A SURVEY OF QUALITY MANAGEMENT PRACTICES IN THE LARGE KENYAN BUILDING CONSTRUCTION FIRMS

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DECLARATION

This project is my original work and has not been submitted for a degree in this or any other university

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DEDICATION

To my late father Sotero Mandere and my mother Rusia Kemunto

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I am indebted to all who contributed in one way or the other to make this research project a reality. Many friends contributed in some way to give a critique here, a suggestion there or some comment that went a long way towards shaping this work. To all of them, I am very grateful

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ABSTRACT

This study sought to determine the extent of quality management practices in the large Kenyan building construction firms and to investigate the challenges that face these firms in their quality management efforts.

The study surveyed the quality management practices being used by the Kenyan building construction firms by collecting primary data via self-administered questionnaires. Data was analyzed using descriptive statistics. The study has found out that the firms use several quality management practices with the traditional practices being the most common, though there are no significant differences in the preference of these practices.

The research established four major challenges facing the building construction firms in their quality management endeavours as resource limitation, inadequacy of designs and contract documents, lack of awareness and knowledge of quality management systems and industry traditions. Those firms that have adopted quality management practices enumerated three major benefits as reduction in costs of quality, client satisfaction and increased profitability. The main conclusion of this study is that most of the Kenyan building construction firms have not adopted modern quality management practices but are still using traditional quality management practices that do not appear to be suitable in this era of cut-throat competition in a liberalized world market.

CHAPTER 1: INTRODUCTION

1.1 Background of the Study

Building construction activity plays a vital role in the process of economic growth and development, both through its products i.e. buildings and through the employment created in the process of construction itself. The development of an efficient building sector through good quality management practices could go a long way towards economic and social development of many countries. However, the focus of research and technical assistance to date has largely been upon the enterprises that comprise the sector; the contractors, subcontractors and consultants.

The building construction industry is an important sector of many economies and contributes significantly to gross domestic product (GDP). The United Nations Environment Programme (UNEP) has noted that, about one-tenth of the global economy is dedicated to constructing and operating homes and offices (UNEP, 1996). The industry generates employment and income for a significant percentage of the population, and covers a wide variety of technologies and practices on different scales.

Quality management concepts have been developed over several decades. They began simply as methods for sorting out defective products from good products through inspection at the end of the production line.

However, from around the Second World War, there has been change of emphasis trying to develop techniques of improving the control of the production processes so that the number of defective products could be reduced, thus emphasizing prevention rather than inspection. With the growing competition in all industries arising from globalization, liberalization, demanding customers, advancements in information and communications technology, it is becoming absolutely important for organizations to have quality management systems and reduce costs of quality if they have to remain competitive and have an edge over competitors.

Some of the methods meant to manage quality during processing include quality assurance, total quality management, etc. Quality management has been defined in many ways. One definition of quality management is "the prevention of quality problems through planned and systematic activities" (Oakland, 1998). In construction, quality has a three-fold meaning according to Hart (1994). It means getting the job done on time, ensuring the final product is within budget and as per specifications.

The aim of quality management is to improve production systems, to prevent defects and eliminate the costs of quality and enhance competitiveness of Organizations. This concept has been used by several companies especially in Japan, the USA and in other parts of the world in various manufacturing and service industries.

The building construction industry being an important industry in most economies should not be left behind in this concept of quality management. The building construction industry is responsible for the provision of shelter, a basic human need and other infrastructure necessary for the development of any economy. These infrastructures include office blocks, hospitals, schools, colleges and universities, among others. All these are executed as projects and involve huge amounts of capital outlay by the Clients; be they individuals, developers, institutions or public bodies. In spite of the importance of construction, it is faced with serious challenges in improving quality of its output. This is more so in the developing countries. Adoption of quality management systems could be a driver and an agent for change of the current quality culture.

Adoption of quality management systems could improve the efficiency and effectiveness in the usage of resources in the construction industry, which may result in the reduction of costs of quality, and hence construction costs.

Reduction in construction costs could make building construction more affordable, leading to improvement of basic infrastructures which will have a positive impact on the living standards of the general population especially in the developing countries such as Kenya.

The volume and composition of construction output in Kenya has seen significant changes since the 1980s. Under the structural adjustment programmes (SAPs), which began in the late 1980s, government development expenditure was heavily curtailed as part of the austerity measures required by the donors (GOK, Economic Survey, 2000). Investment in buildings was particularly affected, as evidenced by the numerous stalled projects that have remained unfinished for more than ten years. The public sector is no longer a major client in the buildings. Repairs and maintenance have also been affected, with very minimal public works tenders awarded for these works.

Private sector clients now dominate in the building construction market. By 1999, the private sector accounted for more that 90 per cent of building construction output (GOK Economic Survey, 2000). Investment in private residential buildings was twice as important, in value terms, as non-residential buildings. Financial sector funding to private construction continued to grow steadily particularly from 1995 to reach an all time high of K£918.15 in 1999.

This growth would have been higher had interest rates not risen sharply as the economy slowed down during the 1990s (GOK, Economic Survey, 2000).

In the recent past there have been reported incidents of buildings collapsing leading to huge losses and uproar from leaders and building professionals about the quality of products of the Kenyan building construction industry. A case in point is the collapse of Sunbeam supermarket building on 13th May, 1996. According to the report of the commission of inquiry to examine the existing building laws, by-laws and regulation (January, 1998), several other buildings in Umoja, Mathare North, Zimmerman, Highridge and the City Centre, among others are unsafe.

1.2 Statement of the Problem

Collapse of buildings as outlined above make one doubt if the building industry firms in Kenya are able to guarantee quality to their Clients. Because of the numerous incidents of reported collapse of the products in the building construction industry even during the maintenance period, it appears doubtful building construction firms in Kenya can provide quality buildings to their Clients.

Somerville (1994) in a survey of construction firms in U.K. concluded that, in view of the industry's uniqueness, reliance on quality assurance will not succeed; rather it will obscure the wider, more fundamental organizational issues which will need to be addressed in order to achieve a holistic quality management. Zantanidis and George (1998) through a survey of construction firms in Greece identified further unique characteristics of the industry, among them the small average firm size and fierce competition resulting in narrow profit margins which hinder majority of firms to invest in research and development.

Wong & Fung (1999) used a case study of a leading construction firm in Hong Kong to examine the strategy, structure and tasks for managing supplier/sub-contractor relationships and the effect on quality management. They established that integrated quality management activities of members in the supply chain is especially salient in quality assurance of construction projects as the general contractor often outsources most of the construction work to other members in the supply chain i.e. its suppliers and sub-contractors.

However, Aosa (1992) advances the view that it is not right to import wholesome the results of a research without taking into account the environmental differences and hence the need to carry out local research in order to understand better the problem. Some researches which have been done in Kenya e.g. by Omufira (2001) and Gitonga (2005) have focused on specific aspects of quality management practices viz; total quality management (TQM) and benchmarking. Kimilu (2005) sought to investigate and document materials management practices in the Kenyan Building industry and found out that there is some level of usage of materials management practices.

Omufira (2001) sought to find the extent of total quality management (TQM) implementation in the construction industry in Kenya and found out that very few firms were practicing it. Gitonga (2005) explored the extent to which benchmarking has been used as a tool for continuous improvement in the construction industry in Kenya and found out that both old and young construction firms have not appreciated this concept.

This study set out to find the quality management practices of general application in the Kenyan building construction firms. The study thus tried to answer the questions: (i) Do Kenyan construction companies employ quality management practices? ii) if so what practices do they employ? and (iii) what challenges do the Kenyan building construction firms face in their quality management endeavours?

1.3 Objectives of the Study

The objectives of the study were:

i) To determine the extent of quality management practices in the large Kenyan building construction firms

ii) To investigate the challenges facing the large Kenyan building construction firms in their quality management efforts

1.4 Importance of the Study

For professionals in the building construction industry, the study has provided insights into quality management by highlighting how their outputs in the supply chain management of the construction process affects the quality of the final product.

The Contractors will understand how the inputs of consultants and suppliers will affect the quality of their products and services. Thus they can put in place systems to integrate these participants in their quality management endeavours.

Academicians will also find this study of interest, as it will show the practical extent to which the theories of quality management have been practically applied in real practice in the building construction industry in Kenya.

The findings of this study will add new knowledge about the local building construction industry that will serve as a base for further research on quality control and management in the construction industry in the country.

CHAPTER 2: LITERATURE REVIEW

2.1 A Conceptual Framework of Quality Management

2.1.1 Quality

Quality is often used to signify "excellence" of a product or service (Oakland, 1998). In some engineering companies the word may be used to indicate that a piece of metal conforms to certain physical dimension characteristics. In a hospital it might be used to indicate some sort of "professionalism". It is thus difficult to find one universal definition for quality. However, Oakland (1998) defines it as simply meeting the customer requirements. Other authors have defined it as "fitness for purpose or use" (Juran, 1989), the totality of features or characteristics of a product or service that bear on its ability to satisfy stated or implied needs or conformance to requirements (Crosby, 1979)

Quality has also been defined as meeting or exceeding the needs and expectations of the customer. Thus, the goal of any business should be to find out what the customer wants and then fine tune the process to ensure that they get it.

Quality has to be managed and it will not just happen. Clearly, it must involve everyone in the process and be applied throughout an Organisation.

2.1.2 Quality Management and its Historical Evolution

Quality management is the creation and maintenance of a quality system.

Quality management practices have evolved over time starting with inspection which according to Oakland (1998) was the detection of defective products at the end of the production line and sorting them from the good products.

In quality management the focus is on prevention rather than detection. This concentrates all the attention on the front end of the process – the inputs and changes the

emphasis to making sure the inputs are capable of meeting the requirements of the process.

After inspections, quality was managed through quality control which is essentially the activities and techniques employed to achieve and maintain the quality of a product, process or service (Oakland, 1998). It includes a monitoring activity and is also concerned with finding and eliminating causes of quality problems so that requirements of the customer are met. Quality control includes new design control, incoming materials control and product control (Panneerselvam, 2001).

New design control involves selling quality products, engineering quality products and planning quality products.

Incoming materials control involves the tasks of buying quality materials, receiving and inspecting quality materials and manufacturing quality products.

Product control involves the activities of testing quality products, shipping quality products and installing and servicing quality products.

After quality control, quality is managed through quality assurance which is broadly the prevention of quality problems through planned and systematic activities, including documentation (Oakland, 1988). These will include the establishment of a good quality management system and the assessment of its adequacy, the audit of the operation system and review of the system itself (Oakland, 1988).

Quality assurance is mainly realized through third party certification such as ISO standardization. ISO stands for International Organization for Standardization, which is an international body that consists of representatives from more than 90 countries (Panneerselvam, 2001). The national standards bodies of these countries are members of this organization. These are non-governmental organizations which exist to provide common standards on international trade of goods and services.

Total quality management (TQM) is a recent philosophy of quality management that is wider in its application than assuring quality of a product or service. It is a way of managing business processes to ensure complete "customer" satisfaction at every stage internally or externally (Oakland, 1998). The core concepts of TQM include continuous process improvement, customer focus, defect prevention and universal responsibility.

Continuous process improvement means that the process improvement takes place in incremental steps. It never stops-meaning that however good things may be, they can always be better.

Customer focus takes care of both the internal and external ones. Every one has a customer, internal customers being those who use what another group provides while external customer refers to the person who purchases the product or service. Thus every work group has to think about providing value to the people who use their product. It involves finding out exactly what the user needs and ensuring that it is provided. Determining customer needs accurately is an important aspect in quality management. It is less costly to rectify a mistake in defining customer requirements before a product is produced than it is afterwards.

Defect prevention is the process of removing or controlling error/defect causes in the system (Oakland, 1998). This is as opposed to relying on inspection to sort out defects after they occur. Some of the methods used in defects prevention included statistical process control, Taguchi method, problem solving and systems failure analysis.

Universal responsibility deals with the fact that quality is not only the responsibility of the inspection department but is everyone's responsibility. Quality is pervasive and every work group in the business should be concerned with seeking ways to improve the quality of their own product or service.

2.2 Quality Management and the Construction Industry

Quality Management in construction activity relates to proper architectural and/or engineering design, use of good materials and components supplied by various producers, contractors and sub-contractors, proper workmanship in the execution of works by the contractor/sub-contractor, and ultimately proper care during the use of the building including timely maintenance and repair by the owner (Omufira, 2001). According to Sommerville (1994), a building must satisfy all limit states of serviceability and collapse. The quality of a building should result in satisfactory strength, serviceability and long term durability so as to lower the overall life-cycle cost otherwise known as costs in use. With globalization and the rapid development of technology, international competition is fierce and the quality of both products and services has become a matter of survival. This is the reason that has led to the systematic and rapid development, implementation and spreading of modern flexible quality systems. These systems have already offered a great deal of support to the competence and profitability of the firms that have managed to apply them successfully (Zatanidis and Tsiotras, 1998). According to Shammar et al (1998), a considerable effort has been expended in the implementation of quality assurance systems in the construction industry.

Omufira (2001) is of the view that the construction industry is a business sector that plays a substantial role in the country's economy and this role is even more important in countries whose infrastructures have serious problems. In such cases, the construction industry can offer substantial support to both the rational and systematic development of various business sectors and the basis economic measures of national economies. To succeed in this task, the management of construction firms need to work very hard and take into consideration criteria like quality, cost and time (Tyier and Frost, 1993).

Most infrastructures such as transportation, energy production, telecommunications, etc in Kenya and in many developing countries are funded by International organizations or bilateral partners. In order for the construction industry to use these funds in the most effective way, it has to employ in its operations methods for quality control, otherwise financiers may withhold further funding.

2.2.1 Quality Control in the Construction Industry

Dan Tindiwesi (1997) notes that, if quality control in construction is to be achieved, there has to be: participants in the process fully understanding their own processes, project process must be understood and each participant must know his own inputs and outputs, and the requirement of each participant must be understood and clearly communicated in good time to participants who must then meet them.

He adds that the success of any construction project can be evaluated by the degree to which it meets the Client's requirement. Achieving this requires not only enough financial and human resources but also successful cooperation of the concerned parties. Quality is concerned with totality of attributes of a building, which enable it to satisfy a Client's needs.

2.2.2 Main aspects of Quality in the building construction industry

Hart (1994) outlines the main aspects of quality in the construction environment as: external attributes- effects of the building on the surroundings and vice versa, e.g. appearances, compatibility and safety; performance attributes- aspects of the building that make it operationally efficient and provides reasonable conditions for users, such as space layout and size, safety, adaptability and maintenance; aesthetics and amenity include the external appearance of the building and landscaping as well as internal standards of comfort, convenience and attractiveness.

Chan (1996) decries the decline of quality in the construction industry. This, he argues is manifested in the high incidences of contractual claims and disputes. He cites the change in the number of interested parties as one of the contributing factors. Where previously there were effectively three parties; client, consultants and contractor with clearly established relationships and responsibilities, that number has more than doubled with the inclusion of project managers, suppliers, sub-contractors and other specialist consultants with relations and responsibilities poorly defined. These added relationships make the consultants' traditional responsibility of ensuring quality compliance more difficult to achieve. Naylor (1995) observes that, in many circumstances and industries the design process is seen as quite separate from production. He cites the construction process as a

good example of this because the design is frequently left as a separate contract from production. He observes that since the cost of design is usually a small portion of the total project cost, its significance is often ignored.

Quality Assurance thus becomes a part of the overall marketing strategy of the contractor's organization. According to Love et al (2000), it is fast becoming, essential for any responsible or reputable construction firm to design and implement its own Quality Assurance program in order to remain profitable and maintain a good reputation. Contractors who have a quality assurance system, and strongly promote it can increase their potential for attracting clients (Omufira, 2001). In order to successfully implement a quality assurance programme there must be a total commitment by top management to improve company performance, and this includes both establishing a company structure and operating procedures, which fit the company objectives (Berry et al, 1994).

A quality assurance system will not solve all problems on a construction site. It does however, ensure that, if conducted properly, the chances of committing mistakes/errors are greatly reduced (Tindiwesi, 1997). Similarly as a consequence of the additional documentation and planning, potential problems have a better chance of being recognized prior to their occurrence.

Quality Assurance systems should commence at the brief and design stages of a project, and continue throughout the construction stage until completion. Quality Assurance will only work effectively if all parties involved viz: client, designer, contract administrator, contractor, subcontractors and suppliers, are convinced that Quality Assurance is good for their business.

Omufira (2001) however, found out that the definition of Quality especially among consultants in Kenya was varied, implying that it may be difficult to agree on what quality is in the construction process and hence the difficult of appropriate Quality management systems. She also found out that only a small percentage of firms are ISO certified.

2.3 Structure of the Construction Industry

Seeley (1991) subdivides the construction industry into two major areas of activity: Building, Civil engineering works. He describes the industry as embracing a wide range of loosely integrated organizations that collectively construct, alter, and repair a wide range of building and civil engineering structures. He reiterates the uniqueness of the industry, which stems mainly from the physical nature of the construction project and its demand. All projects differ and site characteristics vary extensively, hence each project has unique challenges.

The building construction industry sector comprises a multitude of occupations, professionals and organizations (Nedo, 1978). The owner perceives a need to invest in a construction project, employs consultants such as architects, engineers, quantity surveyors, landscape architects, interior designers, etc to design the building. A general or main contractor will employ its own sub-contractors (domestic) and others nominated by the client. Suppliers will supply the required materials either to general contractor or to the sub-contractors.

According to Wong and Fung (1999) the general contractor, the architect and the other consultants, profit is their goal while the owner has the goal of minimum costs. Goals tend to conflict as different parties have different priorities. Service providers always need speedy completion, which may result in poor workmanship. During construction, the general contractor needs to ensure quality throughout the project. However, according to Rowlinson and Walker (1995), the construction industry is characterized by non-standardization. Often products are one-offs and the production processes and project processes are normally different from each other. As a result of this, it is difficult to have universal standards and specifications that can be applied to construction products. This makes it difficult for quality management.

Changes to the design of a project are often common during the construction process (Wong and Fung, 1999). There are various reasons for these changes which could range from the lack of buildability of the design, changes of the clients' requirements, variations by the designer's change of mind, or variations due to the contractor's need to

reduce cost and construction period. Wong and Fung (1999) conclude that where there are frequent changes, quality is often at risk.

2.4 Unique Features of the Construction Industry

According to Somerville (1994), the construction industry includes professions and activities, which contribute towards the production of the build environment e.g. architects, surveyors, contracting organizations, component manufacturers, and materials suppliers. Longford and Male (1991) say that the industry is "amorphous and diverse". This complexity ensures that various influences are able to affect the performance of organizations within the industry. Other unique characteristics of the industry as per Somerville (1994) include: the product is produced on a wide variety of locations; the product includes many component parts supplied by others who may either be factory based or mobile; no two projects are the same, the climatic conditions under which the operatives operate are constantly fluctuating; the organizations which make up the industry are predominantly small firms, the workforce is perceived as being the poor in terms of education, training and development and also in terms of financial stability and security.

Somerville (1994) through a survey study of some construction companies concludes that in view of the industry's uniqueness, reliance on quality assurance will not succeed; rather it will obscure the wider, more fundamental organizational issues, which will need to be addressed in order to achieve a holistic quality management.

Hart (1994) addressed the unique characteristics of the construction industry by comparing the industry with the manufacturing process. The production process in construction ceases to exist after the project has been completed. At this point, product of the construction project is actually a finished facility, building or other products. Any improvement in that process is theoretically not possible, although data gathered may be used to improve any future relevant processes.

Zantanidis and George (1998) through a Survey of construction firms in Greece identified the other unique characteristics of the industry as: products of the industry tend to be

unique because they are single, custom-made and not easily substantiable goods, built to specifications provided by the customer. They are produced on the location of consumption meaning they have territorial immobility. They have long life-time or temporal immobility. Even as they decay, construction products can still be repaired.

Technological and Organizational characteristics; concentration of production at one location is impossible as machinery and equipment have to be moved regularly. The use of traditional rationalization methods (standardization, series production and division of labour) as well as application of specialized machinery and advanced technology is limited mainly due to the uniqueness and immovability of the products. Labour intensity is high and capital intensity is low. The low degree of capital intensity implies limited specialization of firms with regard to the types of products. The small average firm size and fierce competition, resulting in narrow profit margins, do not allow majority of firms to invest in research and development activities. Firms often form temporary joint ventures for bidding and executing large projects.

On product market, the relation between a construction firm and its customers is one of executor and instructor. Typical of the industry is the separation of product design and construction. A construction firm has to sell something which has yet to be built, often under conditions which are partly beyond his control, e.g. weather, the situation of the construction site, etc. Competition is based more on price and less on quality and time span of delivery. Fierce competition has induced entrepreneurs to occasionally use cheaper and lower quality building materials or to adulterate their products in other ways.

Construction products tend to be very expensive goods and therefore it is rare that they are paid for in cash. They have to be financed.

Labour is an important cost factor in this industry. This factor encourages the use of 'black' labour and labour sub-contracting. There is a high labour mobility due to on-site production, low capital intensity and high entrepreneurial risk.

2.5 Quality Management and the Supply Chain

The quality management measures are both technical and organizational. The job of quality control and quality assurance would involve quality audit of both the inputs as well as the outputs. Inputs are in the form of materials e.g. concrete and steel, workmanship in all stages of batching, mixing, transportation, placing, compaction, and curing; and related plant, machinery, and equipment; resulting in the output in the form of concrete in place (Tyier and Frost, 1993).

According to Ganesan et al (1996), each party involved in the realization of a project must establish and implement a quality management plan. Each supplier's and sub-contractor's activities must be included in the plan. It is absolutely essential that all documentation related to the entire project must be readily available upon request by any interested party. Such documentation must include all architectural, structural, civil, electrical, mechanical, and sanitary drawings; test reports and manufacturer's certificates regarding all materials and equipment; records of site inspection of workmanship and various field tests; tasks and responsibilities of all persons involved; non-conformance reports and change orders; acceptance criteria and data; quality control charts; and statistical analysis .

Further, it is necessary that a detailed inspection procedure must be set up covering materials, records, workmanship and construction.

2.6 Relevance of Quality Management in Construction

Chan (1996) defines quality assurance as all those planned and systematic actions necessary to provide confidence that products and services will satisfy given requirements. The Royal Institution of British Architects (RIBA) defines quality assurance as a management process needed to provide high probability that the objective of the product will be achieved. The Construction Industry Research and Information Association (CIRIA) defines quality assurance as a systematic way of ensuring that organized activities happen in the way they are planned.

In essence, quality is the responsibility of every member of the project team. Each activity should be properly identified, where it interfaces with other activities, and their cooperation and integration are important.

Wong & Fung (1999) used a case study of a leading construction company in Hong Kong to examine the strategy, structure and tasks for managing supplier/sub-contractor relationships. They established that integrated quality management activities of members in the supply chain is especially salient in the Quality Assurance of construction work to other members in the supply chain i.e. its suppliers and sub-contractors.

The Client, the Consultants, the general contractor and its sub-contractors and suppliers together form a supply chain as the network of organizations that are involved through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services in the hands of the ultimate consumer. In constructing a project, the responsibility of meeting the needs of the Client falls on the general contractor who has to depend on its sub-contractors and suppliers to carry out the major construction work. Communication with different parties and operating as a team among different parties are essential to provide best performance. Supply chain management adopts a system and integrative approach in managing the operations and relationships among the different parties in the supply chain. According to Berry et al (1994), supply chain management is aimed at building trust, exchanging information on market needs, developing new products and reducing the supplier base so as to release management resources for developing meaningful long term relationships. When applied to construction industry, supply chain management would focus on how a General Contractor can better manage and leverage resources of its Sub-contractors and suppliers through working closely and co-operatively with them.

2.7 Sub-Contracting and Quality Management

In the construction industry Sub-contracting is a widespread practice (Nedo, 1978). According to O'Brien and Zilly (1991), the general contractor in today's construction world has a very difficult and important function: to execute satisfactorily all accepted contracts. The Contractor must turn the Client's idea into a reality. These ideas are

usually in the form of drawings and specifications developed by third party consultants, architects, and engineers. According to Wong & Fung (1999) there are several reasons for the general contractor to use Sub-contractors, among which are the following: a sub-contractor possesses specialized technical, engineering or construction skills; the general contractor's in-house abilities are limited in a particular area; a sub-contractor can augment the general contractor's labour force at a lower cost by relieving the general contractor of developing and maintaining an in-house capability. The use of Sub-contractors helps the main contractor to reduce his commitment to long-term resources such as owned plant or permanent wage workers in certain specialized areas.

2.8 Issues with the Sub-contracting System

In general, Sub-contractors are smaller in size and financially weaker that the General Contractors. Works carried out on construction sites are labour intensive and control of the workers is difficult. It is often difficult to hold Subcontractors responsible for problems of quality. Policy and procedures in small firms are not normally well established and provide little or no guarantee of quality (Ganesan et al, 1996). Therefore the General Contractor should oversee the performance of its Sub-contractors to ensure that they are in compliance with the owner's requirements.

2.9 Client and Quality Management

According to Wong & Fung (1999), the Hong Kong Housing Authority, a Client, took a lead in promoting Quality Assurance in 1991 by requiring that all its Contractors, concrete Suppliers and nominated Sub-contractors, attain the ISO 9000 series quality standards, as accredited by the Hong Kong Quality Assurance Agency.

Miquel & Dins (1999) say that, construction companies in Portugal are seeking certification of their quality systems based on ISO 9000 Standards. Certification originates either in the Clients' demands or in the Companies expectations regarding better management and marketing advantages. They carried out a survey of Portuguese builders and Contractors and established that there was no tangible evidence that certification improves the companies' performance. They also found out that most

Clients in Portugal were not demanding third party certification, but there are signs that this may change in the very near future.

Jefferies et al. (1998) state that, with the increasing members of overseas investors, it is just a matter of time before clients in Seychelles ask for total quality in construction in terms of value for money. McGeorge and Palmer (1997) state that, Clients having the power of the cheque can get what they want or they will not pay for it.

2.10 Quality Assurance in Construction Industry

According to Tyier and Frost (1993) quality assurance has only been taken seriously only in the recent past in the United Kingdom. Even then it is practiced only by the large construction companies.

Quality assurance in the shape of British Standard (BS) 5750 was one of the initiatives of the early 1980's to improve construction performance (Shammar, M. et al, 1998). Pressure was exerted by Clients on construction firms to adopt quality assurance as means of better coordinating the delivery chain. By closely documenting procedure, errors would be reduced and participants could proceed with greater confidence and fewer outstanding problems need to be solved.

The focus within the construction industry is directed towards the more mechanistic aspects of quality attainment. Many construction firms are well versed with British Standard (BS) 5750, and have attained appropriate accreditation even though BS 5750 has its origins in manufacturing industry (Atkinston, 1987). The advocates of quality assurance extol the virtues of having a structure which embraces design work, work on site, commissioning, repair and maintenance, products and their manufacture. According to Atkinson (1987) several construction organizations when asked to support their accreditation under BS 5750 have relied heavily upon this mechanistic view point, failing to appreciate that the production of an accreditation certificate may well be something which the Client desires and thus aids in the organization satisfying the Client.

2.11 TQM in Construction Industry

Total quality management is a set of practices and principles which are intended, amongst other things to facilitate coordination. TQM is increasingly being adopted in many companies in the developed world as an initiative to solve quality problems in the construction industry and to meet the needs of the final consumer (Kanji and Wong, 1998).

Oakland and Aldridge (1995) suggest that if an industry needed to apply the concept of TQM, it is the construction industry. Alfeld (1988) advances the view that construction industry promises greater pay back through performance improvement through TQM more than any other industry because of its magnitude. Milkekovich (1995) states that there are differences in the adoption of TQM in the construction industry among different countries. He found out that the Japanese were among the first to apply this technique on a large scale. They embraced the concept after the oil crisis of 1973.

Thereafter U.S.A construction companies adopted TQM programmes used by U.S.A manufacturing companies.

However, Love et al (2000) in their conceptual model for a learning organization in construction through a review of existing literature concluded that TQM has not been well received in the construction industry as it is perceived to be synonymous with quality assurance.

Omufira (2001) in her study to establish the extent of TQM implementation in the building construction industry in Kenya found out that there is poor or lack of implementation of this practice.

2.12 Benchmarking and Quality Management in Construction

Slack (998) defines a benchmark as a standard of excellence against which to measure and compare.

Camp (1998) defines benchmarking as the search for best practices that lead to superior performance. Benchmarking enables organizations to compare performance with other firms who are identified as best in class in certain quality aspects.

Thus benchmarking is a tool that has been recognized as a way of improving an organization's performance. It has become a key tool for continuous improvement through which an organization goes out to examine what industry competitors and other excellent performers outside the industry are doing.

Gitonga (2005) found out that, majority of Kenyan construction Companies try to compare their performance with other firms either internally or externally in an informal manner meaning lack of proper benchmarking in most construction companies in Kenya.

2.13 Obstacles to Quality Management in Construction Industry

Shammar et al (1998) highlighted co-ordination and communication failures as key features of contracting system where the struggle between technical interdependence and organizational independence are not adequately resolved. Bessant (1991) likens this situation to a relay race where each successful party to a project passes on the baton and with it unresolved problems. Such problems, it is noted, become the occasion for acrimony and dispute and have led to what is commonly described as a culture of conflict. To find ways of increasing co-ordination between concept, design and implementation, replacing the culture of conflict with one of co-operation, has been identified as a priority if increased efficiency, cost-effectiveness and client satisfaction are to be achieved.

Eccles (1991) shows that, in construction a loose association of contractors and sub-contractors exists. This makes it difficult to control quality. Other obstacles as identified by Zantanidis et al (1998) are: differentiation of production sites and project participants; scarcity of relevant standards; great differentiation of products and production processes; and lack of understanding of the meaning of quality by middle management.

2.14 Quality Costs in Construction industry

One of the most effective tools for evaluating the success of a quality management programme is the measurement of quality costs (prevention, appraisal and failure costs). A systematic approach is needed for measuring quality costs especially in the construction industry, due to the great number and complexity of activities involved in a typical project.

Quality-boosting initiatives can help builders save resources and increase profits. When discovered, the range and extent of quality costs embedded in their construction processes usually astound builders. They tend to treat a constant stream of quality errors that plague daily operations as a mere cost of doing business until they discover the costs' magnitude (Caldera, 2004). He argues that those who quantify the cost of that lost time and effort soon learn that the greatest profit opportunities might be waiting inside their own organizations. It is not easy to measure the cost of quality on site. Traditional accounting will not reveal the cost, but it is ingrained in normal responsibilities. For example, when superintendents spend half of their time reacting to things that go wrong, the cost associated with that effort gets buried in overall work force budget.

Likewise, all employees, spend significant, though untracked time dealing with quality and customer satisfaction issues. Caldera (2004) states that a solution exists through instituting a cost of quality estimating process that is followed with a first-time quality process. He argues that quality cost-estimating process has found internal quality costs to be 2% to 4% of sales. When trade contractor quality costs are added, the quality costs are driven up to 8% to 12%.

Caldera (2004) gives a step-by-step approach of doing a preliminary cost of quality that can give a rough idea of the profits that can be uncovered by analyzing the cost of quality.

CHAPTER 3 : RESEARCH METHODOLOGY

3.1 Research Design

This section outlines the research design that was used to meet the objectives of the study which were to determine the extent of quality management practices in the Kenyan building construction firms and to investigate the challenges facing these firms in their quality management efforts. The research design gives the framework of the study, target population, sample and sample design, data collection and data analysis. A survey method was adopted to obtain the information required from respondents who were the officers in charge of quality in the responding firms.

3.2 The Population

The Ministry of Roads and Public Works is the principal body registering contractors in Kenya. The current register has 5000 firms of contractors from all parts of Kenya as per the list of registered contractors kept by the Ministry of Roads and Public Works (GoK, 2000). This register formed the universe from which the sampling frame was derived. Only general building contractors with registered offices in Nairobi were used in the study. This population was considered representative of the Kenyan building construction industry due to the fact that Nairobi is the capital city of Kenya and accounts for a substantial portion of construction works in Kenya. Secondly, most of these firms carry out work in various parts of the country, outside Nairobi, thus reflecting what practices are generally in place in Kenya.

General contractors are the main contractors as opposed to specialist subcontractors. They undertake the general building works and employ sub-contractors to execute specialized works on their behalf.

3.3 Sample Design

The said contractors' register is arranged alphabetically, but mixes both the general building contractors, civil engineering contractors and specialized trade sub-contractors irrespective of location in Kenya.

The contractors are categorized according to their capacity from category A to G with category A being those with the highest turnover per year and G being the one with the least annual turnover.

A list of general building contractors with registered offices in Nairobi in categories A, B, C, and D formed the sampling frame. The choice of these four categories was on the basis that these categories represent the bigger firms controlling a major market share of the building industry and assumably set the standards in quality management in the building construction industry and therefore will be quite representative of the quality trends in building construction in Kenya. A sample size of 100 firms was obtained through stratified sampling method to take care of each category. This was done as follows:-

Table 3.1: Computation of sample sizes by categories.

Category	Total in No. Category	Proportion (%)	Sample Size
A	153	32.9%	33
B	75	16.1%	16
C	94	20.2%	20
D	143	30.8%	31
Totals	465	100%	100

This sample size was considered good as it compares well with sample sizes for similar studies carried out in the past. For example Gitonga (2005) used a sample size of 60 contractors whereas Githiri (2004) sampled 65 construction firms.

3.4 Method of Data Collection

The study was based on primary data that was collected through the use of questionnaires. Self-administered questionnaires were used to collect data from the officers in charge of quality for the sampled building construction firms. Questionnaires

were delivered to respondents by hand and picked once they were completed. Follow up to ensure response was done by phone and/or personal visits. To improve the response rate, an introductory letter was sent to all the respondents to explain the purpose of the research and assure the respondents that the information given would be used confidentially for the study only and not for any other purpose.

3.5 Data Analysis

Data collected was cleaned up through editing, coding and tabulations. Then data reduction was carried out through descriptive studies i.e. by use of descriptive statistics. A narrative summary of qualitative data obtained from open-ended questions was made. The Likert technique was used to analyse responses relating to the extent of quality management practices. The practices used for quality management were ranked according to the level of usage or application. A test to find out if there was any difference in preference of the practices was done at 5% significance level using a chi-squared test.

CHAPTER 4: DATA ANALYSIS, RESEARCH FINDINGS AND DISCUSSIONS

4.1 Response rate and background information

The questionnaires that were received back duly completed were 55 out of 100 that were sent out. This represents a response rate of 55%. The responses by registration category of the responding contractors were as tabulated in table 4.1 below;

Table 4.1: Response by category of contractors

Registration Category	Frequency	Percentage
A	18	32.7
B	13	23.6
C	12	21.8
D	12	21.8
Total	55	99.9 Say 100

Source: Survey questionnaires

The respondents were asked to indicate the number of years they have been in operation and table 4.2 below gives their responses. From table 4.2 below, it emerges that 7 firms which represents 12.72% of the firms have been in operation for less than 10 years, 20 firms which represent 36.36% for between 10 and 20 years and 28 firms which represents 50.92% for over 20 years. A large percentage, 88.89% of the firms in category A have been in operation for over 20 years.

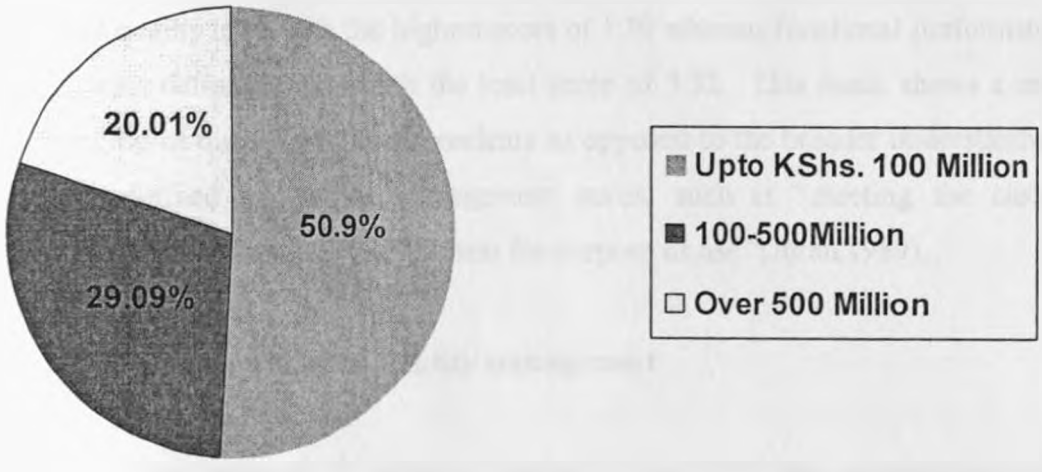
Table 4.2: Years in operation

Category	Years in Operation		
	Less 10 Years	10 – 20 Years	Over 20 Years
A	-	2	16
B	-	12	1
C	2	5	5
D	5	1	6
Total	7	20	28

Source: Survey questionnaires

The respondents were further asked to indicate their average annual turnover and the pie chart 4.1 below gives their responses

Figure 4.1: Annual Turnover



Source: Survey questionnaires

Figure 4.1 above shows that 50.9% of the firms surveyed have average annual turnover not exceeding Kenya Shillings 100 million, 29.09% have average annual turnover of between 100 and 500 million Kenya shillings whereas 20.01% have average annual turnover of over 500 million.

4.2 Definition of quality

The firms were asked to indicate on a 5 point Likert scale the factor that describes quality best. A score of 1 was to represent the most important factor in quality while 5 was to be the least important factor. The responses are represented in Table 4.3 below.

Table 4.3: Definition of quality

Definition	Mean Score
Adherence to specifications	1.30
Meeting Clients' needs by satisfying all aspects in this item	2.38
Delivery of service on time	2.75
Completion of works within budget	2.91
Functional performance of products	3.32

Source : Research findings

Thus from table 4.3 above, adherence to specification was the definition most firms understand quality to be with the highest score of 1.30 whereas functional performance of products least defines quality with the least score of 3.32. This result shows a narrow understanding of quality by the respondents as opposed to the broader understanding of quality as defined by quality management gurus, such as "meeting the customer requirements", Oakland (1998) or "fitness for purpose or use" (Juran,1989).

4.3 Existence of a policy on quality management

The firms were required to indicate whether or not they had a policy on quality management. Their responses are tabulated in table 4.4 below:

From the same table, 4.4 below over 52.7% of the firms i.e. 29 out of 55 have some policy on quality management which leaves 47.3% i.e. 26 out of 55 firms without a policy on quality management. Further it emerges that most firms registered in Category A i.e. 16 out of 18 responding firms or 88.89% have a policy on quality management. It also emerges that less firms in lower categories have policies on quality management

with Category B having 53.3%, Category C having 16.67% and Category D having 33.33% of the firms with some policy on quality management.

Table 4.4: Existence of a policy on quality management

Category of firm	Number of firms		
	Yes	No	Total
A	16	2	18
B	7	6	13
C	2	10	12
D	4	8	12
Total	29	26	55

Source: Survey questionnaire

It thus appears that there is some direct relationship between the existence of a quality management policy and the size of a firm as defined by its annual turnover. Generally, the higher a firm's annual turnover, the more likely it is to have a policy on quality management.

4.4 Quality management practices used

On a scale of 1 to 5, the firms were asked to indicate the level of usage of the quality management practices shown on table 4.5 below with the results as tabulated in the table. Score 1 was to represent the most used quality management practice whereas 5 would represent the least used practice. Thus the least mean score would indicate the most used practice whereas the highest mean score would indicate the least used practice. From table 4.5 below, inspection is the most used by firms in category A and D, quality control for category B and benchmarking for category C. Overall, inspection emerges as the most used practice across the categories. This shows that the firms are focused on problem solving as opposed to problem prevention as articulated by modern management quality management practices such as total quality management. A further deduction on the significance of the difference in the usage of the practices within the categories can be inferred through a hypothesis testing.

Table 4.5: Mean scores per category

Practice	Mean score of firms by category			
	A	B	C	D
Total quality management	3.62	3.23	3.43	3.0
Quality assurance	3.15	3.08	3.43	3.0
Quality control	2.33	2.15	3.0	3.33
Inspection	2.21	2.77	2.57	1.67
Benchmarking	4.62	3.77	2.14	4.0

Source : Research findings

A hypothesis test was carried out as hereunder using the mean scores shown on table 4.5, but with totals as in table 4.6 here below:

H_0 : There is no significant difference in preference of the practices between the categories.

H_1 : There is significant difference in preference of the practices between the categories

Table 4.6: Mean scores per category with totals

Practice	Mean score of firms by category				
	A	B	C	D	Totals
Total quality management	3.62	3.23	3.43	3.00	13.28
Quality assurance	3.15	3.08	3.43	3.00	12.66
Quality control	2.33	2.15	3.0	3.33	10.81
Inspection	2.21	2.77	2.57	1.67	9.22
Benchmarking	4.62	3.77	2.14	4.00	14.53
Total	15.93	15.00	14.57	15.00	60.50

Source: Research findings

A Chi-squared test was used at a 5% significance level and 12 degrees of freedom. The critical value from the chi-squared critical values table is 21.0

The test statistic, χ^2 was calculated using the formula:

$$\chi^2 = \Sigma \left[\frac{(0 - E)}{E} \right]$$

Where:

0 ≡ Observed mean score from field results

E ≡ Expected mean score (if the null hypothesis is true)

The expected cell scores were worked out through simple probability rules assuming that the practice and mean score entries by categories are independent of each other. The expected cell mean scores were worked out using the formula:

$$\text{Expected cell score} = \frac{\text{row total x column total}}{\text{grand total}}$$

The expected cell scores are shown in table 4.7 below:

Table 4.7: Expected cell mean scores

Practice	Mean score of firms by categories				
	A	B	C	D	Total
Total quality management	3.50	3.29	3.20	3.29	13.28
Quality assurance	3.32	3.14	3.05	3.15	12.66
Quality control	2.85	2.68	2.60	2.68	10.81
Inspection	2.43	2.29	2.22	2.28	9.22
Benchmarking	3.83	3.60	3.50	3.60	14.52
Total	15.93	15.00	14.57	15.00	60.50

Source: Research findings

The χ^2 was calculated using the above formula and as per table 4.8 on the next page.

The calculated χ^2 value of $1.60 < 21.0$

Since the calculated value is below the critical value, we were unable to reject the null hypothesis (H_0)

This result shows that there appears to be no significant difference in preference of the practices between the various categories of contractors. Overall, all the practices are equally preferred. Once again, this is contrary to modern quality management principals where practices like total quality management should be preferred over traditional practices such as inspection and quality control.

4.5 Third party certification for quality management

Respondents were asked to specify a particular third party certification for quality management if they had any. Only five of the respondents have third party certification, namely ISO 2000. All the five are in Category A. All the five have had this third party certification for not more than five years.

The results clearly show a limited understanding of third party certification in the industry and some dissemination of the same is required. It would be recommended that building contractor organizations like Kenya Association of Building and Civil Engineering Contractors (KABCEC) organise seminars and workshops to educate their membership on the need to be certified as quality service providers and the processes involved to acquire such certification.

The respondents were further required to give the reason that prompted them to seek third party certification and the responses were as presented at the bottom of page 33.

Table 4.8: Calculation of chi-squared (χ^2)

O	E	(O – E)	$(O - E)^2$	$\frac{(O - E)}{E}$
3.62	3.50	0.12	0.014	0.004
3.23	3.29	-0.06	0.004	0.001
3.43	3.20	0.23	0.053	0.017
3.00	3.29	-0.29	0.08	0.024
3.15	3.32	-.017	0.029	0.009
3.08	3.14	-0.06	0.004	0.001
3.43	3.05	0.38	0.144	0.047
3.00	3.15	-0.15	0.03	0.010
2.33	2.85	-0.52	0.27	0.095
2.15	2.68	-0.53	0.28	0.100
3.00	2.60	0.40	0.16	0.062
3.33	2.68	0.65	0.42	0.157
2.21	2.43	-0.22	0.048	0.020
2.77	2.29	0.48	0.23	0.100
2.57	2.22	0.35	0.123	0.055
1.67	2.28	-0.61	0.37	0.160
4.62	3.83	0.79	0.62	0.162
3.77	3.60	0.17	0.029	0.008
2.14	3.50	-1.36	1.850	0.529
4.00	3.60	0.40	0.16	0.044
				$\chi^2 = 1.60$

	Response		**Frequency**
a)	Improve efficiency	:	3
b)	Impress potential clients	:	1
c)	Demand by clients	:	1

The above results show that the need to improve efficiency was the main factor that drives building contractors to seek third party certification. It accounts for 60% of the responding firms.

4.6 Reasons hindering adoption of a quality management policy

On a scale of 1-7, the respondents of firms that had not adopted a quality management policy were asked to rank the reasons for not adopting a quality management policy, with 1 representing the most critical reason and 7 the least critical reason.
The findings are tabulated in table 4.9 below.

Table 4.9: Reasons hindering adoption of quality management policy

Reason	Mean score
Not sure how to embrace a quality management system	3.68
Not aware of quality management systems	3.79
Industry traditions	3.79
Resource limitations	3.95
Inadequacy of designs and contract documents	3.95
The many participants in the industry make it impossible for a single firm to manage quality	4.26
Quality management systems are very involving without commensurate gains	4.47

Source: Research findings

From table 4.9, it emerges that lack of knowledge of how to embrace quality management systems with a mean score of 3.68 is the most critical reason hindering firms from adopting quality management policies. The fear that quality management systems are very involving without commensurate gains ranks last with a mean score of 4.47

The firms that have adopted quality management policies were required to rank the gains that they have realized from such policy on a scale of 1-5, with 1 representing the greatest gain and 4 the least gain. The findings were as tabulated in table 4.10 on the next page.

Table 4.10: **Gains of adoption of quality management policy**

Gain	Mean score
Reduction in costs of quality	2.08
Increased profitability	2.65
Increased volume of work	3.92
Improved competitiveness	3.38
Client satisfaction	2.42

Source: Research findings

It emerges that reduction in costs of quality is the greatest gain with a mean score of 2.08, followed by client satisfaction (2.42), increased profitability (2.65), improved competitiveness (3.38) and lastly increased volume of work (2.92)

4.7 Mechanization

The respondents were required to state whether they considered their operations mechanized or labour intensive. Forty six of the respondents stated that they are labour-intensive, eight of them (all in Category A) said they are mechanized in their works. One respondent stated their firm is semi-mechanized. This means that whatever gains in quality that may arise from mechanization are not being realized by 83.63% of the building firms.

Asked if they thought mechanization would improve in managing quality, 41 respondents answered yes while 14 of the respondents did not think mechanization would improve quality. On the reasons for not adopting mechanization, nineteen respondents said lack of funds was the major cause; fifteen said they preferred labour because it is cheap, whereas eight said both lack of funds and the cheap labour are the main reasons hindering mechanization. None thought trade union resistance is a factor hindering adoption of mechanization.

4.8 Use of professionals in the building industry

The respondents were required to state whether or not they undertake works that are not designed and supervised by professionals. Twenty of the respondents said they sometimes undertake works not designed and supervised by professionals whereas thirty five of them said they never undertake works that are not designed and supervised by professionals.

The results are as tabulated in table 4.11 below according to the registration category.

Table 4.11: Firms working with or without involvement of professionals

Category	Responses	
	Undertake work without professionals	Do not undertake work without professionals
Category A	2	16
Category B	5	8
Category C	7	5
Category D	6	6

Source: Research findings

Asked whether they agreed that the role of building professionals is important in the management of quality, twenty seven of the respondents said they strongly agreed, twenty three of them said they agreed and five of them neither agreed nor disagreed. None disagreed.

These results show that the quality of a building is dependent on other players other than the building contractors. There is thus a need to synthesize these other players especially the professionals on their role in the overall quality management of a building project so that they may give serious thought in their designs with quality in mind.

4.9 Skilled Labour, training and staff involvement

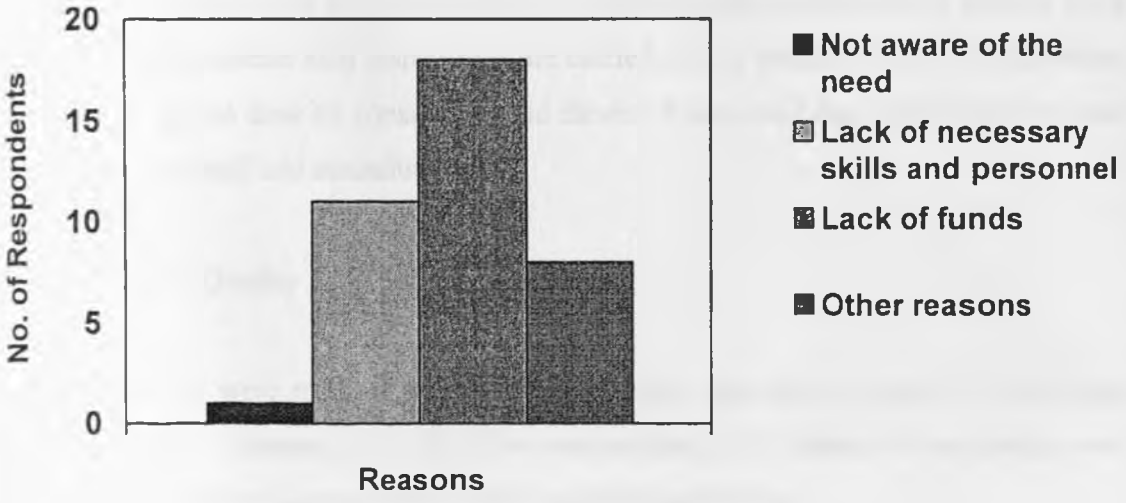
Respondents were asked to answer yes or no if they experience shortage of skilled labour. Forty two answered yes while thirteen answered no.

Asked what they associated shortage of skilled labour with, eighteen of them said it was lack of funds to hire while twenty six associated it to general lack of skilled labour in the country.

Respondents were required to state whether there was time set aside for their staff for quality management/improvement training. Fourteen of the respondents said there is time set aside while forty one said there is no time set aside for this exercise.

Those who did not have time set aside for their staff for quality management/improvement training were asked to state the reason for that and the results were as follows:-

Figure 4.2: Reasons for not involving staff



Source: Survey questionnaires

The other reasons included interesting factors such as that it is not important to involve staff, lack of time and fear that firms may not gain from workers after involving and

training them. All these show some level of unawareness of the benefits derived from staff involvement and training on quality management.

4.10 Supplier Involvement

Seventeen of the respondents stated that they involve their suppliers through get-together functions or other ways in their quality management programmes while thirty six said they do not involve their suppliers.

Asked to state why those who do not involve their suppliers do not do so, seven stated they did not consider it necessary, twenty said it would be very costly to do so, two said materials are checked on delivery, one said they purchase materials from reputable suppliers and one said they do not have specific suppliers of any given materials.

4.11 Materials

Respondents were required to state whether all incoming materials, goods and works done are inspected. All the fifty five respondents answered in the affirmative. Asked to state whether inspections are carried out by internal staff, consultants or others, forty three of the respondents said inspections are carried out by internal staff, one respondent said inspections are done by consultants and eleven of them said that inspections are done by both internal staff and consultants.

4.12 Costs of Quality

The respondents were required first to state whether they had a system of computing costs of quality. Thirteen or 23.6% of the respondents had a system of computing costs of quality while thirty nine or 76.4% of the respondents did not.

Secondly, respondents were required on a scale of 1-4 to indicate the extent to which the costs of quality in table below were important, with 1 indicating the most important cost of quality and 4 the least important.

Table 4.12: Ranking of costs of quality

Cost	Mean score
Preventive	2
Appraisal	2.5
External failure	2.58
Internal failure	2.92

Source: Research findings

From table 4.12 above, it emerged that preventive costs with the least mean score of 2 were the most significant quality costs, followed by appraisal costs with a mean score of 2.5, external failure costs with a mean score of 2.58 and lastly internal failure costs with a mean score of 2.92.

Asked whether costs of quality had any influence on the adoption of quality management policy, sixteen of the respondents said they had while thirteen said costs of quality did not influence adoption of quality management policy.

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary

This study had two objectives, to determine the extent of quality management practices in the large Kenyan building construction firms and secondly to determine the challenges facing the Kenyan building construction firms in their quality management efforts. The study was a survey of the large building contractors registered by the Ministry of Roads and Public works in categories A, B, C and D. The data was obtained by the use of self administered questionnaires which were physically delivered to and picked from the responding contractors. The staff in charge of quality were the respondents as they were considered to be in a position to adequately provide the information required.

5.2 Extent of quality management practices used by Kenyan construction firms

The foregoing analysis shows that firms in the Kenyan building construction industry use a number of quality management practices; inspection, quality control, quality assurance., total quality management (TQM) and even benchmarking. This study was to establish the extent to which these practices are being used. The general finding is that inspection is the most used quality management practice. However, a hypothesis testing shows that there are no significant differences in the preference of the quality management practices in the building construction industry in Kenya. It generally became clear that very few firms are using modern quality management practices such as quality assurance, total quality management and benchmarking. The findings also showed that some 47.3% of the building construction firms do not have any policy on quality management. This could be so because most of the firms understand quality in a narrow sense i.e. as adherence to specifications. Thus firms would take it to mean that as long as they endeavour to adhere to specifications set by the designers, then they do not require any policy on quality management.

It also emerged from the findings that only 5 of the respondents or approximately 9% of the respondents have third party certification for quality management. The findings showed that the firms in category A were the only ones that reported to having the third party certification. This would mean that firms with higher turn-over have adopted quality assurance through third party certification.

5.3 Challenges facing the Kenyan construction firms in their quality management endeavours

The firms are faced with several challenges in their quality management endeavours. These challenges range from lack of resources to the large number of participants in construction process. Some of these challenges are internal while others are external and thus beyond an individual firm's control. Specifically these challenges include:-

a) Shortage of skilled labour. The findings indicate that most building construction firms are faced with shortage of skilled labour thus being forced to make do with less qualified workers to do some duties requiring specialized skills.

b) Shortage of funds. The study shows that firms lack sufficient funds to use for staff training. Some firms even do not have sufficient funds to employ skilled labour even in those trades where there is no shortage of qualified tradesmen.

c) Lack of capacity. Several firms are not able to implement quality management practices because they lack personnel with the necessary know-how to train and introduce necessary quality management practices to their staff.

d) Lack of awareness. Several firms are unaware of what quality management practices are available for adoption. They are not aware of how to embrace quality management systems.

e) Many participants in the industry in a relay-like relationship make it difficult for a single firm to manage quality. The participants include professionals who

undertake the designs and write specifications, various sub-contractors who undertake the specialized works and suppliers who supply the requisite building materials. This means that unless the building firms control the other players, it will be difficult to manage quality as their output is dependent on these other players.

5.4 Recommendations

The study has established that building construction firms in Kenya have adopted various quality management practices. However, the most common practice is inspection which is done at the end to sort out bad from good work. This is so to speak "too little too late". It also emerged that there is no preference of one quality management practice over the others. Thus firms need to be sensitized on the advantages of the more modern quality management practices such as quality assurance and total quality management. This education programme could be undertaken by the building contractors' organization such as Kenya Association of Building and Civil Engineering Contractors (KABCEC). The government could also use the funds they raise from contractors through training levy to arrange seminars or workshops through which they would disseminate the necessary knowledge to contractors on modern quality management practices.

Secondly, the government being the largest single employer of building construction firms in Kenya can trigger adoption of more modern quality management practices, by insisting that for a firm to be registered by the Ministry of Roads and Public Works, it must meet certain minimum quality management practices e.g. ISO Certification or demonstrate that it has adopted total quality management.

Thirdly, to address the lack of sufficient resources for training and hiring competent and qualified skilled manpower, the government of Kenya should either revive the former National Construction Corporation or incorporate a similar parastatal that will support smaller building construction firms in terms of the necessary expertise and even in lending of money and building plant and equipment so that the firms can improve their skills and quality management skills. The proposed parastatal could also be charged with

the responsibility of coming up with training programmes for the building construction firms in Kenya at some reasonable fee.

The government appreciating that the building construction firms play an important role in providing the basic human needs of shelter, and in its obligation to ensure safety of buildings used by its citizens should pass legislation that spell stringent penalties against building contractors who do not produce quality buildings for lack of quality management policy. The same legislation should also give tax incentives to those firms that sponsor their staff for training on quality management.

5.5 Limitations

For the study to come up with valid findings, it has to get accurate and correct information from the respondents. However, going through the responses received from the respondents, one gets the impression that some respondents may not have been truthful. This is because some of the answers were contradicting each other. This would mean that some of the respondents just wanted to satisfy the researcher that they had co-operated. This could have been intentional or may have been caused by suspicion about revealing issues that they may have considered confidential or sensitive and may be, not trusting that the information given would be kept confidential.

However, since the researcher did not have a way of verifying the information given in the questionnaires by the respondents, whatever inaccuracies that may have been there could have affected the research findings.

The other limitation encountered is that few building firms had designated officers in charge of quality. As a result of this, questionnaires may have been filled by others who were not conversant with the subject with the inherent chances of giving wrong information.

5.6 Suggestions for further research

The study findings show that most Kenyan building construction firms are using traditional methods mainly inspections and quality control for managing quality. Modern methods of quality management such as quality assurance, total quality management and benchmarking are not widely used though hypothesis testing revealed that there are no significant differences in the preferences of the various practices being used. Further research is suggested on why these modern quality management practices have not been preferred by Kenyan building construction firms over the traditional ones. Additionally it is recommended that further research be carried out at 1% level of significance to find out if really there are no significant differences in the ranking of the practices involving more than two means.

The study sought to find out the challenges facing the Kenyan building construction firms in their quality management endeavours. The findings show that one of these challenges is the number of participants involved in the construction process in a relay-like manner. This brings the issue of supply chain management. It is recommended that further research be carried out to establish why it is difficult to manage these many participants and how the theories of supply chain management could be applied in this industry.

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APPENDIX 1: Letter of Introduction

December, 2005

Dear Sir/Madam,

RE: MBA RESEARCH PROJECT

I am a student at the University of Nairobi pursuing a Master's degree in Business Administration. I am undertaking a research project in partial fulfillment of the academic requirements. The research seeks to determine the extent of quality management practices and the challenges facing the large building construction industry firms in Kenya in quality management. Your esteemed company has been selected to form part of this study. I will be very grateful if you would spare some time from your busy schedule, to respond to the questions listed on the attached questionnaire, as truthfully as possible.

Your response will be treated in strict confidence. The findings of this research may be availed to you upon completion of the research if you so request.

Your assistance and co-operation will be highly appreciated.

Yours faithfully,

A.N. MANDERE
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APPENDIX 2 : QUESTIONNAIRE

QUESTIONNAIRE

Introduction

This questionnaire is designed to gather information for a research that seeks to establish the practices that building construction firms in Kenya use to manage quality of their products and also to investigate the challenges that these firms face in their quality management endeavours. The study is being carried out as part fulfillment of the requirements for the degree of Master of Business Administration (MBA), Faculty of Commerce, University of Nairobi.

Part a: General Information

1. What is the category of your firm as per Ministry of Roads and Public Works

a)	Category A	[ ]	Tick
b)	Category B	[ ]	
c)	Category C	[ ]	
d)	Category D	[ ]	

2. Number of years that your firm has been in operation

a)	Less than 10 years	[ ]	Tick
b)	Between 10 and 20 years	[ ]	
c)	Over 20 years	[ ]	

3. Average annual turnover of your firm is:

a)	Upto KShs. 100,000,000.00	[ ]
b)	KShs. 100,000,000.00 – 500,000,000.00	[ ]
c)	Over KShs. 500,000,000.00	[ ]

Part b: Definition of Quality

4. On a scale of 1 – 5, how do you rank quality? (1 = most important, 5 = least important factor)

   a) Adherence to Specifications [ ]

   b) Delivery of service on time [ ]

   c) Completion of works within budget [ ]

   d) Functional performance of products [ ]

   e) Meeting Client's needs by satisfying all the above four [ ]

Part c: Quality Management Practices

5. Does your organization have a policy on quality management on the services it provides? Yes [ ] No [ ] Please tick

6. Indicate in the boxes against the practices below that your firm uses on a scale of 1 -5 (1 = most used and 5= Least used practice)

   a) Total quality management (TQM) [ ]

   b) Quality assurance (QA) [ ]

   c) Quality control (QC) [ ]

   d) Inspection [ ]

   e) Benchmarking [ ]

7. Do you have third party certification for Quality Management? Please specify (e.g. ISO 2000)

   a) ISO 2000 [ ] d) ISO 1400 [ ]

   b) ISO 2001 [ ] e) ISO 9000 [ ]

   c) ISO 1900 [ ] f) Other. Specify _____

8. For how long has your firm been using this third party certification?

a) 0 – 5 years

b) 5 – 10 years

c) 10 – 20 years

d) Over 20 years

9. What prompted you to seek third party certification for quality management? Please tick

a) Improve operational efficiency [ ]

b) Demand by clients [ ]

c) To impress potential clients [ ]

d) Because other firms were so certified [ ]

e) Other; specify _____

10. Since your firm adopted a policy of quality management, could you rank the benefits below on a scale of 1 – 5, where 1 = Greatest gain and 5 = Least gain

a) Reduction in costs of quality [ ]

b) Increased profitability [ ]

c) Increased volume of works [ ]

d) Improved competitiveness over competitors [ ]

e) Client satisfaction [ ]

11. If your firm has not adopted a quality management policy, what is the main reason for that? Rank on a scale of 1-7, where 1= most critical reason and 7= least critical reason

a) Not aware of quality management systems [ ]

b) Not sure how to embrace quality management systems [ ]

c) Resource limitations [ ]

d) Quality management systems are very involving without commensurate gains [ ]

e) Many internal participants in the industry make it hard for a single firm to manage quality [ ]

f) Industry traditions [ ]

g) Inadequacy of designs and contract documents [ ]

12. Benchmarking i.e. the process of improving quality by comparing ones' operations with the best-in-class organizations, has been acclaimed as the way forward in quality management, does your firm employ this practice?

Yes [ ] No [ ]

13. If your answer to the above question is no, please give your reason(s)

a) Not aware of the philosophy [ ]

b) Cost is prohibitive [ ]

c) Difficult to identify firm to benchmark with [ ]

d) Other (Please specify) _____

14. Total Quality Management (TQM) is another method of improving quality by continuous incremental improvement through the organization. Has your firm embraced this technique?

Yes [ ] No [ ]

Part d: Mechanization

15. Would you describe your organization as labour-intensive or mechanized?

a) Labour intensive [ ]

b) Mechanised [ ]

16. Does/would mechanization help to improve quality?

Yes [ ] No [ ]

17. If mechanization can help improve quality, what hinders its adoption?

a) Lack of funds [ ]

b) Trade union resistance [ ]

c) Labour is preferred since it is cheaper [ ]

Part e: Role of Professionals in Quality Management

18. Does your firm undertake projects that are not designed and supervised by building professionals? Tick

a) Yes [ ]

b) No [ ]

19. Building professionals or consultants play an important role in quality management through their designs. To what extent do you agree with this statement

a) Strongly agree [ ]

b) Agree [ ]

c) Neither agree nor disagree [ ]

d) Disagree [ ]

e) Strongly disagree [ ]

Part f: Skilled Labour availability and Staff Training

20. Do you experience shortage of skilled labour?

a) Yes [ ]

b) No [ ]

21. If you experience shortage of skilled labour at any time, what would you associate it with?

a) Lack of funds to hire them [ ]

b) General shortage of skilled labourers in the Country [ ]

c) Other (Please specify) _____

22. Does your firm have time set aside for its staff for quality management/improvement training?

Yes [ ] No [ ]

23. If your answer to the above is no, what is the greatest contributor to that situation?

a) Not aware of the need [ ]

b) Lack of necessary skills and personnel [ ]

c) Lack of funds [ ]

d) Others. Specify _____

Part g: Supplier Involvement

24. Does your firm involve your suppliers by way of get-together functions or other ways in your quality management programmes?

Yes [ ] No [ ]

25. If your answer to the above is No, what is the reason for that?

a) Firm does not consider it necessary to involve suppliers [ ]

b) Involving suppliers would be very costly [ ]

c) Other (Please specify) _____

Part h: Materials

26. Do you inspect all incoming materials, goods and work done?

Yes [ ] No [ ]

27. Who carries the inspections?

a) Internal Staff [ ]

b) Consultants [ ]

c) Other (Specify) _____

Part i: Costs of Quality

28. Does your firm have a system of computing and managing the costs of quality?

Yes [ ] No [ ]

29. To what extent are the following costs of quality on a scale of 1 – 4 important in terms of magnitude, where 1= most contributor to costs of quality and 4= least contributor of costs of quality

a) Preventive costs [ ]
b) Appraisal costs [ ]
c) Internal failure costs [ ]
d) External failure costs [ ]

30. Did the costs of quality have any influence on the adoption by your firm of quality management policy?

a) Yes [ ] b) No [ ]

31. If your answer to the above question is yes, briefly explain

_____

_____

Thank you very much for your time.