as well as to understand is said to be complex. New innovations are categorized from the simple to complex ones which define the relevance users find in them, where the ones seen as simple to operate are easily adopted (Greenhalgh et al, 2004).The ability to experiment with an innovation in least time is called trial ability, and if the user is able to test the item before full implementation saves them resources, energy and precious time and hence becomes easily adopted. The visibility of the innovation’s results as seen by adopters is called observability,
where the innovation becomes more adoptable if the outcomes are positive. The above theory instigates the fourth research question: What is the effect of technology on effective implementation of total quality management at Iberafrica ltd?

**Empirical review**

**Management**

The role of top management is critical for quality success. Ashton, (2008), reported that 95 per cent of the CEOs of the top 500 European corporations considered top management attention as the key requirement for success in TQM. Lascelles, (2011) also reported that CEOs are the primary internal change agents for quality improvement, as they are those who shape organisational values and establish managerial structure and actually bring about change. Top management commitment will lead employees at all levels to invest time and effort in the change programme, if that programme has the full and credible support of top management, (Cole, 2011). Krantz & Deming (2006) argues that management is responsible for more than 90 per cent of quality problems. In order to be able to deliver the desired quality, top management should provide the necessary input to the people that are directly involved in producing products and providing services. This input includes the necessary resources, a fitting culture and structure, a fair reward system and the necessary skills that can be acquired through training. Managers are consequently responsible for most problems. They should therefore alter their input in order to prevent defects and facilitate improvement, (McKinsey, 2006).

The role of top management is critical to the success of any TQM initiative. Several studies have stated that since techniques such as successful continuous quality improvement (CQI) implementation may require a sustained effort over several years. Organizational members depend on the leadership of the CEO and senior management to understand and interpret the relevant environmental pressures, and to position CQI within the overall company-wide strategy (Satia 2009).

**Staff Motivation**

An organization should utilize the creative powers and mental abilities of all stakeholders and employees and they all should be involved in the quality process. Organizations can produce total outcomes beyond what is the expected level, due to the synergistic power which comes out of the involvement of all stakeholders. Everyone's involvement in TQM is important for quality improvement and motivation of employees, (Yatkın & Ozden 2002).
No quality program can succeed without the active involvement of all the employees concerned. Several studies have highlighted what exactly constitutes employee involvement in the quality initiative. Lord and Lawrence (2001) explained how employee involvement is reflected in organizations: where operators are responsible for detecting, recording and solving their own problems, usually in small groups. Bradley et al. (2003) identified factors related to management involvement in quality improvement efforts, such as, personal engagement of senior managers, management's relationship with functional level staff, to name a few. Therefore, employee involvement in the quality initiative is critical to the success of the TQM program. Quality can't be delegated. It must be assumed and lived by everyone on the payroll (Harari, 2011).

**Training**

Scholars have long realized that in order for employers to get desired contributions from their employees, they must provide appropriate inducements (Schein, 1965). Satisfied and well-adjusted employees, work willingly towards organisational objectives and respond flexibly to organisational problems (Ostroff, 1992). However it has never been easy for employers to know what employees expect and which kinds of inducements will influence employees to make desired contributions consistently.

Training and capacity building is crucial in any successful organization. It plays a key role in improving the performance of the Service to realize goals and objectives. Over the years, the training function has undergone various phases. Organizations normally design specific in-house training programmes as a method of drawing training interventions which address identified training needs. In addition, training is provided under institutional training both locally and abroad. Induction and orientation training is expected to help an employee familiarize with the work environment and requirements (Little & Dean, 2006). A study carried by Frye (2000) on training for all, found that agencies are aware of how expensive training is, and they’re aware it’s ongoing. But when the budget gets tight, training is probably the first to go. He also found another barrier to training is that some agencies have considerable turnover. They aren’t eager to spend their scarce resources training employees who may later leave (Frye, 2000).

**Technology**

Technology is popularly known to help enrich jobs and increasing job satisfaction. For example, the introduction of IT involves cross training of all employees in all aspects of work including the running of technical infrastructure, which eliminates paper-based task assignments and free employees from routine activities. Consequently, employees with higher skills and knowledge of the work find greater job satisfaction and henceforth enhancing the quality of work. Also, this process will break the departmental silos and result in internal integration – one of the main themes of TQM, (Porter, 2003).
Sum and Teo,(2008) observed heavy usage of IT in the most profitable logistics services providers and identify the importance of technology as a key impact agent for the future. They further classify IT into high-cost and revolutionary technology, medium-cost, medium revolutionary technology and low-cost, incremental technology. High-cost and revolutionary technology includes robotics, automated material handling equipments and automated storage and retrieval equipments. Medium-cost medium revolutionary technology includes data handling hardware (barcodes, optical scanners, local area network and hand-held data entry devices) and software such as EDI, direct product profitability, material resource planning and distribution resource planning. Low-cost, incremental technology includes software applied to inventory control (in process, raw materials, finished goods) and warehousing (order selection, short-interval scheduling) (Germain,2012).

METHODOLOGY

The researcher regards it as the only way to gather information on problems, opinions and views of respondents. This method appropriately enabled the researcher to tentatively analyse study objectives. It also enabled increase of the validity and reliability of the result. In the attempt to determine the effective implementation of total quality management in thermal power plants in Kenya, the study employed a descriptive research design, which is more suitable.

target population represents the purpose of the study or determinants of effective implementation of total quality management in question. In addition, the population is the universe upon which the results of the study will be interpreted. In this study the target population was the staff of Iberafirca Ltd.

This study used both primary and secondary data, which were qualitative and quantitative in nature. The primary data was the data that was originally collected by the researcher for the first time while in the case of secondary data the nature of the already existing data or information.

The following model was used to analyze the determinants of effective implementation of total quality management in thermal power plants in Kenya with reference to Iberafirca.

\[
Y = \alpha + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \epsilon
\]

Y = Dependent variable used for Effective implementation of total quality management

\(\alpha\) = Constant (The intercept of the model)

\(\beta\) = Coefficient of the \(X\) variables (independent variables)

\(X_1\) = management styles
X_2 = staff motivation
X_3 = training
X_4 = technology
\( \varepsilon \) = Error term

**Conclusions**

The study concludes that vision, mission, innovation, team work, quality training and competitive advantage were necessary for TQM implementation.

The study also concludes that implementation improved institution’s competitiveness both locally and regionally and implementation has improved local and international approval of institution’s processes and that implementation improved customer’s confidence on services.

Finally, the study concludes that the top management didn’t support implementation of TQM and that bulky documentation replaced people involvement in implementation.

**Recommendations**

The study also recommends that in order to be able to deliver the desired quality, top management should provide the necessary input to the people that are directly involved in producing products and providing services. This input includes the necessary resources, a fitting culture and structure, a fair reward system and the necessary skills that can be acquired through training. Managers are consequently responsible for most problems. They should therefore alter their input in order to prevent defects and facilitate improvement.

The study also for organizations to realize their objectives, to be strong and effective, they should give importance to teamwork depending on harmony and cooperation among workers. Training is an important component of TQM. As the quality leaders, training administrators are responsible for coaching their staff. They should act as a coach and teacher and provide their staff with necessary training and resources to carry out their duties as the part of the quality system.
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