

THE EFFECTIVENESS OF QUALITY MANAGEMENT
IN

THE DESIGN AND CONSTRUCTION INDUSTRY IN
GHANA

BY

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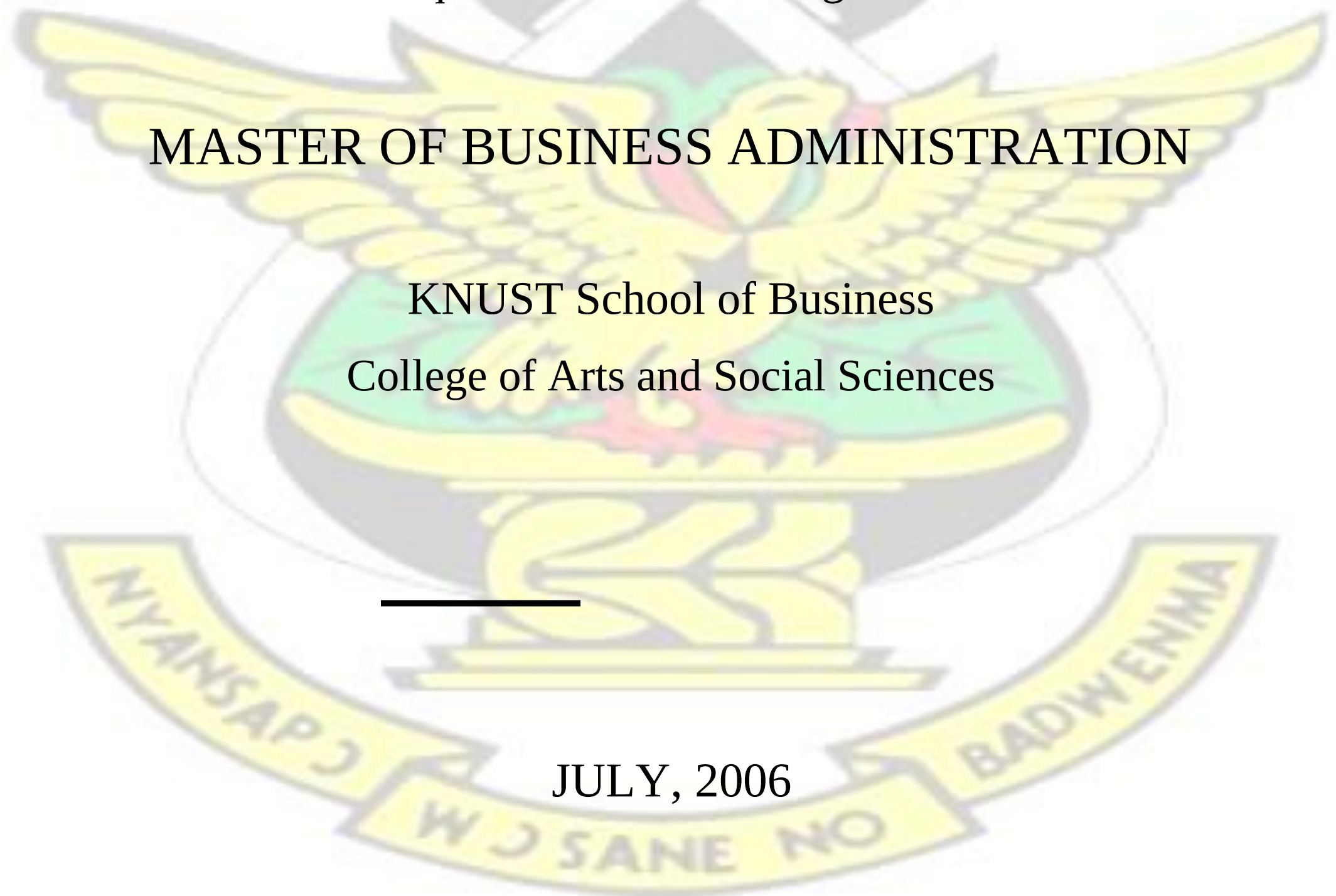
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MASTER OF BUSINESS ADMINISTRATION

KNUST School of Business
College of Arts and Social Sciences

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DECLARATION

I hereby declare that this submission is my own work towards the MBA and that, to the best of my knowledge, it contains no material previously published by another person nor material which has been accepted for the award of any other degree of the University, except where due acknowledgement has been made in the text.

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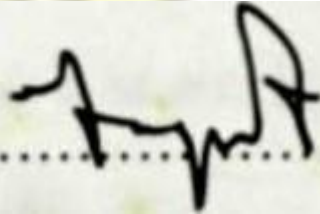


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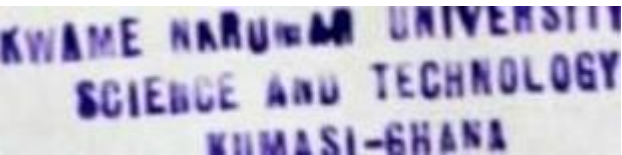


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ABSTRACT



The current economic situation in the global market has engaged many organizations in research and development management to keep pace with customer needs and satisfaction and thus stay on top. (Theo C. Haupt, 2004). The search for solution to survival and leading market share has led to the concept of providing quality in totality. Total quality management (TQM) is a relatively new management philosophy approach to the art of management which seeks to promote industries that want to remain effective and efficient in the new competitive global and local competitive market. KWIME

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The main objectives are to assess the quality systems in place and evaluate employee understanding in the Development Office—Kwame Nkrumah University of Science and Technology (KNUST) and a construction firm Wilkado Construction Works Limited. The data was obtained through stratified random sampling of employees from the various departments of the firms and simple random sampling of clients to answer questionnaires and interviews. The researcher used perceptual measures on a ten point interval scale, to develop the questionnaire to capture information about quality management implementation in the form of attitude statements.

The firms have a great potential for growth and thus Total Quality Management can be applied successfully only if it is central to the business strategy and if the people factor is at the core of the approach, arrive at comprehensive strategic guidelines in managing quality in business organizations in Ghana. Certain elements of quality management methods such as supplier quality management, client focus, client relationship, management and cost of quality and non-quality, which the study could not cover in detail, should be considered in any future research.

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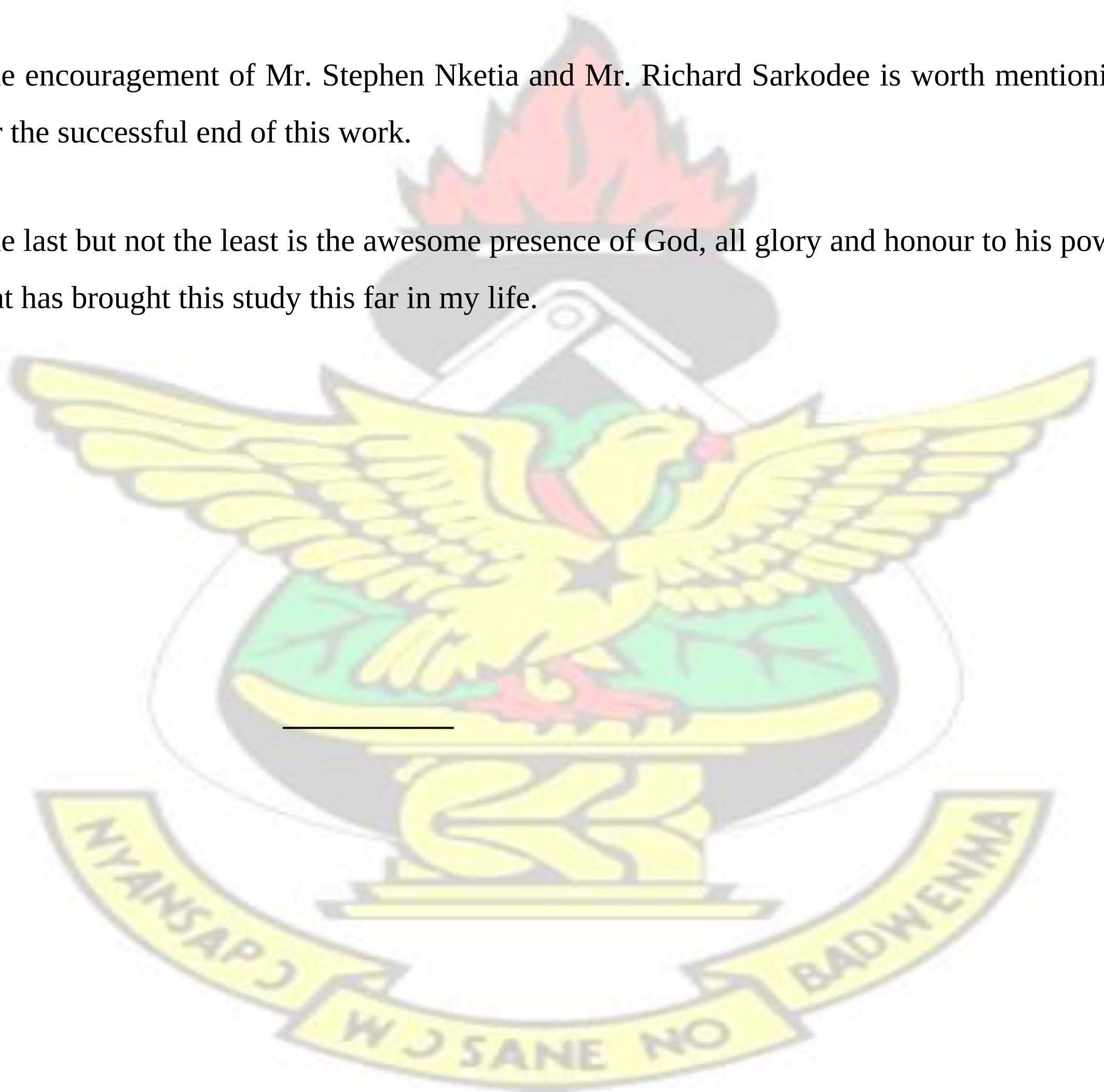
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CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The concept of quality in the global industrial setting is receiving a growing concern among society in general and businesses both in the developed and developing countries. This has come about as a result of fierce international competition among firms and organizations through globalization of business activities in the world today. Quality is one of the greatest tools of organizational success and development in today's industrial society. It is central to the survival of both small and large organizations. Quality stems from the need to assure the general society who consumes products and services of safety and satisfaction for patronage.

The current situation has engaged many organizations in research and development to keep pace with customer needs and satisfaction and thus stay on top. (Theo C. Haupt, 2004). The search for solution to survival and leading market share led to the concept of providing quality in totality. Total quality management is a relatively new approach to the art management which seeks to improve product and service quality and increase client satisfaction by restructuring traditional management practices.

It is a management philosophy that seeks to ensure quality on every side. The idea has now developed into a new management philosophy, known as Total quality management (TQM) as a solution to promote industries that want to remain effective and efficient in the new

competitive global market. As a result of these developments the establishment of quality systems by design and construction industries in Ghana has become essential if they are to gain a significant share of the market.

1.2 Quality in the Construction Industry

Quality management has for many years been the vocabulary of the manufacturing industry. It is therefore a relatively new concept to management in the construction industry. (Rahman, 2001) Note should be taken of the difference with regards to building. (Gaylord, 1999)

- Construction projects are 'unique'. Each building process represents a single production run.
- The construction site is also 'unique' in terms of its temporary environment.
- The life cycle of a construction project (inception to completion) extends beyond the production cycle and also tends to evolve and develop through time.
- The assembly of design and construction staff precludes development of production teams with each site likely to have different team members.
- There are no precise standards for design and construction quality (in manufacturing — there are carefully controlled tolerances).
- Supervision and inspection of construction work is less systematic than in manufacturing.
- Feedback from building in use to the designer is very remote from the actual time of design and . construction and often precludes the effective analysis of defective designs and construction (in manufacturing testing for deficiency and necessary remedial action can be implemented quickly).

- Building designers and contractors, unlike manufacturers, may be involved in a wide variety of projects.

What therefore do we mean by quality in the design and construction industry?

Essentially, an assurance is being sought that the design and construction aspects have the capability to produce a product that is effective, efficient and economic whether that product is the design of the building or the construction of the building. Quality within the construction industry is expected to give clients confidence in the ability of designers, contractors, suppliers and other parties alike to address and meet their particular requirements. Whilst quality management systems differ in nature and format and in the various sectors of construction, their principles and direction are singular in one aspect — the pursuit of "better quality in building". (Gaylord, 1999)



1.3 Quality Management and the Total Building Process

In the construction industry there are five broad sections for quality. These are:

1. Client — in the project brief—
2. Designer — in the design and specification.
3. Manufacturers — in the supply of materials, products and components.
4. Contractors — in construction, supervision and management..
5. User — in the use of new buildings, in their upkeep and repair.

This study however focused on the designer and the contractors.

1.4 Problems of Achieving Quality

Vast majority of building failures are thought to occur from faults originating in the quality of design and the construction process. The problems exist due to:

- a) Historic separation of design from construction.
- b) Poor communication of design requirements.
- c) Design is difficult to build.
- d) Poor labour skills and supervision.
- e) Unrealistic time and cost assessments.

A Quality system entail having the organizational structure, responsibilities, procedures, processes and resources for implementing quality management such that there is a guiding framework to ensure that every time a process is performed the same information, method, skills and controls are used and practiced in a consistent manner. With its primary focus being the involvement of everyone, TQM has the potential to improve business results, greater customer orientation and satisfaction, worker involvement and fulfillment, team working and better management of workers within companies. However, the construction industry has been slow to embrace the concept of TQM. Construction firms have been continually struggling with its implementation. Historically, construction ____bgen-anindustry has reluctant to implement change. (Theo C.

Haupt, 2004) Consequently; it has lagged behind in the implementation of TQM. Generally, the principles of TQM are not applied beyond management levels within general contractors. (Theo C. Haupt, 2004)

1.5 Statement of the Problem

For innovation and continuous improvement to be encouraged and become a norm, traditional practices need to be unlearnt. The construction industry has been reluctant to implement change. This process of change is especially difficult in the competitive environment in which construction takes place and where the bottom line is still primary motivation of construction companies. Further, companies are prepared to only

implement those aspects of total quality management (TQM) programmes that will provide them with competitive advantage and improve their overall financial performance.

In general the lack of effective application of TQM principles that has made other industries successful but not in the construction industry has given rise to the problem. (Skibniewski, M. and Hendrickson, C. 1993) The problem includes a lack of adequate budget, failure to plan adequately for quality, inadequate training at all levels except for top or senior management positions, and little recognition given to those who strive for quality improvement on their projects. Once a project was awarded it seemed that all efforts focused on getting started with construction quickly, getting the subcontracts written on a timely basis—then—progressing the work in a manner that would produce the greatest revenue in the shortest amount of time. Quality was primarily achieved through the inspection process. In order to survive and thrive in today's competitive world, it is extremely necessary for every business organization to implement and maintain an effective quality management system. It is through the implementation of TQM that a firm can ensure the quality of its products. This brings to the fore the importance of TQM in the operations of firms. In every organization an effective implementation of widespread TQM system ensures positive returns on investment with minimal wastage of valuable resources and cost reduction. These will not only help to improve total client satisfaction but also result in decent profit margins. Some companies perceive TQM as not applicable in Ghana and have not ventured for its use. They believe it is suitable and practical in the highly technologically advanced companies in developed

OF countries.

Total Quality Management (TQM) awareness in the management of these firms is therefore needed in Ghanaian firms. The above problem has received some attention in the area of manufacturing. However detailed research into the management practices of design and construction organizations with proposed solutions to combat this problem has probably not been conducted. Since the benefit of TQM strategy cannot be over emphasized, a thorough research into its application to ascertain an ultimate effective implementation of quality is therefore needed.

Guiding Questions

The following key research questions were used for the study.

1. What systems and structures have been put in place by management to assure quality and how are these systems being managed?
2. What problems are being encountered in the implementation of TQM in design and construction firms?
3. What specific principles govern the operation of TQM?
4. How do firms perceive quality and what are the perceptions of workers on the quality system in place?
5. What is the state of quality awareness in Ghana's Design and Construction setting?

1.6 Objective of the Study

The main objective of this study is to ascertain the measure and strategies for ensuring TQM application in the Development Office of KNUST and Wilkado Construction

Works Limited, which is a construction firm currently working on campus.

The specific objectives are to:

1. Assess the quality systems in place in the Development Office and a construction firm.
(Wilkado Construction Works Limited.)
2. Investigate into the main areas of quality concentration in the case study firms.
3. Evaluate employee understanding of the TQM in place and how culture has influenced the quality systems in place.
4. Make recommendations for improvement in the system that will favor increasing improvement in productivity and quality culture.

1.7 Rationale for the study

With growing global competition, quality management is becoming increasingly important to the management of all organizations. The rationale behind this study is thus to establish the level of quality awareness in Ghana's Design and construction industry.

For the case study firms in particular, any adverse or positive feedback from management and employees towards the quality culture will form a basis for management to redesign its set-up to achieve the desired objective of the firm. It is to remove the misconception of quality operations in the country's construction industry that this work was carried out.

1.8 Research Methodology

In social research, surveys are one of the most frequently used methods of data gathering. The survey protocol of random sampling procedures allows a relatively small number of people to represent a much larger population. Surveys are an effective means to gain data on attitudes, on issues and casual relationships. However, they can only show the strength

of statistical association between variables. Surveys do not explain changes in attitudes and views over time. They also provide no basis to expect that the questions are correctly interpreted by the respondents.

This notwithstanding, questionnaire survey, I think would be appropriate for achieving the objectives of this study. Because of the large number of design and construction firms in Ghana only two firms were selected. Basically, those who have the experience of working almost in all the ten regions of the country were chosen for the study. The researcher has done some work with these firms on the KNUST campus.

Data was obtained from two sources: primary and secondary.

1.8.1 Primary Data

Primary data was obtained using questionnaires, personal observations, formal and informal interviews with management, workers and clients of the firms under study.

Structured interviews were conducted and used to obtain information from the sampled employees, clients and management to ascertain their views on relevant issues.

1.8.2 Secondary Data

Secondary data was obtained from relevant published and unpublished literature written on TQM application and other related materials. They included data from the firms concerned, information from the dailies, libraries and other institutions of interest. This provided relevant background information for the actual research survey.

1.8.3 Measurement Variables

To evaluate quality management status, it is important to have an instrument for measurement. An instrument of quality management concept in 7-dimension variables was used for this purpose. The variables used to assess the effectiveness of the TQM application in the case study firms are:

- i) Leadership and commitment ii)
- Training and education iii)
- Information and communication iv)

Motivation—

v) Planning

VI) Measurement and control

vii) Client satisfaction.

Scope of study

The study is mainly focused on the management aspects of quality which involves policy formulation, implementation, review and client perception of quality of buildings.

The Design and Construction industry under the study is restricted to the design and construction of buildings. Other civil works were not considered.

1.9 Organization of the Study

This study is divided into five chapters. Chapter one covers the introduction of the study. This comprises the background to the study, the need for this study, and also the method used. Chapter two is the literature review and conceptual framework of the study. Chapter three takes a look at the research methodology applied. Chapter four is a presentation of the findings, and analysis and discussion of data. Chapter five is the summary of findings, conclusions and recommendations.

CHAPTER TWO 2.0 LITERATURE REVIEW

2.1 Introduction

This chapter seeks to evaluate the theoretical basis of the quality management philosophy and its role as a strategic management tool in the current trend of industrialization. It also seeks to identify implementation problems and evaluates the quality management situation in construction firms in Ghana.

The current trends of globalization and market competition through the capitalized market have resulted in quality becoming increasingly more important to organizations. Quality is becoming the main platform of competition in international trade, with sophisticated notions such as eco-labeling, organic products, environmentally friendly technologies and processes. There are more and more discussed and taken as a networked world. Firms would have to adapt quickly to technological change if they are to stay ahead of competition and still maintain the standard of quality required by customers.

Thus the need for quality management is imperative in every firm's activities for success.

2.2 The Concept of Quality

2.2.1 Definition of Quality

Quality is difficult to define and means different things to different people (Merkrud, 1993). In simple terms, quality is defined variously as zero defects in the products/services provided by an organization in order to satisfy customers' needs (ISO 9000), and totality of characteristics of an entity that bears on its ability to satisfy stated and implied needs (ISO 8402, 1994, ICT 1996). Juran (1996) also defines it as fitness for use. Crosby (1997) on the other hand defines quality as the compliance with

productspecified requirements. The definition of quality has evolved into multi-dimensional descriptions of customers' wants and perceptions. The need for effective management of the descriptions of customers' need led to the concept of Total Quality Management (TQM).



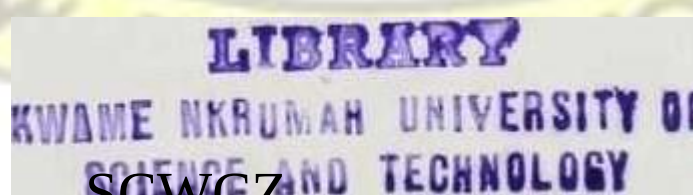
2.2.2 Definition of Total Quality Management (TQM)

Different authors focused on the need for customer satisfaction and delights. TQM is a structured approach for managing business to achieve the best results. It goes far beyond management systems related to the production processes and encompasses the philosophy, principles, processes, and procedures and services provided by all parts of the organization (Love et al. 1998). They further explain that TQM is not a time-limited project, which has a beginning and an end. It is essentially a continuous process that ends when the company folds up, yet many firms have given up on the concept because the rewards have not been as profitable as first envisaged. According to Chase and Aquilano (1992), TQM may also be defined as managing the entire organization so that it excels.

He gives emphasis to elements such as:

- Customer-driven quality standards
- Supplier — customer links
- Prevention oriented operations

- Continuous improvement
- Quality at source



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British standards define quality assurance as "all activities and functions concerned with the attainment of quality, which is now widely referred to as Total Quality Control and the related system as TQM. (Project Management Journal Vol. 18, No. 5, 1987.)

The focal point of all the various definitions given by the gurus is centered on the customer as the reason for an organization's existence. There is therefore the need to ascertain the true requirements of these customers and meet them on the professional level through the provision of high quality products and services not only to satisfy the customers but also to give them delight.

2.3 ISO 9000 and TQM

2.3.1 ISO 9000

ISO 9000 is a family of standards that provide a series of guidelines on how to establish a quality system to manage the processes that affect an organizations product or services. This family of standards was first published by the International Organization for Standardization (ISO) in 1987 and was subsequently updated in 1994 and 2000 to reflect application in all industries. Management is required to document the quality system and employees are expected to follow consistently the documented procedures. After the quality system is implemented, the firms can obtain registration through an audit performed by an independent (third-party) registrar (Quazi et al, 2002).

2.3.1.2 Effects of ISO 9000 Certification

In a study conducted in two manufacturing plants of a large corporation in the USA, one ISO 9000 registered and the other non-ISO 9000 registered, it was found that the ISO 9000 quality programme improved the participants' quality of work life (Elmuti, 1997).

In addition, there was a positive impact on employee productivity and export sales.

Anderson (1999) found that manufacturing firms in North America adopted ISO 9000 as a means to provide credible signals of quality assurance to external parties. ISO 9000 complements rather than substitutes TQM.

2.3.1.3 Relationship between ISO 9000 and TQM Practices

The family of ISO 9000 standards has faced criticisms that the certification process fails to deal with some important aspects of TQM practices such as leadership, strategic planning, and employee empowerment.

Questions have been raised as to whether an ISO 900 registration can result in an effective implementation of quality management practices. Sadgrove (1995) argues that

ISO 9000 is a lower form of life than TQM that offers a firm background to an effective TQM system. Héagues that, most activities follow a preset format right from the arrival of raw materials to packaging as well as in all other work processes. In all these processes mistakes are bound to occur even by dedicated staff. ISO 9000 gives a solid base, with agreed systems that everyone can work to. It operates on the following principles: put in writing how tasks should be keep records, do audits, manage quality control, allocate responsibility and control paper work. It thus formalizes systems already in use and thus can help companies to perform better when used correctly.

He continued to say that in the perfect quality system, each employee knows how the system works because he was involved in writing or updating it, everyone knows how their job works because they are familiar with the written procedures, the workforce uses the system to prevent and correct errors, and staff use the quality manual as a source of information, and to remind them how a product should be made. He concludes that, ISO

9000 need not be an enemy of TQM. It can be the reverse of the same coin; TQM looks at the corporate culture and ISO 9000 looks at the corporate system. Together they help a company come world class.

2.4 Concepts of Total Quality Management

2.4.1 Historical Background of TQM

The origin of the term TQM and its concepts are paramount to give a better understanding for its usage by practitioners and researchers. The recent mass propagation for TQM application as a new management philosophy suggests a recent origin.

Powel (1995) makes the point that, TQM's origin can be traced to 1949, when the union of Japanese Scientists and Engineers, and government officials devoted to improving productivity and enhanced their post-war quality of life and American firms also began to take serious notice of TQM around 1980.

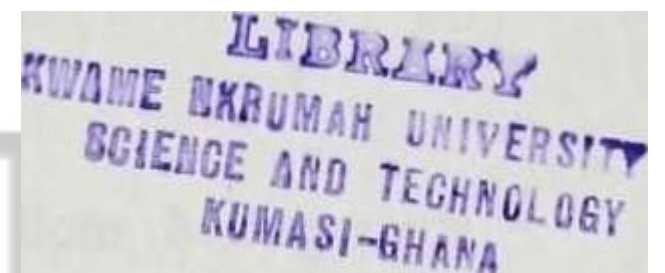
Martinez (1998) and Lorente (2000) have argued that many of the TQM dimensions were being applied by organizations before the TQM movement appeared; consequently it is not easy to establish the exact date of birth of the term TQM. Stuelpnagel (1993) stated that in Ford and Crowter's book, "My life and work", published in 1926, the origins of TQM can be found. Nevertheless, it is clear that the term and philosophy as a whole appeared around the mid 1980s. Bemowski (1992) states that the term TQM was initially coined in 1985 by the Naval Air Systems command to describe its Japanese-style of management approach to quality improvement. Perhaps, the main reason for the origin of the term TQM could be a substitution in the previously used term of total quality control (TQC), the word "control" by "management" with the reasoning that quality is not just a matter of control, it has to be managed. This is reinforced by Deming's (1982) view that

sampling inspection should be suppressed and also Crosby (1979) who makes the point that control is not necessary when a zero defect level is achieved. The term "control" is sometimes understood as meaning control over the workforces' activities and this is clearly not the aim of TQM.

In the USA the development of quality management resulted from the penetration of its markets by Japanese products, which started in the 1970s, together with the writings of Crosby, Deming, Feigenbaum and Juran. (Bemoski 1992) Consequently, companies and academics studied the works of these authors and integrating their approaches with quality management gave rise to the concept of TQM. This movement was exported to other countries, the UK being One of the first. Dale (1988), who started his research in quality management back in 1981, believes that the term TQM arose in the UK from the

activities of the Department of Trade and Industry National Quality campaign which was launched in 1983 and the pioneering work of organizations such as Institute of Business

Management (IBM).



2.4.2 Views of Gurus on Total Quality Management

Crosby, Deming, Feigenbaum, Ishikawa and Juran can be considered the most important gurus of the quality management movement. However, this does not mean that their approaches are the same. Deming achieved great popularity in 1980 after the NBC television documentary about success in Japan where he was considered a key element. Although Deming maintained a contrary position with respect to some of the TQM elements for example zero defects and quality costing (Deming, 1982, 1986). A considerable number of authors [Davis and Fisher (1994); Granzol and Traaen (1995); Milakovich, (1991); Pollock, (1993); Rago, (1994); Schay (1993); Tamimi and Gershon, (1995)] consider him as one of the main supporters of the TQM concept.

Hackman and Wageman (1995), state that Deming, Ishkawa and Juran can be considered the founders of the TQM philosophy. Surprisingly, they do not mention Feigenbaum, the originator of the-term TQM, which as shown in the review has many similarities with the term TQM.

2.5 Benefits of Quality Management Systems

Quality has become imperative in today's business operation as a result of fierce market competition and globalization. Organizations striving for larger market share and staying

on top have used the all-pervasive business tool, quality management to secure their place in the world market. (Deming 1986)

As Schomberger and Knod (1996) put it in their book, "Operations Management, Customer focused principles", "TQM is thought of as a good management philosophy in general and an imperative for global competitiveness. Recent studies suggest a strong relationship between TQM and competitiveness. The quality gurus, Crosby (1979; Juran (1982) and Deming (1986) have consistently claimed the contribution of quality to business performance. Empirical research from the American Professional Institute of Management Studies (PIMS) supports the preposition that better quality has a positive relationship with business performance. This is true for the service sector also. (Caruana and Pitt's (1997) study of 131 UK service firms suggests that better quality does have a positive effect on the overall performance of the firm, relative to its competitors. Although quality itself does have positive relationship with better performance, there is a little commonality in how performance is measured or how quality is defined (Garvin, 2000).

Installation of QM gives a corporate image to an organization on the international scene. The ISO 9000 quality system when installed in an organization leads to attainment of quality certifications. A certified company is highly prepared as its customers are assured of quality. Quality certifications registrations and awards have become influential suppliers. Surviving suppliers are usually those that have achieved customer-certified status. Companies and their suppliers are increasingly seeking to become registered to the ISO standards, which are internationally recognized. Ghanaian firms need to take the

issue of quality management as crucial and get on board with it since it has become the order of the day internationally in business for better performance.

Firms and organizations that want to become world class leaders or leaders in their own market must prove to customers that they offer the best product or service at an affordable price and be able to convince consumers of the status quo they claim. Organizations that have adopted TQM and have successfully practiced it as a corporate policy now remain at the top. Notable examples are the Japanese automobile industries that have captured the American market and other markets. As Chase and Acquilano (1996) put it, "the impact on North American manufactures of high quality competition from Honda, Toyota and others has been enormous". The Japanese inroads were made through reliability and high resale value based upon product quality but the fact remains that Japanese cars are the symbol of quality in the US market place. (Gilks and Sprink, 1990)

On the Ghanaian scene, TQM has not been adopted on a wider scale until recently. Some manufacturing companies that have been applying quality systems are Uniliver, Coca

Cola bottling company and Pepsi Cola Company limited. Ghanaian based organizations such as Aluworks Ghana limited; Pipes and Plastics Products Limited and Carnaud Metal Box Ghana Limited have embraced TQM. (Ghana Quality Organization, Newsletter, 2005)

Even though the companies above produce for construction works, the management of the design and construction process has not done much on the implementation of total quality management.

2.6 Elements of Total Quality Management

Total Quality is a description of the culture, attitude and organization of a company that strives to provide customers with products and services that satisfy their needs.(Nayantara Padhi, 2004). The culture he said requires quality in all aspects of the company's operations, with processes being done right the first time and defects and waste eradicated from operations. To successfully implement TQM, an organization must concentrate on eight key elements:

1. Ethics
2. Integrity
3. Trust
4. Training
5. Teamwork
6. Leadership
7. Recognition
8. Communication

TQM has been coined to describe a philosophy that makes quality the driving force behind leadership, design, planning and improvement initiatives. For this, TQM requires the help of those eight key elements. These elements can be divided into four groups according to their function. The groups are:

- i) Foundation: - Ethics, integrity and Trust ii) Building
- Bricks: - Training, Teamwork and Leadership iii) Binding
- Mortar: - Communication iv) Roof: Recognition

i) Foundation of TQM

TQM is built on a foundation of ethics, integrity and trust. It fosters openness, fairness and sincerity and allows involvement by everyone. This is the key to unlocking the

ultimate potential of TQM. These three elements move together, however, each element offers something different to the TQM concept.

1. Ethics is the discipline concerned with good and bad in any situation. It is a twoface subject represented by organizational and individual ethics. Organizational ethics establish a business code of ethics that outlines guidelines that all employees are to adhere to in the performance of their work. Individual ethics include personal rights or wrongs.
2. Integrity implies honesty, morals, values, fairness and adherence to the facts and sincerity. The characteristic is what customers (internal or external) expect and deserve to receive.
3. Trust is a by-product of integrity and ethical conduct. Without trust, the framework of TQM cannot be built. Trust fosters full participation of all members. It allows empowerment that encourages pride ownership and it encourages commitment. It allows decision making at appropriate levels in the organization, fosters individual risk-taking for continuous improvement and helps to ensure that measurements focus on improvement of process and are not used to contend people. Trust is essential to ensure customer satisfaction. So, trust builds the cooperative environment essential for TQM.
Basing on the strong foundation of trust, ethics and integrity, bricks are placed to reach the roof of recognition. This includes:

ii) Building Bricks

- Training is very important for employees to be highly productive. Supervisors are solely responsible for implementing TQM within their departments, and teaching their employees the philosophies of TQM Training that employees require are

interpersonal skills, the ability to function within teams, problem solving, decision making, job management performance analysis and improvement, business economics and technical skills. During the creation of the formation of TQM, employees are trained so that they can become effective employees for the company.

- Teamwork is needed to become successful in business. With the use of teams, the business will receive quicker and better solutions to problems. Teams also provide more permanent improvements in processes and operations. In teams, people feel

more comfortable bringing up problems that may occur, can get help from other — Workers to find a solution. There are mainly three types of teams that TQM organizations adopts:

- a) Quality Improvement Teams or Excellence Team (QITS). These are temporary teams with the purpose of dealing with specific problems that often re-occur. These teams are set up for period of three to twelve months.
- b) Problem Solving Teams (PSTs) — These are temporary teams to solve certain problems and also to identify and overcome causes of problems. They generally last from one week to three months.
- c) Natural Work Teams (NWTs) — These teams consist of small groups of skilled workers who share tasks and responsibilities. These teams use concepts such as employee involvement teams, self-managing teams and quality circles. These teams generally work for one to two hours a week.

- Leadership is possibly the most important element in TQM. It appears everywhere in organizations. Leadership in TQM requires the manager to provide and inspiring vision, provide strategic direction that is understood by all and to instill values that guide subordinates. For TQM to be successful in the business the supervisor must be committed in leading his employees. Supervisors must understand TQM, believe in it and then demonstrate their belief and commitment through their daily practices of TQM. Supervisors make sure that strategies, philosophies, values and goals are transmitted down through out the organization to provide focus, clarity and direction.

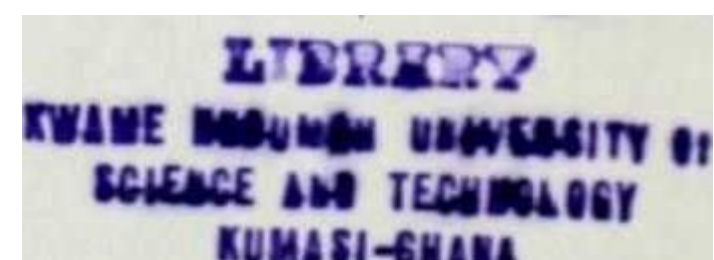
A key point is that TQM has to be introduced and led by top management in creating—and deploying clear quality values and goals consistent with the objectives of the company and in creating and deploying well defined systems, methods and performance measures for achieving those goals.

Mortar SCIEUCE


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- Communication binds everything together. Starting from foundation to roof of the TQM house, everything is bound by strong mortar of communication. It acts as a vital link between all elements of TQM. Communication means a common understanding of ideas between the sender and the receiver. The success of TQM demands communication with and among all the organization members, suppliers and customers. Supervisors must keep open airways where employees can send and receive information about the TQM process. Communication coupled with the sharing of correct information is vital. For communication to be credible the message must be clear and receiver must interpret in the way the sender intended. There are different ways of communication such as:
- Downward Communication This is the dominant form of communication in an organization. Presentations and discussions basically do it. By this the supervisors are able to make the employees clear about TQM.
- Upward Communication — By this the lower level of employees are able to provide suggestions to upper management. As employees provide insight

 and constructive criticism, supervisors must listen effectively to correct —
 the situation that comes about through the use of TQM. This forms a level of trust


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between supervisors and employees. This is also similar to empowering communication, where supervisors keep open ears and listen to others.

- Sideways communication — This type of communication is important because it breaks down barriers between departments. It also allows dealing with customers and suppliers in a more professional manner.

iv) Roof

- Recognition is the last and final element in the entire system. It should be provided for both suggestions and achievements for teams as well as individuals. Employees strive to receive recognition for themselves and their teams. Detecting and recognizing contributors is the most important job of a supervisor. As people are recognized, there can be huge changes in self-esteem, productivity, quality and the amount of effort exerted to the task at hand. Recognition comes in its best form when it is immediately following an action that an employee has performed.

Recognition comes in different ways, places and time such as,

- Ways - it can be by way of personal letter from top management. Also by award banquets, plaques, trophies etc.
- Places — Good performers can be recognized in front of departments, on performance boards and also in front of top management.
- Time — Recognition can be given at any time like in staff meeting, annual award banquets, etc.

We can conclude that these eight elements are key in ensuring the success of TQM in an organization and that the supervisor is a huge part of developing these elements in the work place. Without these elements, the business entities cannot be successful TQM implementers. It is very clear from the above discussion that TQM without involving integrity, ethics and trust would be a great remiss, and in fact it would be incomplete. Training is the key by which organization creates a TQM environment. Leadership and teamwork go hand in hand. Lack of communication between departments, supervisors and employees create a burden on the whole TQM process. Last but not the least; recognition should be given to people who contributed to the overall completed task. Hence, lead by example, train employees to provide a quality product, create an environment where there is no fear to share knowledge, and give credit where credit is due is the motto of a successful TQM organization.

2.7 The Design and Construction Process

In the planning of facilities, it is important to recognize the close relationship between design and construction. These processes can best be viewed as an integrated system. Broadly speaking, design is a process of creating the description of a new facility, usually represented by detailed plans and specifications; construction planning is a process of identifying activities and resources required to make the design a physical reality. Hence, construction is the implementation of a design envisioned by architects and engineers. In both design and—construction, numerous operational tasks must be performed with a variety of precedence and other relationships among the different tasks.

Several characteristics are unique to the planning of constructed facilities and should be kept in mind even at the **very early** stage of the project life cycle. These include the following:

- Nearly every facility is custom designed and constructed, and often requires a long time to complete.
- Both the design and construction of a facility must satisfy the conditions peculiar to a specific site.
- Because each project is site specific, its execution is influenced by natural, social and other location conditions such as weather, labour supply, local building codes, etc.
- Since the service life of a facility is long, the anticipation of future requirements is inherently difficult.
- Because of technological complexity and market demands, changes of design plans during construction are uncommon.

In an integrated system, the planning for both design and construction proceed almost simultaneously, examining various alternatives which are desirable from both viewpoints and thus eliminating the necessity of extensive revisions under the guise of value engineering. Furthermore, the review of designs with regard to their constructability can be carried out as the project progresses from planning to design. For example, if the sequence of assembly of a structure and the critical loadings on the partially assembled structure during constructions are carefully considered as a part of the overall structural

design, the impacts of the design on assembly details can be anticipated. However, if the design-professionals are expected to assume such responsibilities, they must be rewarded for sharing the risks as well as for undertaking these additional tasks. Similarly, when construction contractors are expected to take over the responsibilities of engineers, such as devising a very elaborate scheme to erect an unconventional structure, they too must be rewarded accordingly. As long as the owner does not assume the responsibility for resolving this risk-reward dilemma, the concept of a truly integrated system for design and construction cannot be realized.

The willingness to assume responsibilities does not come easily from any part in the current climate of the construction industry in Ghana. On the other hand, if owner, architect, engineer, contractor and other groups that represent parts of the industry do not jointly fix the responsibilities of various tasks of appropriate parties, the standard of practice will eventually be set by court decisions.

2.7. 1 Examining architects'

The performance of the construction industry has consistently been a source of concern to clients (Okuwoga, 1998). The industry is characterized by repeated delays, cost overruns and collapse of buildings (Okpala andAniekwu, 1988; Elinwa and Buba, 1993; Mansfield et al., 1994). In many instances, these problems are so severe that serious questions as to the efficiency of human factors in the construction process have started to emerge. While some would blame the client or contractor, the majority would hold the

architect who conceptualizes the design responsible. A major reason for this is that the architect is perceived not only responsible for providing an appropriate design but also to provide efficient construction supervision and the successful delivery of the building. Chappell and Willis (2000) noted that architects are dependent on other people to interpret their designs and their involvement during the erection of the building is as important to its ultimate success. Unfortunately, most architects are over enthusiastic about design at the expense of the other elements and make the design an end itself: design for design's sake. The act can be both intoxicating and addictive, but design is not the only differentiating factor when clients make their choice of consultants (Emmitt, 1999).

Over design is likely to be one of the key reasons for project failure (Dallas, 1992). According to Emmitt (1999) the manner in which a building is designed and then built is rarely a neat, ordered process. Generally changes may occur in both the design and the programme as a project moves from conception to a completed building. Architects are able to navigate this process because they have a conceptual framework in their mind, which enables them to understand the process and also to accommodate changes that are often out of sequence (Hubbard, 1995). Therefore the performance of the architect, who is a key contributor not only during the design stage but the whole building delivery process, demands serious attention. Dallas (1992) pointed out that poor performance by key contributors is one of the key reasons for project failure which will affect not just the responsibilities of the poor performer but will often have significant knock-on effects to others. The results can be very costly in terms of quality, progress and cost.

There is the need-to evaluate the performance of the architect in relation to the client's priorities. According to Tong and Youjie (1992) and Wilson (1982), if the clients and consultants understand the fundamental needs of one another, and if they are prepared to take an effective role in construction process, the chances of producing successful projects will improve.

Various attempts have been made by different researchers to determine architects' responsibilities within the building delivery process (Symes et al., 1995; Chang and Ibbs, 1998; Banks and Nicholson, 1993; Emmitt, 1999). The literature abounds with lists of criteria associated with the domain of architect/consultant responsibilities. Although there are some commonly identified criteria such as design criteria in relation to time, cost, and quality, there is however no general agreement on suitable criteria set. From the literature, a set of 28 criteria were identified and grouped under the headings: client focus, buildability of design, quality of works and management systems.

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2.7.2 Client focus

Clients are the core of the process and their needs must be met by the industry (Latham, 1994), hence performance criteria should reflect owner requirements and expectations (Barry, 1991). Egan (1998) noted that most clients are interested only in the finished product, its cost, whether it is delivered on time, its quality and functionality. Concentrating on the view of the consumer leads to a view of construction as a much more integrated process. The clients must become part of the firm's organizational structure (Coxe, 1980). Good communication between client and architect is crucial, not

just for the success of a project but also for long-term client relationships (Emmitt, 1999). The better the understanding of the client's needs the better the competitive advantage of the architectural firm (Maister, 1993). Satisfied clients are the most important source of new work, either through further commissions or through their recommendations to others (Kaderlan, 1991). Criteria under "client focus" include, understanding client cooperative objectives, forethought and consideration of user requirements, identifying and prioritizing project objectives, analyzing the design concepts and requirements, the project was designed within budget, completion of design to time and design conformance to owner's requirements.

25.3 Constructability/Buildability of Design

The Construction Industry Research and Information Association (CIRIA, 1983) defined buildability as "the extent to which the design of a building facilitates ease of construction, subject to the overall requirements for the completed building". Though constructability is not new in the construction field (Tatum, 1987; Eldin, 1988), its planning requires the optimum integration of construction knowledge and experience with the engineering design to achieve the overall project objectives (O'Connor and Tucker, 1986). Whilst the CIRIA appreciates that ease of construction may be influenced by many organizational, technical, managerial and environmental considerations, the major contribution was thought to lie in those factors which fall within the influence or control of the design team (Griffith, 1984). The architect must therefore give necessary attention to buildability from the conceptual planning stage of the design. This will not only allow timely delivery of

the project but also go a long way in reducing cost. Criteria in this group include completion and simplification of design, standardization of element, dimensional co-ordination of element, flexibility in design, knowledge of performance characteristics of materials and components, constructability review was carried out and effective participation in supervision and control

2.7.4 Quality of works

While there have been various definitions for quality, it could be defined within the construction industry as fitness of purpose (CIRIA, 1985), the effective achievement of agreed goals between client and contractor (Fan, 1995), meeting the legal, aesthetic and functional requirements of a project (Arditi and Gunaydin, 1997) or conformance with the requirements of clients (Atkins, 1994). Taylor and Hosker (1992) highlighted that architectural firms must give their clients confidence both in the quality of the service they provide and in the quality of the buildings they produce. They must be able to accomplish this cost effectively in order to stay competitive. Macdonald and Piggott (1990) noted that total commitment to quality is seen as the best way of consistently delighting the customer through quality service and quality products. Criteria in this group comprises aesthetics and quality of design, high quality specification, production of quality management strategies, assistance in production of quality manuals, non rework and efficiency of design, design conformance to codes and standard and assistance in production of construction inspection and testing program.

2.7.5 Management systems

(1982) and 1
Sidwell Ireland (1984) noted that managerial control is a key element in achieving project success, being related significantly to all measures of success.

Rowlinson (1988) also concluded that a high level of administrative ability in the project team leads to reduced time overruns, which in turn leads to increased satisfaction of client. Today, management systems have been incorporated in project management which has emerged as a distinct profession, leading to further fragmentation of the building process (Smith and Morris, 1992) and further loss of control of the building process by architectural firms (Pawley, 1990). From the business standpoint it makes sense to adopt project management, helping to ensure the long-term viability and profitability of firm while maintaining the all-important link between client and architect for producing quality architecture (Emmitt, 1999). Walker (1996) also noted that from the client's perspective a situation where architecture and project management are combined in one firm is likely to be attractive. However architectural education continues to be concerned first and foremost with design. According to Symes et al. (1995), only 21 per cent of architects interviewed in a recent survey in UK thought that they were trained adequately in project management and a survey of architectural students in UK indicated they wanted more training in this field (Rogers, 1995).

Architects should be aware that this would give them added advantage in ensuring smooth successful project delivery from conception to final handover. Building projects are extremely complex, requiring the skills of many individuals from diverse backgrounds who need to be brought together as a well-organized team; thus the interaction of sound

professional management systems is essential if the client's goals are to be realized. Criteria under the management group include, pre-design project meetings, assistance in defining project strategy, involvement of other professionals during design stage--co-ordination among phases of design, co-ordination between design and construction, effective communication of design to contractor, and project review meetings.



2.8 Benefits of TQM in the Construction Process

The benefits of introducing TQM as a management technique in the construction process may be summarized as follows: (Quality Management for contractors; in accordance with BS 5750: 2002, part 2)

- a) The client receives assurance that the structure he ordered has been constructed in accordance with established work procedures using materials of specific quality.
- b) The contractor's procedures become more efficient, wasteful practices are eliminated and the communications within the company improve because the responsibilities of people involved in construction are better defined.
- c) Communications between the parties to the construction work (i.e. contractor, architects, engineers, sub-contractors etc.) improve through the use of more formal channels of communication.
- d) More work is produced "right-first time" and cost savings are made because less remedial work is required.
- e) Less time is lost because of poor materials supply, and the costs of replacing rejected materials are reduced.
- f) Project information, drawings, specifications etc. are supplied by the client's representatives more systematically. Specifications should be clearer.
- g) —The contractor has a better chance of meeting his budget and completing the project on time. Any disputes which arise should be settled more easily by reference to the project quality records.



h) Where there is staff turnover on site, new incumbents

find it easier to check that parts of the works completed before their arrival have been carried out correctly. Equally, young engineers gain experience with greater confidence since the written procedures they are asked to apply have been prepared and tested by engineers more experienced than them.

i) The contractor obtains assurance through audits and corrective action that his project management is operating correctly

Any approaches used to achieve and maintain quality can be of value. But all approaches are valuable only if managers at all levels are living the quality message, paying attention to quality, spending time as evidenced by their calendars and above all applying the principles of quality management systems, the world would be a better place to live.(Ghana Quality Organizations news letter. Volume 1 Issue 2 September 2005)

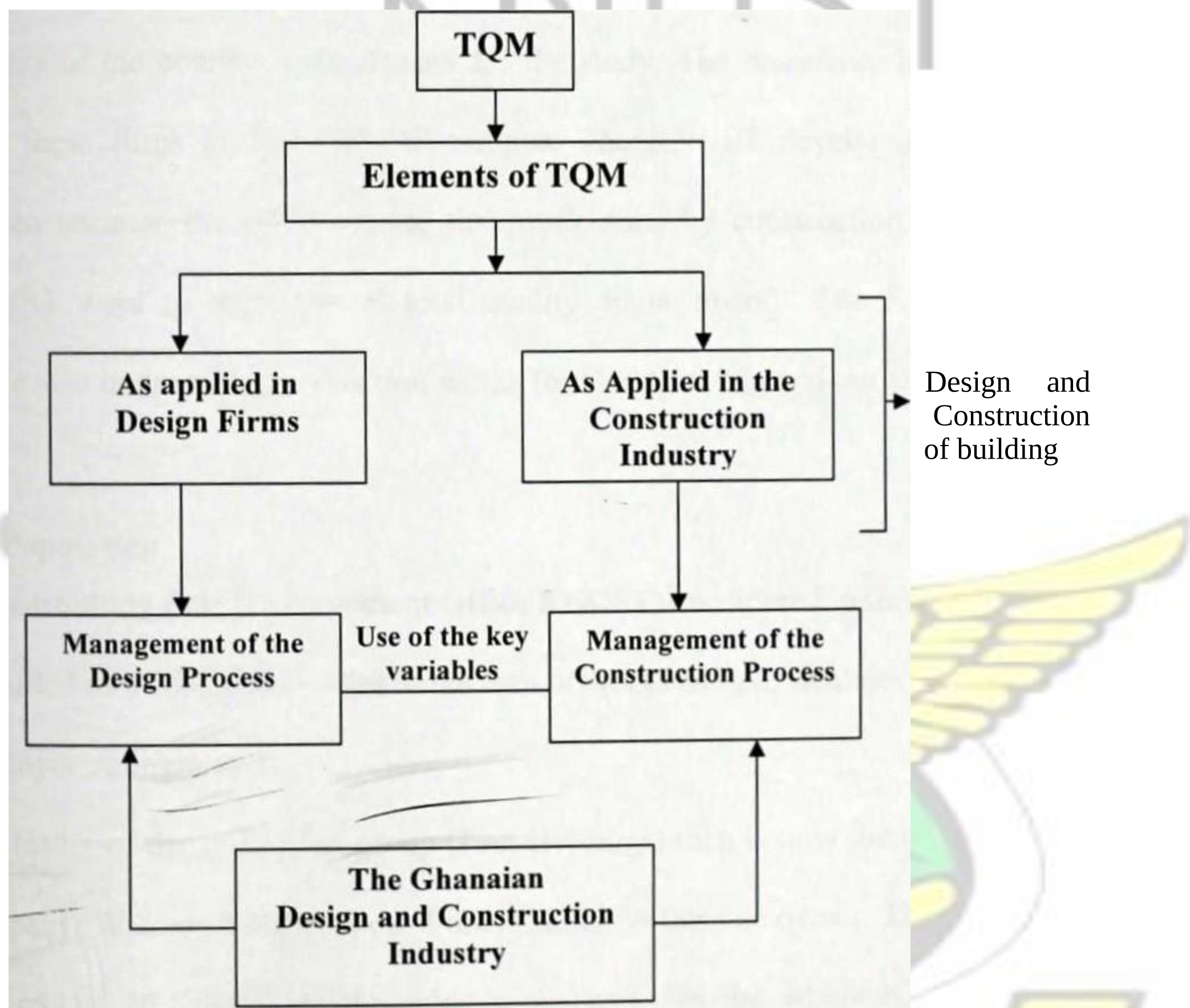
2.9 Conceptual Framework

From the literature reviewed, it has been realized that, most of the writers on TQM, concentrate on manufacturing organizations. The few that we have on construction are focused on the application of the principles and the benefits. The reviewed literature

provides, the concept of quality, definition of quality and TQM, ISO 9000, historical background of TQM and the benefits of TQM systems, the elements of TQM, the design and construction process and how TQM benefits the industry. The benefits of TQM are expected to be seen in the performance of the Design and Construction industry. The study therefore considered the perception of staff on issues of quality by using the TQM dimensions outlined below. (Schaffer and Thompson 1992)

An assessment of TQM systems in the case study firms was carried out using the TQM variables of Leadership and Commitment, Training and Education, Information and Communication, Motivation, Planning, Measurement and Control and finally client satisfaction.

Figure 1: CONCEPTUAL FRAMEWORK



Source. Researchers own development

The study is only concerned with the design and construction of buildings.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Scope of the Study

There were large numbers of design and construction firms in Ghana. Only three firms were selected. Basically, those who have the experience of working in almost all the ten regions of the country were chosen for the study. The researcher has done some work with these firms on the KNUST campus. The KNUST development office was also chosen because the office ensure that work done by construction firms in Ghana for KNUST were of standards of total quality management. The KNUST development office also under take construction works for clients within and out side campus.

3.2 Population

The case study firm (Development Office KNUST) considered in this research can be classified as a consultancy firm in the area of works and physical development. It has an employee strength of 32.

The leader of the technician group (Fast Holdings) then is now the C.E.O. of the current company, Wilkado Construction Works Ltd. He is the sole owner. The company has staff strength of 76. These are the salaried workers. On the whole it employs about 660 temporal workers.

In carrying out this study, the researcher firstly granted questionnaire interviews to all the 12 senior staff and 20 junior staff. The interviews were conducted on specific questions, but there was room for open discussion so that the interviewees could share complementary information on the various quality management issues under discussion.

3.3 Sampling Technique

In social research, surveys are one of the most frequently used methods of data gathering. The survey protocol of random sampling procedures allows a relatively small number of people to represent a much larger population. Surveys are an effective means to gain data

on attitudes, on issues and casual relationships. However, they can only show the strength of statistical association between variables. Surveys do not explain changes in attitudes and views over time. They also provide no basis to expect that the questions are correctly interpreted by the respondents.

This notwithstanding, questionnaire survey, was appropriate for achieving the objectives of this study. Because of the large number of design and construction firms in Ghana only three firms were selected. Basically, those who have the experience of working almost in all the ten regions of the country were chosen for the study. The researcher has done some work with these firms on-the—KNUST campus.

Data was obtained from two sources: primary and secondary.



3.3.1 Measurement Variables

To evaluate quality management status, it is important to have a valid instrument for measurement. The 7-dimension with 6-9 item instrument of quality management was used to serve this purpose. (Schaffer and Thompson 1999)

The dimensions used are as follows;

i) Leadership and commitment ii)

Training and education iii)

Information and communication iv)

Motivation

v) Planning vi) Measurement

and control vii) Client

satisfaction

The researcher used perceptual measures on a ten point interval scale, to develop the questionnaire with 1-4 = poorly done, 5-6 = fairly done, 7-8 = very effective and 9-10 = excellently done, to capture information about quality management implementation in the form of attitude statements.

3.4 Data Collection

Primary Data

Primary-data was obtained using questionnaires, personal observations, formal and informal interviews with management, workers and clients of the firms under study. Structured interviews were conducted and used to obtain information from the sampled employees, clients and management to ascertain their views on relevant issues.

Primary data was obtained through stratified random sampling of 100 employees from the various departments of the firms and simple random sampling of clients to answer questionnaires. The stratified random sampling was based on the number of people in each department. Also, informal interviews were conducted whilst key functional managers in the firm were also interviewed. In carrying out this study, the researcher granted interview to both senior and junior staff. This enabled the researcher to tailor questionnaires to junior staff based on the senior staff interview.

The interviews were on specific questions, but there was room for open discussion so that the interviewees could share complementary information on the various quality management issues under discussion.

Secondary Data

Secondary data was obtained from relevant published and unpublished literature written on TQM application and other related materials. They included data from the firms concerned, information from the dailies, libraries and other institutions of interest. This provided relevant background information for the actual research survey.

3.5 Hypothesis

The Effectiveness of Quality Management in the Design and Construction Industry In Ghana can be hypothesised into the null and the alternative hypothesis for the study as follows;

Ho: = there were no significant difference in the effectiveness of quality management in the design and construction development office of KNUST and Wilkado Construction Works Ltd.

$H_1: \mu =$ there were significant difference in the effectiveness of quality management in the design and construction development office of KNUST and Wilkado Construction Works Ltd.

3.6 Data Analysis

Standard Deviation tool in the SPSS and Microsoft Excel graph tool computer software were used to determine the degree of assertion in the perceptual data collected.

3.7 Research Constraints and Problems

Time and Resource Constraints

Although the subject matter was found to be interesting and of much importance to the firms it focused on, the limited time and money available for this study did not allow for a more detailed research, both field and secondary. Ideally case studies of the quality programs implementation in some developing countries should have been examined in the course of the study, but as has already been pointed out, time and funding limitations did not make that possible.

Data constraint

Recommendations were based on the assumption that data received from the administered questionnaires were reflective of the reality on the ground

CHAPTER FOUR

4.0 DISCUSSION AND ANALYSIS OF RESULTS

4.1 Introduction

This chapter presents the findings of the study aimed at assessing the implementation of quality programmes and policies of the case study organizations. The discussions and

analysis first looks at the design industry with the Development Office of KNUST as the case study firm, followed by the construction firm; Wilkado Construction Works Limited. Attention was therefore generally focused on ascertaining the state of quality in these organizations.

4.2 The State of Quality Management Application in the Development Office — KNUST

The Development office was established in the late 1960s. It was established to ensure that the University gets the best of any infrastructural development on its campus. The office became the consultant for the university in the areas of works and physical development. Over the years, the office has fulfilled this vision by ensuring that buildings designed for the University are built to specification.

The office has not been able to integrate the quality concept into the entire operations by ensuring effective top management support, total involvement of the entire work force and creation of quality-oriented culture. This is evidenced in the fact that some employees have no knowledge of TQM as a management system.



The Quality Management Implementation Survey at the Development Office, KNUST

The case study firm (Development Office KNUST) considered in this research can be classified as a consultancy firm in the area of works and physical development. It has an employee strength of 32.

In carrying out this study, the researcher firstly granted questionnaire interviews to all the 12 senior staff and 20 junior staff. The interviews were conducted on specific questions, but there was room for open discussion so that the interviewees could share complementary information on the various quality management issues under discussion. To evaluate quality management status, it is important to have a valid instrument for measurement. The 7-dimension with 6-9 item instrument of quality management was used to serve this purpose. (Schaffer and Thompson, 1992)

The dimensions used are as follows;

i) Leadership and commitment (DI) ii)

Training and education (1)2) iii)

Information and communication (D3) iv)

Motivation (1)4)

v) Planning (1)5)

vi)—Measurement and control (D6)

vii) Client satisfaction (D7)

The researcher used **perceptual measures** on a ten point interval scale, to develop the questionnaire with 1-4 = poorly done, 5-6 = fairly done, 7-8 = very effective and 9-10 = excellently done, to capture information about quality management implementation in the form of attitude statements. The rating and their meaning are presented in table 4.1 below. The questionnaire is presented in Appendix I.

To characterize the effectiveness of the management system in place, respondents were required to rate their firms effectiveness of the application of the quality management concept. This represented the attitude/cultural survey of the firm to know employees perceptions of the quality management system.

Table 4.1: Rating and their meanings for the attitude survey

Ratings	Meaning
	Poorly done
5-6	Fairly done (average)
7-8	Very effective
9— 10	Excellentlly done

Source Researchers own development

Survey Results: Development Office KNUST

To evaluate the status (level) of quality management implementation in the Development Office, the researcher calculated the mean value for each of the factors measured on a 10 point Likert scale with multiple items. The mean value of all the items measuring a particular factor (example DI) is taken as the value of the factor. The value or level of quality management implementation is derived by an average of all the factors that is DI — D7. In this study, a level of quality management implementation above the mean value Of 5 — 6 is regarded as a "positive" level of implementation. This means that the firm has made conscientious effort to practice quality management or to implement quality management systems; whereas with a level of quality management implementation below the mean value of 5 — 6 would indicate that it lacks the effort to practice quality management or to implement quality management systems.

4.4.1 General Staff Analysis

Under general staff rating responses on quality management factors (shown in table 4.2 below), the highest rated factor was client satisfaction (D7) at a mean level of 6.21. The second highest rating was management commitment followed by training, communication and motivation being the lowest rated item at a mean level of 5.36.

Table 4.2: Descriptive Analysis for all Staff.

Ratin	No.	Min.	Max.	Mean	Std. Deviation
Leadership & commitment of senior mana ement.	32	1.00	10.00	6.21	2.12
Education and Training	32	1.00	10.00	6.15	2.22
Information and Communication	32	1.00	10.00	5.92	2.10
Motivation	32	0.00	8.80	5.36	2.24
Client Satisfaction.	32	0.00	10.00	6.21	1.95
Total-Average				5.27	

Researchers own development

4.4.2 Senior Staff Analysis

Table 4.3 below shows senior staff responses on quality management factors. The highest rated factor was training (D2) at a mean level of 7.03.

Table 4.3: Descriptive Statistical Analysis for senior staff responses

Rating responses	NO.	Min.	Max.	Mean	Std. Deviation
Leadership and commitment	12	1.30	9.50	6.49	2.19
Education and Training	12	1.00	9.50	7.03	2.18
Information and Communication	12	1.00	9.70	6.06	2.23
Motivation	12	0.00	8.80	5.24	2.47
Client Satisfaction	12	2.20	9.40	6.24	1.81
Measurement and Control	12	0.00	9.40	6.33	2.41
Planning	12	2.90	9.80	6.37	1.95
Total Average				6.25	

Researchers own development

This means that the firm attaches great importance to training senior staff on the concept. The second highest rating was management commitment followed by planning, control,

client satisfaction, communication and motivation being the lowest rated item at a mean level of 5.24. These ratings give a clue to the fact that much focus as far as training in the quality system is concerned has been on senior staff.

4.4.3 Junior Staff-Analysis

Junior staff rated client satisfaction (D7) as the highest at a mean level of 6.19.

This Indicates the perception of staff on the high importance placed on customer satisfaction by management. The second highest rating was management commitment followed by communication, motivation with training being the lowest rated item at a mean level of 5.42. The implication of this is that management is not committed to fully training and motivating the junior staff to support the quality system in place.

Table 4.4: Descriptive Statistical Analysis for junior staff responses

Rating Responses	No.	Min.	Max.	Mean	Std. Deviation
Leadership and commitment of senior mana ement	20	1.00	10.00	6.01	2.08
Education and training	20	1.30	10.00	5.42	2.09
Information and communication	20	2.60	10.00	5.82	1.96
Motivation	20	0.00	8.80	5.54	2.07
Client satisfaction	20	0.00	10.00	6.19	2.06
Total Average				5.80	

Researchers own development

The results show that the firm generally has a "positive" (point value = 5 — 6) level of quality management implementation at the upper end of the ten-point interval scale, where 10 represents excellent operation and 1 means the firm does nothing in terms of quality management. A closer look at the quality management implementation factors reveals that

none of the factors in quality management falls below the 5-point value. This suggests that the—Development office recognizes the critical components of quality management and has implemented them to a certain level.

4.5 Critical Concerns in the Attitude Survey; Development Office KNUST

4.5.1 Leadership and Commitment

According to senior staff and junior staff, senior management commitment is 'average' as shown in table 4.3 and 4.4 at a mean level of 6.49 and 6.01 respectively. The survey outcome implies that the workers do not see management as fully committed to the quality program for its effective implementation. Since workers look up to management for commitment to TQM in place, management must improve their commitment.

4.5.2 Training and Education

The rating given on training shows that training in quality is not fully organized and consistent with the actual training needs of employees. As have already been stated, training for junior staff has not been adequate with a mean level of 5.42 compared with that of senior staff shown in table 4.3 with a mean rating of 7.03. There is the need to improve upon it.

As to whether the firm develops measures for effective training that reflect feedback from clients, employees and process. Some of the senior staff admitted that there was a problem with that AS the office was not yet there.

4.5.3--InfOrmation and Communication

For information and communication, respondents stated that quality issues are not fully communicated to them. On the part of junior staff it was revealed that management is not fully open to them so far as the development of the quality system is concerned; mostly



attention is given to senior staff Junior staff rating at mean level of 5.82 (Table 4.4) compared with that of senior staff at a mean level of 6.06 (Table 4.3) confirms this. It was revealed that there is no clear cut mode of communication in the system.

4.5.4 Motivation

Motivation received the lowest rating by both junior and senior staff. The mean rating from junior staff was 5.54 whilst that of senior staff was 5.24 as shown in Tables 4.3 and 4.4 respectively. Junior staff respondents expressed dissatisfaction with the promotional policies and reward systems. The staff currently perceives motivation as low in the firms operation. Management needs to provide incentive packages for deserving workers to motivate them to work to their maximum abilities.

4.5.5 Client Satisfaction

On client satisfaction, which is the ultimate for the implementation to achieve desired results in the firms performance, the results obtained is quite revealing. Junior staff rated the firm's effectiveness on an average of 6.19 and that of senior staff on an average of 6.24, which are almost the same. (Tables 4.3 and 4.4) Both junior and senior staff confirmed that even though satisfaction level has been increased, it is not the best at the moment; there is room for improvement.

4.5.6 Planning, Measurement and Control

For planning measurement and control, which are the preserve of senior Management, the survey revealed that at the moment, measurement is not efficient and this has great influence on planning. Rating on measurement was given at a mean level of 6.33 while planning received a rating of 6.37. (Tables 4.3 and 4.4)

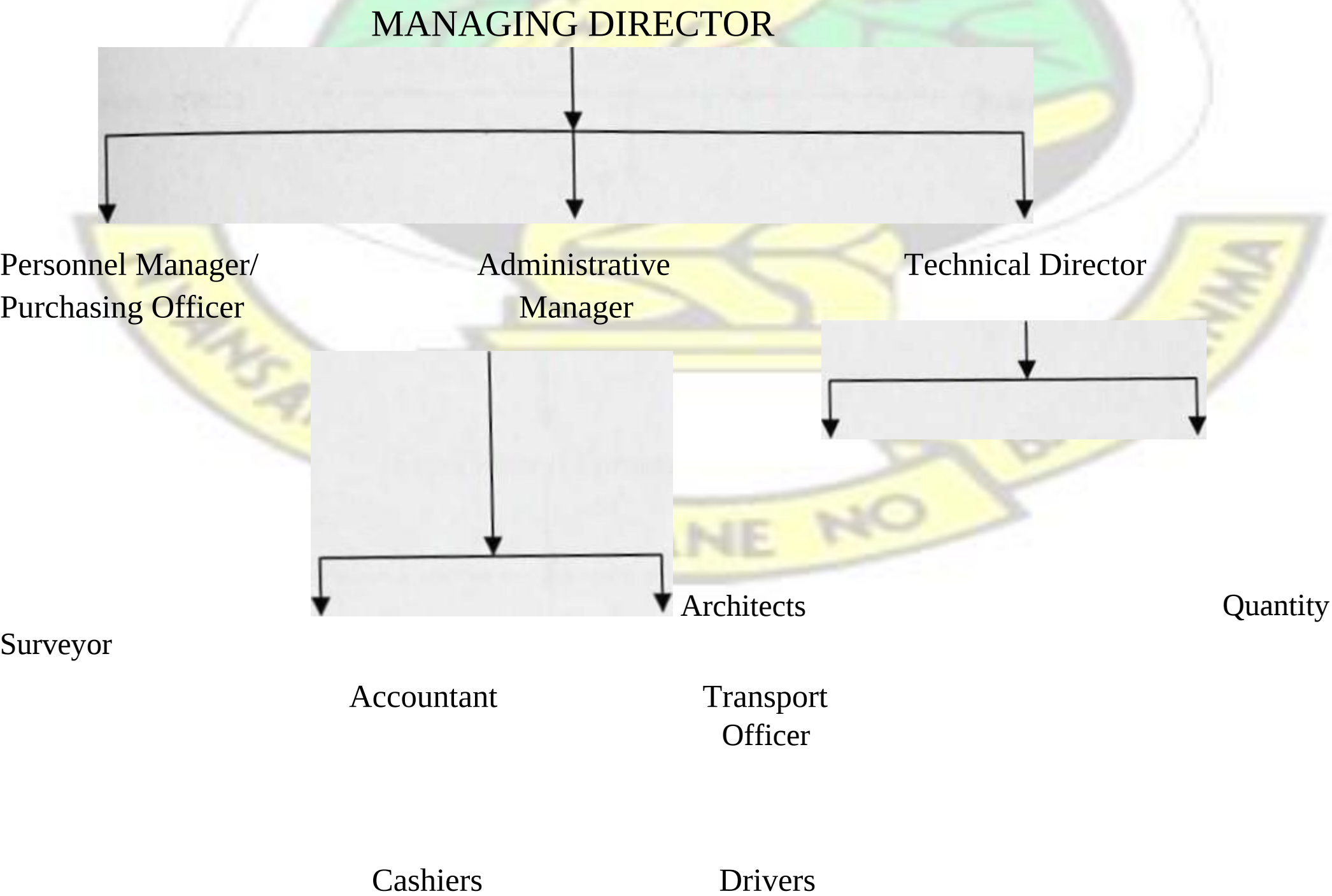
From the various suggestion and sentiments given by the staff (both junior and senior) it can be concluded that the Development office is not doing badly in its commitment to clients and staff satisfaction. However there is more room for improvement since TQM looks at a continuous improvement in perpetuity.

4.6 Survey Results: Wilkado Construction works Limited

4.6.1 Quality management Application in Wilkado Construction Works Ltd.

About ten years ago, the company started with a few men as electrical technicians group undertaking electrical works. This developed into an electrical contractor who undertook subcontracts in major construction works. Five years ago they started entering into mainstream construction when their capital base grew tremendously. The leader of the technician group (Fast Holdings) then is now the C.E.O. of the current company, Wilkado Construction Works Ltd. He is the sole owner. The company has staff strength Of 76. These are the salaried workers. On the whole it employs about 660 temporal workers.

Figure 1: Organizational Structure (General)



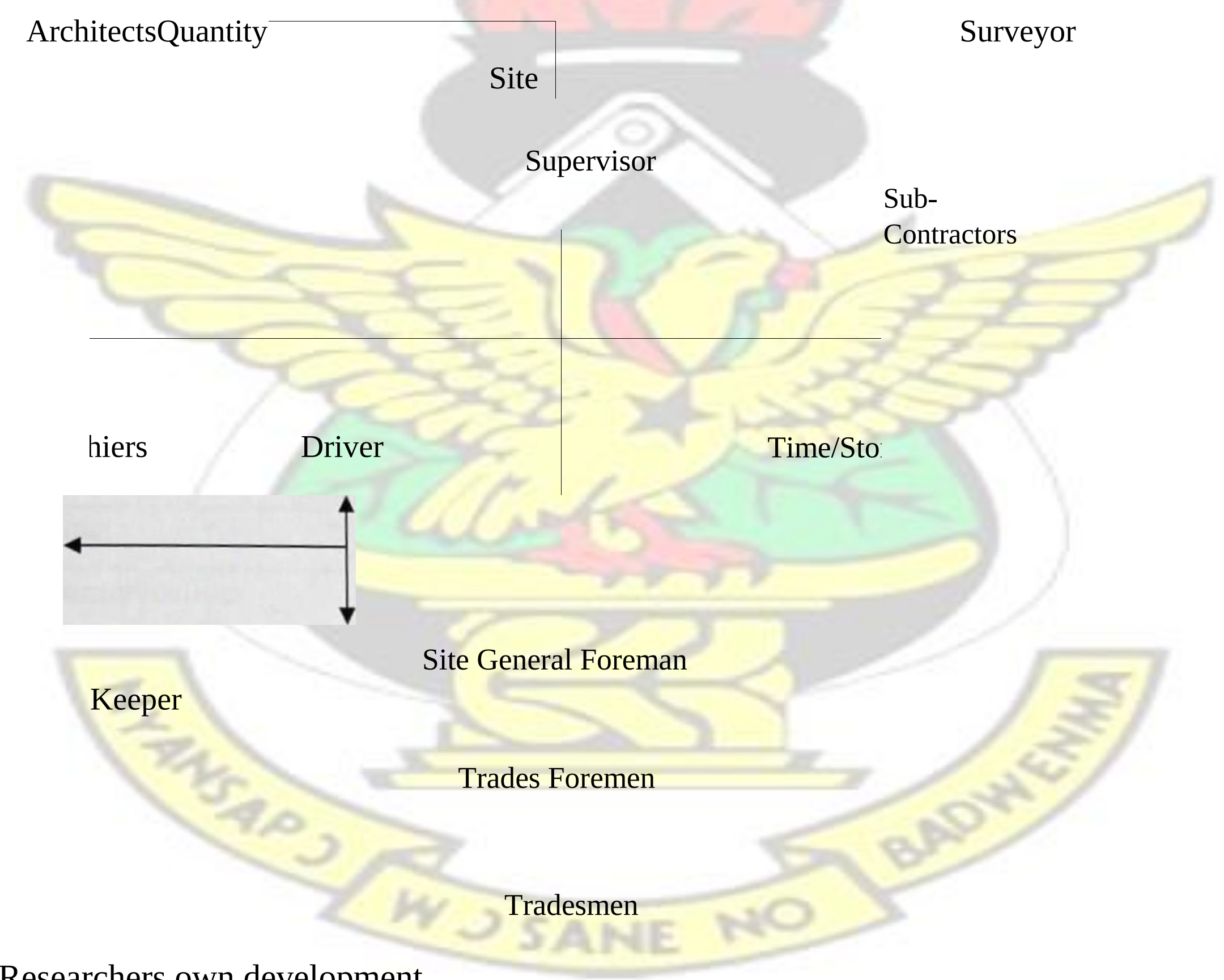
Researchers own development

The structure however on each construction site is indicated below. This is of interest to the study, since the study concentrated on a particular project.

KNUST



Figure 2: Organizational Structure on Site



Researchers own development

The selected site fore the study is the KNUST hall seven project. The site has 68 workers.

Senior staff of about 10 and the remaining 58 forms the junior staff.

4.6.2 Senior Staff Analysis

The table below (Thble 4.5) shows senior staff responses on quality management factors.

The highest rated factor was client satisfaction at a mean level of 7.20. This is an indication that the company attaches great importance to satisfying their clients. The next highest rating was leadership and commitment followed by measurement and control, planning, education and training, information and communication, with motivation being the lowest rating.

Table 4.5 Statistical Analysis for senior staff responses

Rating responses	No.	Min.	Max.	Mean	Std. Deviation
Leadership and commitment	10	1.20	9.40	6.39	2.10
Education and Training	10	2.20	9.40	6.24	1.91
Information and Communication	10	1.00	9.70	6.05	2.34
Motivation	10	0.00	7.60	5.04	2.46
Client Satisfaction	10	1.00	9.50	7.20	2.19
Measurement and Control	10	0.00	8.40	6.30	2.30
Planning	10	2.80	9.70	6.27	1.85
Total Average				6.25	

Researchers own development

The highest rated factor was client satisfaction at a mean level of 7.20. This is an indication that the company attaches great importance to satisfying their clients. The next highest rating was leadership and commitment followed by measurement and control, planning, education and training, information and communication, with motivation being the lowest rating.

4.6.4 Junior Staff Analysis

Table 4.6 Statistical Analysis for junior staff

Rating Responses	No.	Min.	Max.	Mean	Std. Deviation
Leadership and commitment of senior management	58	1.00	10.00	6.02	2.07
Education and training	58	1.20	10.00	5.45	2.05
Information and communication	58	2.40	10.00	5.70	1.86
Motivation	58	0.00	8.60	5.30	2.08
Client satisfaction	58	0.00	10.00	6.17	2.06
Total Average				5.70	

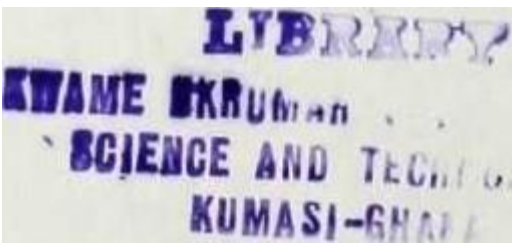
Researchers own development

Client satisfaction was again the highest rated with a mean level of 6.17. This shows that workers have the perception that management places high importance on satisfying clients. The next rating was leadership and commitment followed by information and communication, education and training with motivation again being the lowest rating. The company has a positive level of quality management implementation since all the ratings are above 5. This is an indication that Wilkado Construction Works Ltd recognizes the components of quality management and is implementing them to a certain level.



4.7 Critical Concerns; Wilkado Construction Works Ltd

4.7.1 Leadership and commitment



Leadership and commitment had the second highest rating for both senior and junior staff. The senior staff mean was 6.39 and 6.02 for junior staff. (Tables 4.5 and 4.6) This indicates how management is not fully committed to the quality program. Commitment to TQM must be exhibited by management through their attitude towards work and employees.

4.7.2 Education and Training

Training and education was given a rating of 5.45 for senior staff. (Table 4.5) This shows that for senior staff management gives some attention to training and education on quality. However the rating of 5.45 for junior staff is an indication of a lower concern for training in quality. (Table 4.6) As one employee puts it, the training must be properly organized to meet the needs of the individual to improve his performance.

4.7.3 Information and Communication

The results show how quality issues are not properly communicated to employees in a consistent manner. Senior staff respondents gave an indication that for them they are informed a bit on quality issues. Senior staff rating was 6.05 as compared to junior staff rating of 5.70. (Tables 4.5 and 4.6) There is no formal method of making sure that employees are made aware of quality issues. Some respondents said there was no avenue for them to make suggestions to management in the system.

4.7.4 Motivation

For both Senior and Junior staff, motivation received the lowest mean rating of 5.04 and

5.30 respectively. (Tables 4.5 and 4.6) Employees in general see motivation as very low in the company. There are no incentive packages was the complaint of some workers. Some showed their dissatisfaction with the system in place at the moment. Again they are not made to feel a part of the organization.

4.7.5 Client Satisfaction

Both senior and junior staff respondents rated client satisfaction as the highest. A mean rating of 7.20 and 6.17 was given for senior and junior staff, respectively. (Tables 4.5 and 4.6) This provides information that management is really committed to satisfying clients. Such result tells that quality management is being implemented some how but not holistically. One respondent said that client requirements in relation to quality and early completion of projects should be met. Management therefore needs to do more to satisfy clients better.

4.7.6 Measurement and Control

For a construction company it is expected that this is done properly in the area of materials and their use. Senior staff respondents gave a mean rating of 6.03 which is average. This implies that a lot must be done to improve on the system in place as far as measurement and control is concerned.

4.7.7 Planning

Planning according to some of the respondents is done by senior management. Employees are not involved. Senior staff response gave a rating of 6.27 which is an indication that effort is being made to involve the senior staff. From the various

suggestions given by both senior and junior staff, the company is performing well in respect of client satisfaction. There is however more room for improvement. The issue of motivation must be addressed since respondents gave it the lowest rating. Wilkado construction works Limited needs to improve on its reward systems.

4.8 Correlation between Survey results of the Design firm (Development Office KNUST) and the Construction firm (Wilkado Construction Works Ltd.)

The values obtained from the Development Office survey will be represented by 'X', while that of Wilkado is represented by 'Y'.

Table 4.7 Senior Staff correlation

X	Rank(rx)		Rank(ry)	$D^2=(r_x-r_y)^2$
6.49	6	6.39	7	1
7.03	7	6.24	4	9
6.06	2	6.05	2	
5.24	1	5.04	1	
-G.ï4	3	7.20	3	
6.33	4	6.30	6	4
6.37	5	6.27	5	

Researchers own development
Rank correlation coefficient (r) = 0.75

Since the rank correlation coefficient lies between -1 and +1, there exist a relationship between the Design firm and the Construction firm. The coefficient of determination (r^2) is 0.5625 which implies that, when there is a change in any of the two firms, 0.5625

percent of the factors will come from a change in the other firm. Other factors may account for the change.

In the Design and Construction firms the use of senior staff with similar qualification and skill may be the reason for the relationship between the two firms. Also the final product, which is a building, is one for both firms.

Table 4.8 Junior Staff correlation

X	Rank(rx)		Rank(ry)	$D^2=(r_x-r_y)^2$
6.01	4	6.02	4	
5.42	1	5.45	2	1
5.85	3	5.70	3	
5.54	2	5.30	1	1
6.19	5	6.17	5	0

Researchers own development

The rank correlation coefficient for Junior Staff is 0.90, which also lies between —1 and +1. Here the coefficient of determination (r^2) is 0.89 which indicates that 0.89 percent of the factors that account for a change in one firm directly comes from a change in the other. The Design firm employs skilled and unskilled junior staffs who are also employed

by the Construction firm. In both firms a number of unskilled labour is employed. This may account for the relationship between the results.



CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATION

5.1 Conclusion

5.1.1 Introduction

Any approach used to achieve and maintain quality can be of value. But all approaches are valuable only if managers at all levels are living the quality message, paying attention to quality, spending time as evidenced by their calendars and above all applying the principles of quality management systems. With this the Design and Construction industry would provide us with better buildings.

Quality within the Design and Construction industry, gives clients confidence in the ability of designers and contractors, to meet their particular requirement specified. The survey results provide an indication that management activities are focused on satisfying clients' interest. This tells how the industry is beginning to implement TQM in its operations.

5.1.2 Findings from Case Study Firms

Areas of concern; this refers to issues where further improvements are possible.

- a) Training; as concluded from the staff survey, the training program has not been effective enough for junior staff compared with that of senior staff in
——disseminating the concept of TQM.

- b) Motivation; to the staff, motivation is very low compared with work achievement despite the fact that the firm offers are better than others. Motivation received the lowest rating by both junior and senior staff; a fact that shows that something needs to be done about it.
- c) Communication; Communication was also found to be partially effective. Staff in the junior ranks has little knowledge about the quality system than the rest of the staff.
- d) Quality Integration; It came to light that though the quality system was meant for the entire staff, only a section of it has understanding and appreciation of it

The problem with the studied firms' system is not technical but human oriented. The overall performance of the firms studied, depicts that quality management system implementation is feasible. The firms have a great potential for growth and therefore need to address the areas of concern identified to achieve a better performance. Thus Total Quality Management can be applied successfully only if it is central to the business strategy and if the people factor is at the core of the approach.

5.2 Recommendation

Recommendations are made with the purpose of enhancing the implementation process of-the Quality system in the case study organizations. The firms will need to add and change some of the processes used. It is felt that a change in the firms' culture in terms of increasing acceptance of TQM concepts and ideas is needed most.

5.2.1 Standards and Measurement

Management should establish realistic quality standards that are specific, measurable, attainable, results- oriented and timely (SMART) to measure the progress of each section on quality improvement. Standards should be precisely quantified whenever possible. For instance, progress in the area of Development can be measured from the ability to meet design schedule and usage of problem solving techniques in construction. However, care must be taken to ensure that the measures are adequately identified else people would work just as hard to increase the wrong measures as the right ones. Regular surveys focusing on employee behavior related to quality improvement, teamwork and client service can show if the changes necessary for lasting quality improvement are taking root. Also surveys at the beginning of a quality process can be used to build useful (internal) benchmarks against which subsequent progress can be measured and also compared with external benchmarks. A regular survey for measuring client satisfaction is urgently needed to improve on client satisfaction.

5.2.2 Reward and Recognition

When employees demonstrate appropriate 'quality-minded' behavior, it is essential that management offers praise-antféinforcement. The reward system needs to tie the rewards to the key measures of the firm. People need to be rewarded for individual effort only if it contributes to the mission of the whole firm. Reward and recognition should be specific, honest and meaningful to the team member and shared with others in the team. In general, it is preferable to emphasize non- monetary rewards instead

of monetary rewards. Publicizing the individuals or the teams name in the firms 'quality of fame' list is one way to create a positive atmosphere for continuous quality improvement. In this way, employees will feel more involved in their work and the firm can sustain their long term commitment.

5.2.3 Training

Training is a waste of time and effort if the programs are not effective in creating the desired change in behavior. The result of the training program, not the fact that it is being done, is what a company should focus on. Thus, some suggestions on improving the effectiveness of the training course are as follows:

- A formalized training program structured to support TQM, should be designed for training in the new concept of quality.
- For all new employees, videos should be used for first time training to introduce the company quality policy and TQM concept. A top-down training method can be applied to a more formal training course when it is conducted. After the supervisor have attended the training course, they should be made responsible for ensuring the training of their subordinates. By having the direct superiors as trainers, the training would be more effective since it would be —better related to the actual working environment in each particular department.

- Formal evaluation of the results of training should be done by using a training assessment survey or by conducting a formal review.

5.2.4 Leadership and senior management commitment

It is hard to change the traditional managerial culture in any company. Continued effort has to be put in training and educating the reluctant managers to adopt TQM concept, thereby establishing uniform management commitment. The slow pace of implementation of TQM was most probably due to lack of leadership. Manager's initiative to direct the employees towards the goal of continuous quality improvement is very important.

Another vital aspect of commitment to be considered is to ensure a proper understanding by managers of their role change. The new role will put more emphasis on coaching and supporting. However, it is essential that the managers understand that their new role does not undermine their authority as set in the organizational structure.

5.2.5 Communication

One staff should specifically be assigned to handle both internal and external issues on communications. This will ensure that more attention is given to communicating the day-to-day progress of the system to all staff as quickly as possible.

5.2.6 Suggestions for Future-Res-CETéW

To present a complete picture of the quality implementation situation in Ghana, the following are suggested:

- A more conclusive study is needed by using a larger sample size for both manufacturing and service industries to arrive at comprehensive strategic guidelines in managing quality in business organizations in Ghana.
- Certain elements of quality management methods such as supplier quality management, client focus, client relationship, management and cost of quality and non-quality, which the study could not cover in detail, should be considered in any future research.



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