EFFECTIVE IMPLEMENTATION OF TOTAL QUALITY MANAGEMENT WITHIN THE NIGERIAN CONSTRUCTION INDUSTRY

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Dedication

This thesis is dedicated to my Daughters, Precious and Praise Dike.

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I would like to express my profound gratitude to my supervisor, Prof. Chaminda Pathirage, who was always ready to welcome me into his office, and often without prior notice. I wish to emphasise that his guidance, advice, and support have contributed to the successful completion of this PhD research journey.

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Declaration

I declare that I undertook the research in this thesis by the University of Salford requirements for the award of a PhD degree by research. Before the submission, some research findings of this research were published in a report and as referred conference papers.

No part(s) of this thesis has previously been submitted to the University of Salford or any other institution for the award of a diploma, degree or any other qualification.

Signature……

Date……

List of Abbreviations

AGIS	ABUJA GEOGRAPHICAL INFORMATION SYSTEM
AQL	ACCEPTABLE QUALITY LEVEL
CAGR	COMPOUND ANNUAL GROWTH RATE
CI	CONTINUOUS IMPROVEMENT
CQI	CONTINUOUS QUALITY IMPROVEMENT
CWQC	COMPANY-WIDE QUALITY CONTROL
EFQM	EUROPEAN FOUNDATION FOR QUALITY MANAGEMENT
FCDA	FEDERAL CAPITAL DEVELOPMENT AUTHORITY
FCT	FEDERAL CAPITAL TERRITORY
GCR	GLOBAL COMPETITIVENESS REPORT
GIS	GEOGRAPHICAL INFORMATION SYSTEM
GPD	GROSS DOMESTIC PRODUCT
ISO	INTERNATIONAL ORGANISATION FOR STANDARDS
MBNQP	MALCOLM BALDRIDGE NATIONAL QUALITY PROGRAMME
PDCA	PLAN – DO – CHECK – ACT
QA	QUALITY ASSURANCE

QC	QUALITY CONTROL
QM	QUALITY MANAGEMENT
QMS	QUALITY MANAGEMENT SYSTEM
SON	STANDARD ORGANISATION OF NIGERIA
SPC	STATISTICAL PROCESS CONTROL
SQC	STATISTICAL/STRATEGIC QUALITY CONTROL
USA	THE UNITED STATES OF AMERICA
TQC	TOTAL QUALITY CONTROL
TQM	TOTAL QUALITY MANAGEMENT
UK	UNITED KINGDOM
UN	UNITED NATIONS
ZD	ZERO DEFECT

Abstract

Today's commercial environment demands the adoption of Total Quality Management (TQM), which a managerial approach that aims to achieve customer satisfaction and global competitiveness. Therefore, TQM is a systematic approach that views quality as the result of the integration of many organisational activities, i.e. engineering/construction, manufacturing, marketing and administration. Nevertheless, construction sector projects have long suffered from high fragmentation, considerable waste, poor productivity, cost and time overruns, and conflicts and disputes. This study develops a framework for the effective implementation of TQM within the Nigerian construction industry. The research focuses on construction projects undertaken by local construction organisations in Nigeria that originates locally and operates within the immediate project vicinity, state or country. It explores the significant contribution of the TQM philosophy to the Nigerian construction industry. The epistemological positioning of this research leans towards interpretivism, where an opinion survey with expert (interviews with expert) and a more general questionnaire survey were used to collect qualitative and quantitative data. Twelve semi-structured interviews were conducted with experts based on their experience in the construction sector, and 173 completed questionnaires were analysed. The questionnaire survey explores the capacity and the understanding of TQM amongst the indigenous firms within the Nigerian construction industry.

Research findings highlighted two main challenges, which are leadership and communication. The data analysis informed the development of a framework for effective TQM implementation, which is intended to function as a guideline for construction industries in Nigeria. The development of a framework helped to identify impediments to the effective implementation of TQM within the Nigerian construction industry. This research highlights that such barriers are similar to those amongst similar organisations from different parts of the world. However, the impacts of some notable indicators, such as undesirable organisational behaviour regarding communication and leadership, have never previously been identified as impediments to TQM adoption. It is anticipated that the framework will help to improve the awareness and understanding of individuals and organisations about the implementation of TQM in the Nigerian construction industry and its potential impact on project performance.

1 INTRODUCTION TO THE STUDY

1.1 Introduction

This chapter presents a detailed overview of the study and is organised as follows: firstly, the background to the research is presented, followed by the research problem and identification of research gap. Secondly, the research aim, objectives and the research questions are described. Thirdly, this chapter highlights the scope of the research, the research methodology and provides the background of the study. Finally, this chapter concludes by outlining the structure of the thesis.

1.2 Background to the Research

A recent report by Trimetric (2016) has revealed that the construction industry in Nigeria is expected to expand greatly from 2016 to 2020 with its output value increasing at a Compound Annual Growth rate of 9.49%. In 2014, the Nigerian economy was declared the largest African economy. The declaration followed (and was a result of) the country's rebasing of its GDP between 1990 and 2010; this resulted in an 89% increment in the estimated size of the economy, thus surpassing South Africa. The report from Trade Economics identified that Nigeria's Gross Domestic Product (GDP) from construction increased to 623,349.23 NGN Million in the fourth quarter of 2016, which was an increase from 543,808.12 NGN Million (£1,160,163) in the third quarter of 2016. Furthermore, GDP from construction in Nigeria averaged 550,720.61 NGN Million from 2010 until 2016, reaching an all-time high of 740204.22 NGN Million (£1,594,241.37) in the second quarter of 2015 and a record low of 369,190.91 NGN Million (£769,316.08) in the third quarter of 2010. Rapid technological advances, particularly within information dissemination and communications, competition, and the deregulation of markets swiftly changed the traditional concepts of manufacturing scale, and the style of management (Dory & Shier, 2012). The world has now become an open global market, which is compelling many organisations in different nations, including Nigeria, to use every possible tool to sustain competitiveness. In such a dynamic environment, achieving and retaining a competitive edge is both a necessity and a challenge. To achieve these objectives, many organisations are changing their traditional business operations from production-orientation to competitive customer-orientation, where customer satisfaction lies at the heart of their business operations.

Recent decades have witnessed widespread acceptance of TQM as a means of gaining and maintaining competitiveness in the global marketplace, including Nigeria (Bayazit & Karpak, 2014; Rawabdeh, 2012; Soltani & Lai 2015; Wadsworth, 2012). Therefore, if Nigerian construction organisations are to survive, and compete against their current and future rivals, they need to adapt to the changing environment by pursuing, adopting, and institutionalising quality management systems. Customers now demand motivated companies from around the world to respond and improve their goods and services; thus, technologies and methodologies, such as TQM, help them to achieve this (Bayazit & Karpak, 2014; Wadsworth *et al.*, 2012).

TQM views an organisation as a collection of processes. It maintains that organisations must strive to continuously improve these processes by incorporating the knowledge and experiences of their workers. The simple objective of TQM is to, 'do the right things, right the first time, every time' (Olatunji et al., 2012), which emphasises the importance of accuracy, timing and the need to perform at a consistently high level. Moreover, TQM is infinitely variable and adaptable; although originally applied to manufacturing operations, and for some years only used in that area, it is now becoming recognised as a generic management tool that is equally applicable in service and public sector organisations. Total Quality Management (TQM) is a philosophy for continuously improving products and services. Organisations that have adopted TQM have gained many benefits; these include profits, employee satisfaction and customer satisfaction (Olatunji *et al.,* 2012). Windapo and Nureni *et al*., (2012) define TQM as a corporate culture characterised by increased customer satisfaction through continuous improvement in which all employees in the firm actively participate. Thus, the last two decades have witnessed the widespread acceptance of TQM across both manufacturing and construction sectors. Indeed, its implementation has signified its recognition as a means of gaining and maintaining a competitive edge in the global marketplace as well as an important factor for growth, survival and success (Elmuti *et al.,* 2006; Sahney *et al.,* 2014). Moreover, Soltani and Lai, (2007) concluded that, to survive and succeed in the business environment, competitive pressure has forced some organisations to adopt quality management systems, hence TQM became a major survival strategy in the 1990s.

Nevertheless, Nigeria has witnessed a critical economic crisis that affected all its industrial sectors (Soltani and Lai, 2015). Moreover, Trimetric (2016) recognises that construction organisations in Nigeria still have a vast untapped potential, and that concentrated efforts are

required for its full realisation. Significantly, the construction sector in Nigeria has been exposed to more aggressive global competition for a longer period than the service sector. Moreover, in Nigeria, the challenges confronting professionals in this vast field include the inconsistent exercise of construction (Madu, 2013), which differs between clients, in terms of the capacity or task intricacy amongst construction professionals. The next section will discuss the research problem and justification.

1.3 Statement of the Problem/Justification

One of the major problems faced by most construction companies in Nigeria is how to adopt a strategy for high-quality buildings that will satisfy the needs of the customers at a reduced and effective price and still ensure that they remain in business without any incurrence of debt (Okuntade, 2015). These problems are multifaceted because the client wants to spend the least amount possible for the highest quality end product (Damci & Yalcin, 2011). Thus, the challenge now arises as to how companies in the Nigerian construction industry will meet such client demands, particularly in a time of extensive competition from numerous bidders. Okuntade (2015) stated that these, and many other factors, increase problems concerning quality and result in companies cutting corners in an attempt to be more competitive. Sometimes, they also reduce bids by cutting profit margins in the hope of winning the few jobs available. This illustrates that construction professionals today are faced with multifaceted challenges. Unprecedented changes are occurring in the construction industry, in terms of techniques, skills, methodologies; moreover, Okuntade (2015) states that the expectations and attitudes of clients toward the end product of their building project are such that requirements are not being met.

This confirms that quality is a major problem in the Nigerian construction industry (Oyedele, *et al.,* 2013), where most construction organisations promise quality in project implementation but fail to meet the required standard and client expectations. Therefore, construction projects in Nigeria have continued to be plagued by issues with quality goals and methods; this contributes to longer-term problems in the construction industry in general, which is confirmed by Arditi and Gunyadin (2013) who confirm that the attainment of an acceptable level of quality in the construction industry has been a problem. Significant amounts of time, money and resources (concerning both human and materials) are wasted every year due to insufficient or non-existent quality management procedures. Damci and

Yalcin (2011) traced this chronic problem to low productivity, poor health and safety, inferior conditions, and inadequate quality management techniques, which mean the standards of quality in construction are not properly managed.

Cases of construction quality failures are not restricted by the climatology or level of urbanization as they cut across cultural and ethnical barriers. Indeed, many cases of construction building collapse have been reported in Nigeria. For instance, in Nigeria Folagbadeet al., (2011) and Chinwokwo et al.,(2010) identified 42 occurrences of building collapse between 2000 and 2009; meanwhile, Makinde (2007) listed 54 cases that occurred between January 2000 and June 2007. Building collapse has also been observed to cut across the different categories of building, namely private, corporate or public. Folagbade (2011) identified that, of the 25 reported cases of building collapse between 2000 and 2010 in Lagos State, private buildings accounted for 76%, corporate buildings totalled 12%, and government or public buildings amounted to 12%. Also, building collapse is not necessarily influenced by structure size. For example, Amusan (2016) reported that the Barnawa flat disaster in 2014 involved a three-storey building, whilst a public building (secondary school) which collapsed in March 2016 in Ibadan was a two-storey building; furthermore, the collapsed showroom for cars in Lagos in 2012 was just a single-storey building, and the Primary School in IIoabuchi, River State in July 2015 was a bungalow. Nevertheless, Folagbade (2011) also reports that the Abuja construction collapse in March 2010, and the Ojuelegba construction collapse in 2009 were both multi-storey buildings. Furthermore, two separate building collapses occurred in 2007 killing several people; these occurred within the Ebute-Meta area of Lagos State and Kano State. Also reported was the fence of a nursery and primary school that collapsed in the Olomi area, Ibadan, in March 2008, killing 13 pupils. The death of over 50 students of Sake Comprehensive College, in Port Harcourt in 1990 was the result of an owner attempting to construct an additional structure out of the approved design.

Effective customer service is the process by which an organisation delivers its services or products in a way that allows the customer to access them in the most efficient, fair, cost-effective, humanly-satisfying and pleasurable manner possible (Williams, 2015). There are potentially a number of factors that may influence customer service in the construction sector, including the products and management systems, which include the ‘queue technique’. Pickles *et al.,* (2014) posited that customer satisfaction means providing a quality product or service that satisfies the needs/wants of a customer and encourages them to return for further

business. In comparison, good customer service means continued success, increased profits, higher job satisfaction, improved company or organisational morale, better teamwork, and a market expansion of services/products. Indeed, good customer satisfaction enables an organisation to enhance its reputation among customers in the Nigerian construction sector. Pickles *et al*., (2014) believes that it helps problem-solving amongst staff at an organisation and creates the ability to multi-task in various areas, such as the navigation of complex databases and the switch between computers to retrieve information for customers.

This problem may have an immediate or subsequent effect on the construction industry because competition has intensified worldwide; organisations are looking beyond local firms to downsized competitors. Clients are now highly selective, and consider the past records of construction companies before awarding contracts. Furthermore, the incidence of substandard work could be identified and rectified during the construction and maintenance stage, although certain defects may only be evident after the facilities are in operation, which could cause an unnecessary nuisance to the owner (Thomas *et al*., 2011). Hence, most construction companies or organisations need to change their concept of quality to survive in this highly competitive industry. Jung and Yung (2006) state that the ability to identify what is changing in the environment and respond proactively through continuous improvement efforts has been viewed as a key element for organisational success.

Based on this discussion, quality and customer service improvements within the construction sector are important for the growth of the Nigerian economy, and could increase the number of certified companies. Moreover, there has been little empirical research undertaken on this subject in developing countries in general (Magd & Curry, 2013; Salaheldin, 2013), and in Nigeria in particular. Thus, there is a critical need to conduct an empirical investigation, which aims to help in the effective implementation of TQM in the Nigerian construction industry. Having explained the research problem, the next section will discuss the aim, objectives and research questions of this study.

1.4 Aim, Objectives and Research Questions

1.4.1 Aim

The aim of this research is to develop a framework for effective implementation of Total Quality Management within the Nigerian construction industry

1.4.2 Research Objectives

1. To examine the definition of Total Quality Management and its principles
2. To explore current Total Quality Management practices in the Nigerian construction industry
3. To critically evaluate the critical success factors and barriers to the implementation of Total Quality Management in the Nigerian construction industry
4. To develop and validate a framework for effective Total Quality Management implementation in the Nigerian construction industry.

1.4.3 Research Questions

The following research questions have been formulated to achieve the research objectives.

1. What is Total Quality Management and what are its principles?
2. What are the current practices of Total Quality Management in the Nigerian construction organisation?
3. What are the critical success factors/barriers affecting the implementation of Total Quality Management in the Nigerian construction industry?
4. How can a framework be developed for the effective implementation of TQM within the Nigerian construction industry?

1.5 Scope of the Research

This research develops a framework for the effective implementation of TQM within the Nigerian construction industry. The research focuses on projects undertaken by construction firms in Nigeria and explores the potential contribution of the TQM philosophy within the industry. TQM is defined as an essential way of planning, organising and understanding each activity of the organisation and thus depends on each activity at each level. Moreover, TQM is a comprehensive and structured approach to organisational management that seeks to improve the quality of products and services through refinements in response to continuous feedback. Data collection for this study is carried out in Nigeria from two consultancy firms, the Nigerian Federal government organisation responsible for construction approval and procedures, and local contractors who are working in the Nigerian construction industry. The government organisation was chosen for the reason that the organisation oversees the

infrastructural, physical development, planning, design and construction of the new federal capital city. Each department is attached to a contractor (a construction company) that carries out projects taking place in the Federal Capital Territory.

A framework for effective TQM implementation is developed as a guideline for the construction industries in Nigeria, which is based on the qualitative and quantitative data analysis and findings. The data comes from semi-structured interviews with 12 practitioners, and the 173 responses to the practitioner survey (a total of 450 surveys were issued, which comprises a 38% return rate). These methods enable the researcher to gain both in-depth and generalisable knowledge from experts working within the Nigerian construction industry. It is expected that this framework will help to improve the awareness and understanding amongst individuals and organisations about the implementation of TQM in the Nigerian construction industry.

1.6 Research Methodology

The research consisted of four phases: establishment of the research problem, research methodology design, concurrent data collection, and analysis and write-up of the thesis. The establishment of the research problem (section 3.3 chapter 1) explained how the researcher identified the research problem, which was achieved via the researcher's previous research experience and the literature review. The methodological design discusses the research philosophy, approach, strategy, choice, time horizons, and data collection and analysis techniques for the study. It achieves this by following the structure of the 'Research Onion' designed by Saunders *et al.* (2012). The philosophical stance of the researcher is to explore a real life situation based on practitioners' experiences and knowledge, as illustrated in Figure 3.3 in Chapter 3. In terms of the ontological position, an interpretivist view is adopted; meanwhile, the epistemology assumed for this study is subjective, and the axiology assumes a value-laden stance. An interpretative research philosophy is adopted for this study, with a methodology that combines qualitative and quantitative (mixed method) approaches. More specifically, semi-structured interviews, a documentary survey, an expert opinion survey and a questionnaire survey are used to collect the qualitative and quantitative data. Furthermore, a content analysis technique and statistical analysis software are employed as key data analysis tools. The time horizon for this research is cross-sectional, and the main outcome

of the Saunders model is its clear framework that enables practitioners to select appropriate strategies and approaches through its different layers.

The rationale for incorporating both qualitative and quantitative (mixed method) data collection techniques is to clarify different aspects of the phenomenon whilst reducing the number of key reasonable alternative conclusions that could be obtained by verifying the findings. The analysis of each section (issue) is first presented qualitatively and is complemented by the presentation of the quantitative data analysis. This study used the five constructs for Total Quality Management in the construction industry. It is essential, before preceding with further analysis, that the scales used are reliable, namely that the items within the scale measure the same idea they are set to examine. This is referred to as internal reliability or consistency and is often tested through Cronbach's alpha, which measures the consistency between items. In this research, the conceptual framework for the effective implementation of TQM within the Nigerian Construction Industry was validated using experts in the construction industry in Nigeria. The validation team was drawn from contractors, consultants, government agencies and academia. The Five-Likert scale validation questionnaire was sent out to 17 carefully selected members from the Nigerian construction sector. The selection of experts for the validation process was based on a purposive sampling technique. In the next section, the researcher will discuss the study's potential contribution to the existing body of knowledge.

1.7 Contribution to Knowledge

This research contributes to the body of knowledge on the effective implementation of TQM within the Nigerian construction sector by bridging the gap between the existing approach to TQM and that required for its effective implementation in a Nigerian construction context. This research is conducted in an environment where no such previous research efforts have been undertaken regarding the effective implementation of TQM; consequently, this study is original in its field. Whilst TQM has attracted the attention of researchers interested in the private sector, and some individuals in the public sector generally, there has been less interest in the TQM approach amongst construction industries with the result that very little empirical literature exists (Cruickshank, 2013). Furthermore, an analysis of TQM studies conducted in different countries has revealed inconsistencies in knowledge concerning TQM practices, such that there are gaps in understanding in, for example, Africa, the Middle East and South

America (Sila & Ebrahimpour, 2012). This lack of research has been attributed to the fact that only a small number of construction firms have adopted the TQM philosophy. Osseo-Asare and Longbottom, (2012) noted the absence of applicable research publications and suggested the need for further research to evaluate TQM in the context of the construction industry. However, whether in advanced or developing countries, it is important to consider the recommendation by Smith (2005) who argued that wherever the proposed implementation is to take place, there should be a thorough investigation of the organisation and its readiness before any attempt to implement change is made. Thus, an investigation into the Nigerian construction sector will reveal factors about the potential success, or otherwise, of the intended program.

Furthermore, this research contributes to a limited range of empirical evidence in order to examine the relationship between a group of critical success factors/barriers and the quality management progress towards TQM. The study reveals some important lessons for Nigerian construction organisations in improving their TQM practices, such as the need for communication improvements and good leadership skills. Also, this may provide the opportunity for other researchers to execute more research in this field and to merge other modification efforts that should be undertaken before any TQM implementation. It is expected that the TQM framework will help to improve the awareness and understanding of individuals and organisations regarding the implementation of TQM in the Nigerian construction industry and its impact on project performances.

1.8 Structure of the Thesis

This thesis is divided into six chapters, which includes the introduction, as presented below.

Chapter 1- Provides an overall view by discussing the key issues, which leads to the initiation of this study, its aim and objectives. A brief introduction to the research methodology and its contribution to theory and practice are outlined.

Chapter 2- Reviews the key issues identified from literature, which enable the progressive formulation of the research problem of the study. Accordingly, literature related to the effective implementation of TQM within the Nigerian construction industry is explored. It presents a critical review of the literature, beginning with the history and evolution of TQM, different definitions of quality and TQM, and quality management problems in Nigeria. It

subsequently identifies the principles and benefits of TQM, the benefits within the Nigerian construction industry and the problems associated with its implemtation (namely, the negative aspects of TQM). Finally, the chapter explores TQM in the Nigerian construction industry, its barriers to implementation and the research framework developed from the literature.

Chapter 3- Describes the methodological design and the research process of the study. Commencing with the establishment of the research problem, the chapter details the research philosophy, approach, strategy, choice, time horizons, and data collection and analysis techniques used for this study. The concurrent data collection and analysis procedures are discussed followed by the ethics, validity and reliability in relation to the study.

Chapter 4- Presents the primary findings of the empirical investigation carried out within the Nigerian construction industry. The findings from the qualitative and quantitative approaches were gathered from different sources, which were used to achieve the research aim and objectives.

Chapter 5 - In this chapter, a detailed discussion of the research findings is provided and links to the literature review are made. Also, the implications of these findings are presented, and a discussion is presented. The discussion adopts an interview approach in which the similarities and contradictions between each element in the list of factors and the corresponding interview findings are examined. This approach provides the opportunity to discuss unique issues arising from the interview findings that were not predicted in the literature.

Chapter 6 - Concludes the research; it presents the main contributions to the existing body of knowledge. The chapter also addresses the generalisation of the results and limitations to the research. Suitable recommendations for further research were also highlighted.

1.9 Summary

This chapter highlighted the background of the research which identified that Nigeria has witnessed a critical economic crisis that affected all its industrial sectors. Thus, to achieve business objectives, many organisations are changing their traditional business operations from production-orientation to competitive customer-orientation, where customer satisfaction forms the core of business operations. The research problem explained the quality problems in the Nigerian construction industry and identified the contradictions and tensions that lie at

the heart of discussions about, and implementation of, quality. Such demand and promises in Nigerian construction projects often fail to meet the required standards and client expectations. Thus, such projects have continued to be plagued by quality issues, which contributes to long-term problems in the Nigerian construction industry in general and have thus informed the research aim, objectives and research questions. The chapter also outlined the scope of this research, which is focused on construction projects undertaken by construction firms in Nigeria, and explored the contribution of TQM philosophy in the Nigerian construction industry. A brief overview of the research methodology was given, which further highlighted the methods used for this research. The study's contribution to knowledge and the framework developed were also discussed, and the structure of the thesis was introduced. The next chapter presents a comprehensive literature review on effective TQM implementation in the context of the Nigerian construction industry.

2 LITERATURE REVIEW

2.1 Introduction

This chapter presents a critical review of the literature, beginning with the history and evolution of QM, different definitions of quality and TQM, and quality management problems in Nigeria. It then identifies the principles, and potential benefits and problems of applying TQM to the Nigerian construction industry. Finally, the research framework developed from the literature, has many key elements, which are illustrated towards the end of the chapter. The chapter is structured in such a way as to facilitate the understanding and relevance of TQM within the construction industry from the perspective of developed economies to developing economies, particularly Nigeria.

2.2 History and Evolution of Quality Management

Quality control, as it is known today, did not exist in the 18th and 19th Centuries; however, some quality control activities would have been performed informally by individuals at the workshop level (Garvin, 1988). The development and evolution of Quality Control started during, and spanned the entire, Twentieth Century (Feigenbaum, 1983). In 1913, JC Penney became one of the earliest business people to present the fundamentals of TQM philosophy when he suggested that concepts, such as customer satisfaction, fairness, quality, value, associate training, and rewards for performance, form the managerial basis for business (Jablonski, 1994). Furthermore, Fredrick W. Taylor, who is known as the father of scientific management, 'presented other quality concepts in the early 1900s as well' (Garvin, 1988). Moreover, the achievements of the Japanese businesses in North America and Europe continue to be attributable to the excellent quality of their products (Feigenbaum 1984). Several quality programmes were recommended to facilitate Western business to achieve particular degrees of quality, including Total Quality Control, and more recently, TQM. Thus, basic initiatives to facilitate Quality Management (QM) were introduced such as increased opposition from other businesses, predominantly from Japanese organisations.

The initial step for several North American firms was to split the structure of production by allocating quality management to a specific (quality) department; this decreased the quality performance to among control, primarily using physical examination. The refining of such techniques started promptly after the Second World War by individuals, such as Juran and

Deming. The technique initially made an effort to promote the adoption of quality circles to educate businesses in customary quality control methods and to encourage the participation of personnel. Often, quality circles were not that productive in Europe or North America (Hayward & Dale, 1984; Hill, 1991). In evaluating the disappointment outcomes from the application of quality circles, two quality management requirements became apparent. Firstly, in order for the production unit function, it was not possible to maintain the quality management as a priority purely for that department; instead, it needed all departments needed to commit to the concept. Thus, it was also acknowledged that accessing the full advantages of statistical quality control, even within a production unit, demanded an alteration to the customary role of all personnel. This transformation is variously labelled as staff intervention, participative management, or empowerment, and recognises that it is important to coach groups of individuals in customary quality control techniques. Secondly, such individuals required training in more general, problem-solving techniques, and team management skills. The subsequent growth and development of quality management arose to resolve the demand for quality regulation to become a company-wide exercise.

The idea of company-wide quality control, often referred to as total quality control, had spread throughout North America by the early 1980s (Hattori, 1984), and had become the most commonly method by companies in the mid-1980s. The application of total quality control in other non-production fields triggered a dilemma in how to describe quality given that its management had shifted outside manufacturing departments. For this reason, the demand increased for an approach that recognised the client's perception, and considered the possibility of internal and external clients. Thus, the need to incorporate the customer as well as the contributions of a range of other organisational personnel to quality management grew and thus, the phrase TQM started to replace total quality control. The reason for this customer focus and the development of more holistic quality control procedures that considered contributions from outside the production area, made TQM applicable to both service and construction industries. Moreover, it was adopted by the U.S Department of Defence in the mid-1980s and extended rapidly into the U.S healthcare industry at the same time.

In North America, a number of quality experts were key contributors to the diffusion of TQM (Jackson, 1990), while in the United Kingdom, the government start to accept the idea. The most famous Quality Management figures are Deming, Juran, Crosby, and Feigenbaum. In contrast, Total Quality Management, is less specifically linked to particular authors; thus,

initiatives to encourage the adoption of continuous improvement by organisations are usually labelled the products of TQM packages. TQM has become a component of the many expansive ideas that cover general organisational performance and recognises the perceived importance of process. By the 21st Century, TQM had been integrated around the globe into holistic frameworks aimed at supporting establishments to achieve outstanding results in customer and business benefits. Furthermore, in Europe, the implementation of a vast framework called 'Business Excellence' or the 'Excellence Model' was promoted by the European Foundation of Quality Management (EFQM), and by the British Quality Foundation (BQF) in the UK.

A researcher tracing the development of TQM throughout the Twentieth Century may easily notice a gap between the development of TQM as a theory in literature, as opposed to its development and implementation in practice, particularly in the U.S.A. where it originated (Kinlaw, 1992). For example, it took more than fifty years for the teachings of Walter A. Shewhart (a physicist with Bell Telephone Laboratories, which was the birthplace of the American quality) to be recognised and implemented in the U.S.A. (Kinlaw, 1992). Nevertheless, the development of the approach to quality control in the U.S went through four broad stages: operator quality control, inspection quality control, statistical quality control, and total quality control (see Figure 2.1).

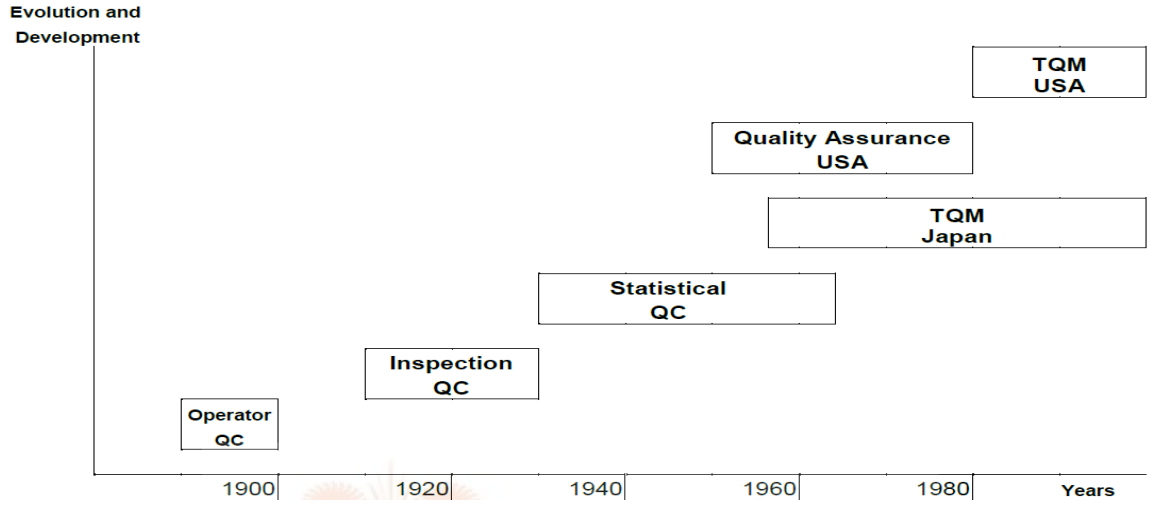


Figure 2-1: Evolution of Quality Control (adapted from Feigenbaum, 1983)

The next section will discuss the operator quality component, which outlines the duty of the operator within the quality control system.

2.2.1 Operator Quality Control

Before the early 20th century, the principal focus of mass production had been on quantity, rather than the quality, of goods made. Goods were produced in small volumes, and artisans and skilled craftsmen performed quality control activities (Garvin, 1988). This period in the quality control movement is termed the operator quality control era (Feigenbaum, 1983). At this time quality control was conducted within the product manufacturing field, and was not the responsibility of an independent person. However, during the 1800s, a breakthrough occurred when the rational gauging system was implemented. Under this set-up, a model of a product is kept from use as it serves as a standard for measuring the degree of conformity or subsequent output (Garvin, 1988). Another innovative idea in the field of quality occurred in 1819, when the concept of inspection processes to control product quality were introduced; however, this was not formally adopted in practice nor its value immediately recognised.

2.2.2 Inspection Quality Control

Inspection quality control may be the first formally introduced concept that was directly linked to TQM. In the early 1900s, Fredrick W Taylor gave this concept more credence by advocating it as a task for bosses to manage their businesses effectively (Garvin, 1988). In 1922, G.S Radford further developed Taylor's idea by clearly stating the direct link between inspection activity and quality control. These contributions have further encouraged a formal link between the concept of inspection and quality control, and their connection with management. Prior to this it was performed on an independent basis (Feigenbaum, 1983).

2.2.3 Statistical Quality Control

The first statistical theory originated over 80 years ago, developed by Sir Ronald Fisher (Jablonski 1994). Moreover, in 1931, Steward pioneered a breakthrough statistical quality control (SQC) within his publication, which was based on statistical principles (Garvin, 1988). He realised that in any work process there would be natural variations, such that limits should be specified to distinguish acceptable product fluctuation within these two limits (Kinlaw 1992). At this point, Steward was working within a team at Bell Telephone Laboratories at Western Electric where they had a program of nationwide telephone network standardisation and uniformity. The challenge they faced was how to extract the big amount of information regarding units' quality from a selection of inspection data.

2.2.4 Total Quality Control

Dictionary meanings of the word ‘control’ are many but some of them are (Webster, 1992):

- “To exercise directing, manage, restraining or governing influence over”
- “To regulate, verify as an experiment by comparison with a parallel experiment or another relevant standard.”
- *“To check”*

These meanings imply three ideas of the word 'control'. These are: to direct, to regulate, and to check results against relevant standards. All these definitions are relevant to how the word control is used in the field of management. Quality control (QC) is the practice of control activities to achieve quality goals. Therefore, quality control in the manufacturing field can be defined as to direct (regulate and check) work activities to achieve manufacturing quality objectives. However, several writers suggest more detailed definitions for quality control. In fact, they deal with this term as a system that consists of interrelated components so as to fulfil a particular objective(s). Most of these control components, basically, revolve around the components of the Plan-Do-Check-Act (PDCA) management cycle. Ozeki and Asaka (1990, p.45) define the term quality control as the objective of the job, developing and carrying out a plan to meet that objective, and checking to determine if the anticipated results are achieved. If the anticipated results are not achieved, modifications are made in the work procedure to fulfil the plan.

Feigenbaum‘s (1983) definition is not far from that of Ozeki and Asaka; he reasons that quality control is the procedure for meeting the quality goal. He then specifies, almost the same PDCA cycle components to be used as steps in such control. The point of departure for Feigenbaum is the concept of planning for improvement. For Ishikawa (1985), the emphasis is on the economic dimension. He postulates that quality control has to be economical, and further notes that customer satisfaction is the reason why a construction firm has to be engaged in quality control. In the Table 2-1, Ishikawa’s PDCA cycle is redefined, presented with six steps.

Table 2-1: Control Cycle (source: Ishikawa, 1985)

1	Determination of Goals and Targets
2	Determination of Methods to Reach Goals
3	Engaging in Education and Training
4	Implementing Work
5	Checking the Effects of Implementation
6	Taking Appropriate Action

As shown in Table 2-1, Ishikawa breaks down the 'plan' step in the PDCA cycle into two, namely, Determination of Goals and Targets and Determination of Methods to Reach Goals. Also, Ishikawa considers that engaging in education and training is part of the implementation step of the control cycle. Moreover, dimensions of the quality control concept are offered by Galgano (1994) who sees quality control as a revolution in attitude that influences whole organisational change as well as providing a means of empowering the organisation's constitution. According to Galgano, quality control is prevention, whereby work continuity and the performance level are maintained. Also, QC is carried out by applying the PDCA cycle, which is based on statistical methods. He asserts that the ultimate objective of QC is customer satisfaction. Thus, the definitions mentioned above view QC as a continuous procedure aimed at planning and implementing all activities throughout the organisation, appraising conformance and checking results against the plan and then taking appropriate corrective action. QC is therefore prevention; its objective is to achieve the organisation's goals, although the ultimate objective within construction organisations is to fulfil customer needs.

Consequently, a question arises as to the difference between quality control and planning, and quality improvement. Moreover, it is important to ascertain where quality control fits in the whole quality management framework. In an attempt to answer all such questions, Peach (1997) considers that the four quality management activities, namely quality planning, quality control, quality assurance and quality improvement are correlated within the classic PDCA management cycle, where, each activity is managed by the application of the whole PDCA cycle. However, quality planning focuses on the 'Plan' step, quality control focuses on the 'Do' step, quality assurance focuses on the 'Check' step, and quality improvement focuses on the 'Act' step. Therefore, quality control is basically an essential part of management activities within quality planning and quality improvement. In other words, there is an inherent control step, which implements the plans and checks the results against the plan. Figure 2-2 depicts the interrelationship of the three major quality management activities of planning, control and improvement.

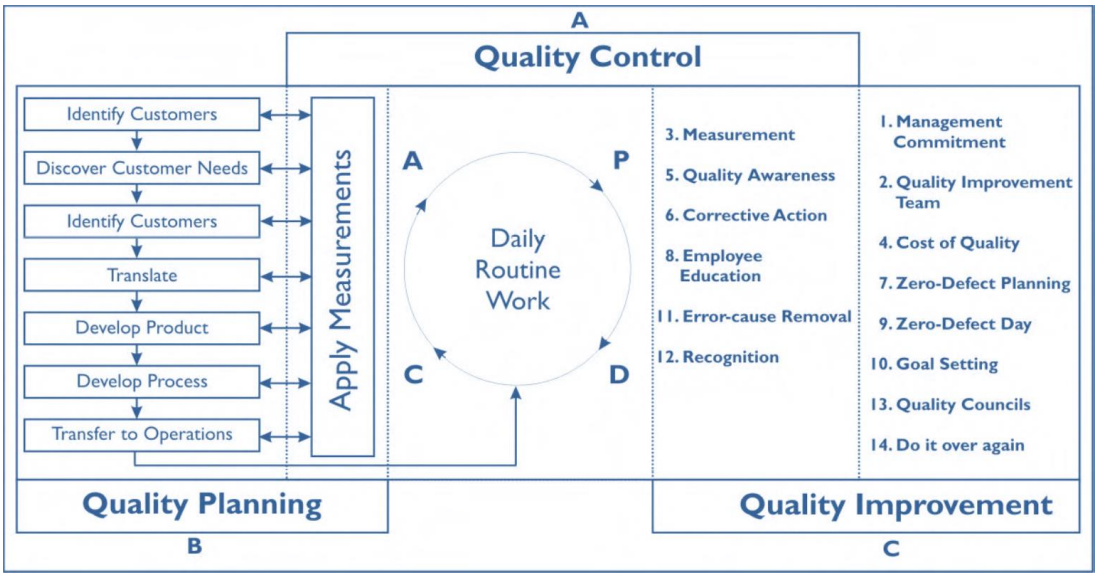


Figure 2-2: Interrelationship of the Three Major Quality Management Activities (source: Peach, 1997)

Figure 2.2 shows Juran's (1989) road map where the planning process occurs in the quality planning section, in column (B). Quality control column (B) includes the PDCA Control Cycle of daily routine work as well as an overlap on the control aspects of both quality planning and quality improvement. Meanwhile, Column (C) shows Crosby's 14 steps for continuous improvement. Apart from Peach's approach presented above, Juran (1992) offers

another view for the relationships of the three major management activities. He sees that management activities pass through four distinct stages. The first stage is quality planning whereby customer needs are determined; in effect, product features are specified, and the development process fulfils the product feature requirements that meet customer needs. The next stage starts when the plan is given to the operating forces to produce the product. Operations are expected to experience problems and not to achieve 100% perfect product. In this instance, quality control constitutes an evaluation of the actual performance by comparing it with the quality goals and then acting on the deficiencies. Two kinds of deficiency are expected to occur, namely, 'sporadic' problems, which result from special causes such as a specific machine, material or employee, whilst 'chronic' problems originate from the plan itself, indicating that the product planning itself contains inherent issues. Quality control activities can overcome sporadic problems and prevent things from getting worse. Also, it is expected that small steps of improvement will result from the implementation of quality control. The third stage concerning a dramatic quality improvement is needed to overcome any chronic problems. In the fourth stage, quality control is carried out again with fewer deficiencies and variations in products and processes.

Nevertheless, there seems to be no clash within the relationship between management activities. On the contrary, while accepting the three distinct stages of planning, control and improvement, there is still a control step within both quality planning and quality development. Thus, Figure 2-3 embodies the role of quality control in the whole TQM framework, which shows that:

- There are three major quality management activities, namely: quality planning, quality control and quality improvement.
- These three components interact and are functionally integrated.
- Undertaking the PDCA control cycle controls each management activity.
- Quality control activity is responsible for implementing and translating quality planning and quality improvement outcomes into a daily routine work, which in turn, is controlled by continuously carrying out the PDCA cycle.

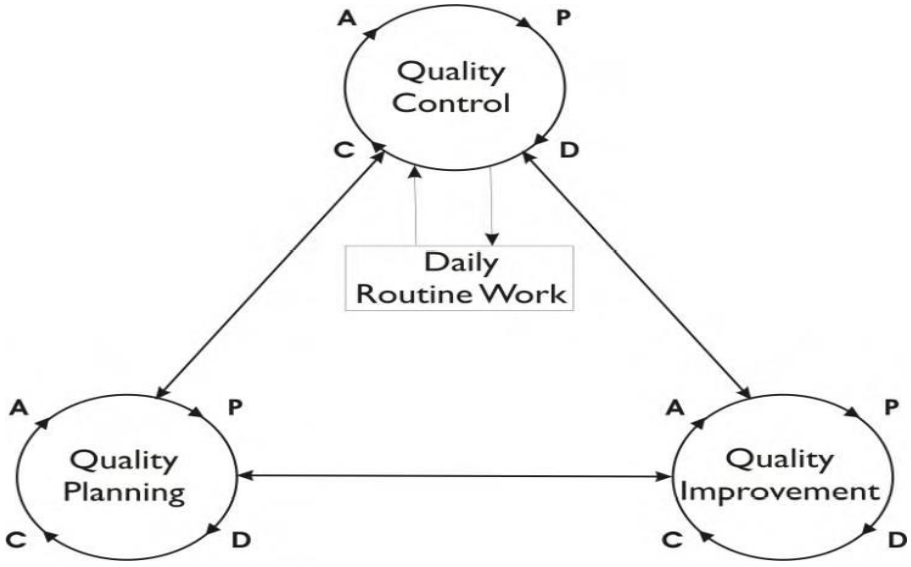


Figure 2-3: Quality Control Cycles in Management Activities (source: Juran, 1992)

Although many TQC aspects were developed in the USA in the 1950s, the concept of TQC grew rather slowly in the USA (Kinlaw 1992). Quality only was implemented in American and European industries in the 1980s (Kinlaw 1992). According to Feigenbaum (1983, p.215), this was because there was no "willingness or … ability of business and governmental organisations to take adequate steps concerning the findings of technical and statistic work". He also stated that "existing decision-making structures could not handle the quality problem" (Feigenbaum, 1983). In other words, as posited by Darin (1988), quality control still was seen as the duty of an inspection group or statistical quality control coordinator on the shop floor level. However, this structural level of decision-making did not consider the quality problem in sufficient breadth, and excluded the impact of management and administration on the quality problem. On the other hand, Japanese quality before the 1940s was limited to inspection quality; thus, even the SQC approach was limited to a small group of experts.

Quality control progress in the USA took a different route with initially less momentum than in Japan. Nevertheless, the 1950s had seen an invaluable theoretical contribution; for instance, the 'Quality Control Handbook' by J.M Juran, which was published in 1951, tackled the economics of quality (Garvin, 1988). In addition, during 1956, Feigenbaum proposed a comprehensive approach to quality in his publication 'Total Quality Control' (Garvin, 1988). Moreover, with the implementation of quality concepts, in 1961-62, Martin Company took a new step by adopting a programme called Zero Defect (ZD) over the concept of Acceptable Quality Levels (AQL) which had been proposed in 1942 by the War Department. The ZD

programme was based on quality principles, such as workers' motivation and training, as well as the idea that ZD was an achievable objective (Garvin, 1988). In fact, some authors labelled the quality control movement over the 1950s and 1960s as the period of Quality Assurance. Thus, the next section discusses quality.

2.3 Quality

The word 'quality' is derived from the Latin word 'qualis'. It is a difficult term to define as the word means different things to different people (Sahney, 2004; Fields *et al*., 2014). Indeed, Warwood and Roberts (2004) concluded that the concept of quality is not revolutionary but rather has evolved over the last few decades. As yet, there is no universal definition of the meaning of the term quality; however, well-known gurus have considered different perspectives (Demirbag, 2006). Edwards Deming, who is one of the best-known pioneers in this area, defined quality as a process that "should be aimed at the needs of the customer, present and future" (Deming, 1986, p. 5). Furthermore, Joseph M. Juran, who specialised in quality management, defined quality as "fitness for purposes or use" (Juran, 1988, p. 11). Moreover, Armand Feigenbaum (1963, p.7) was the first quality guru to use the term 'Total Quality Control', and defined quality as, "the total composite product and service characteristics of marketing, engineering, manufacture and maintenance through which the product and service in use will meet the expectation by the customer's requirement. Philip B. Crosby (1984, p.64) defined quality as, "conformance to requirements, not as goodness" whilst Oakland (2003, p. 4), understands that quality means "meeting the customer's requirements", which may include availability, delivery, reliability, maintainability and cost effectiveness (see Table 2.2 for gurus and their contributions to the development of quality).

Table 2-2: Gurus on Quality and Their Contributions (Source: Oakland, 2003)

Gurus on Quality	Main Contribution
Walter A. Shewhart	Contributed to the understanding of process variability and developed the concept of statistical control.
W. Edwards Deming	Stressed management's responsibility for quality and developed 14points to guide companies in quality improvement.
Joseph M. Juran	Defined Quality as "fitness for use". Also developed concept for cost of quality
Armand V. Feigenbaum	Introduced concept of Total quality control
Philip B. Crosby	Coined phrase "quality is free" and introduced concept of "zero defect"
Kaoru Ishikawa	Developed cause and effect diagrams. Also identified concept of " internal customer"
Genichi Taguchi	Focused on products design quality and Taguchi loss function.

The International Organisation for Standardisation [ISO] (2005) defined quality as "the totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs". Additionally, both Powell (1995) and Egan (1998, 2002) are concerned with effective management support for the quality initiatives. The requirements incorporate the 3c's, defined as commitment, championing, and communication. The Powell (1995) instrument considers all of the above and requires a top executive decision to commit fully to a quality program, actively champion quality and communicate a quality commitment to employees. This is accords with Egan's (1998) committed leadership, which concerns management's belief in, and total commitment to driving forward an agenda for improvement

and communicating the required cultural and operational changes throughout the whole of the organisation. Crosby's (1979) 14 steps identify that 'management commitment' is the first step in the implementation process, whilst Deming's 7thprinciple is to 'adopt and institute leadership'; similarly, Lo (1997) argued that employees would need to rally around a common vision in the application of Deming's principles. Thus, the approach adopted was the '3C' concept: charge, challenge and change.

In summary, no universal definition of the term quality has emerged and different authors place different emphases on certain aspects of this concept according to their experience. Garvin *et al*., (1988) discuss the term quality and dedicate three chapters of their book in an attempt to offer a comprehensive meaning for quality. They begin the third chapter with a conceptualisation of the term quality, which is "by raising questions of whether quality can be a subjective term or an objective one; absolute or relative; and what its relationship with variables such as price, cost, productivity and market share is" (Garvin *et al.* (1988). They categorise most of the definitions into five principal groups, which are: the transcendent, product-based, user-based, manufacturing-based, and value-based. For convenience, of these five approaches, the most relevant to this study two will be analysed, namely manufacturing-based and user-based definitions.

2.3.1 Manufacturing-Based Definitions of Quality

Manufacturing-based definitions of quality look at quality from a manufacturing viewpoint, where pre-determined requirements, design activities and manufacturing practices are the basis of quality product and accordingly, the quality definition will be conformance to requirement (Crosby, 1990). Crosby argues that this definition offers a practical meaning for quality and that it considers that a zero-defect product is the only acceptable quality level since 100 percent conformance to requirements is the only acceptable quality measure. However, it is management's prime responsibility to create the right requirements to meet customers' real needs (Crosby, 1990). In comparison, Juran (1992) finds the definition of quality to be conformance to specifications or conformance to standards. This is a problematic definition when applied at managerial levels as a product is meant to meet customer needs while a conformance to specifications is just one of many means to achieve that objective on the part of the manufacturer. Furthermore, standards and specifications are static while quality is a moving target. "Lawton (1993) supports Juran's observation by mentioning that

requirements are specified by the producer who may have only a partial relationship to customer desires". Gavin (1988) echoes this criticism when he says that the definition of conformance to specifications considers that when the product, which is of interest to the customer, deviates from specifications, it is likely to be described as poor quality; as such, this would be a serious problem in the definition of quality.

2.3.2 User-Based Definitions of Quality

User-based definitions view quality from the perspective of the customer; thus, the quality of the product is determined by the user or the customer (Feigenbaum, 1983). Moreover, the product regarded as having the highest quality is the one that best satisfies customer's preferences (Garvin, 1988). Juran's (1989) popular definition underlies this approach where he defines quality as fitness for use. Juran then identified two dimensions of quality, namely product features that meet customer needs, and freedom from deficiencies. However, Garvin points out basic problems with the user-based approach in that it equates quality with maximum customer satisfaction; although related, they are not identical. Also, to achieve satisfaction from a wide range of customers, it would be practically difficult to comprehend varying individual preferences and to transform those into a meaningful definition of quality at a market level. Moreover, by considering quality to be exclusively customer determined, the product's impact on the environment, health, safety and social concerns are not explicitly addressed. Indeed, where these concerns are considered, it would be at individual level only.

2.3.3 Comprehensive Approach for a Definition of Quality

According to Juran (1992), to date, there is no consensus on the adoption of a simple comprehensive phrase to describe quality. Garvin (1988) further points out the potential conflict that exists between marketing, engineering and manufacturing departments within an organisation, as individuals within each field tend to hold different views of what constitutes quality. Marketers tend to see quality from the customer's viewpoint; hence, their concern is what happens to the product outside the factory. Engineers, in general, focus mainly on specifications and how to translate product performance into precise measurements; meanwhile, manufacturing departments would tend to prefer a practical meaning of quality, namely conformance to specifications and 'doing things right the first time' while reducing waste. These three approaches are not unified; therefore, a serious problem in communication may exist within an organisation. However, an organisation can take advantage of these

dissimilar perspectives to enhance its position, through adopting a comprehensive meaning of quality, rather than the limiting their perspective to a particular definition of quality. In supporting Garvin‘s findings, Galgano (1994) states that quality becomes a comprehensive and unifying concept. He further suggests that this is possible by relating the internal structure of the organisation to the quality concept itself. Moreover, he considers quality to be a changing concept, constantly increasing over time. Most of the definitions in Table 2-3 that are based on the comprehensive approach for quality consider that there are several dimensions of quality. However, all agree that it must be customer-oriented. Also, each definition specifies a set of factors and conditions that correlate with quality.

Table 2-3: Examples of Categories of Quality (source: Garvin, 1988)

Group	Examples of Definitions
Transcendent	• "Quality is neither mind nor matter, but a third entity independent of the two ... even though Quality cannot be defined, you know what it is.” (Pirsig, 1974, p.185) • “ . . . A condition of excellence implying fine quality as distinct from poor quality... Quality is achieving or reaching for the highest standard as against being satisfied with the sloppy or fraudulent." (Tuchman, 1980, p.38)
Product-based	• “Differences in a quality amount to differences in the quantity of some desired ingredient or attribute." (Abbott, 1955, pp.126-27) • “Quality refers to the amounts of the unpriced attributes contained in each unit of the priced attribute." (Leffler, 1982, p.)
User-based	• “Quality consists of the capacity to satisfy wants”. (Edwards, 1968, p.37) • “In the final analysis of the marketplace, the quality of a product depends on how well it fits patterns of consumer preferences." (Kulm and Day, 1962, p.101) • “Quality is fitness for use”. (Juran, 1974, p.22)

Manufacturing-based	• "Quality [means] conformance to requirements." (Crosby, 1979, p.15) • "Quality is the degree to which a specific product conforms to a design or specification." (Gilmore, 1974, p.16)
Value-based	• "Quality is the degree of excellence at an acceptable price and the control of variability at an acceptable cost." (Broh, 1982, p.3) • "Quality means best for certain customer conditions. These conditions are (a) the actual use and (b) the selling price of the product." (Feigenbaum, 1961, p.1)

A review of the quality definitions and factors in Table 2.4 suggests that it may be useful to categorise these into broader quality dimensions. Therefore, the next section will briefly discuss the quality dimensions. Table 2.4 presents several selected definitions of quality that are based on the comprehensive approach. It also gives a set of quality factors correlating with each of the definitions.

2.3.4 Quality Dimensions

The comprehensive approach sets the quality concept as a base and goal for all operational and organisational activities undertaken (Galgano, 1994). Therefore, quality should be a multi-dimensional concept which keep customer satisfaction as the focal point. Nevertheless, the main quality dimensions are briefly presented below:

- **Operational Dimension**: Operational dimension of quality deals mainly with engineering, manufacturing and quality of outputs, such as specifications, conformance, and product features, delivery service and product quality.
- **Reliability Dimension**: may include durability, serviceability, and maintainability.
- **Economical Dimension**: is concerned with the balance between quality value and quality cost for each quality characteristic (Juran, Sedar & Gryna, 1962, p.10). Factors such as cost, productivity, profit and competitiveness fall into this dimension.
- **Organisational Dimension**: deals mainly with the quality of organisational structure and performance.

- **Social and Environmental Dimension**: involve quality characteristics within and outside the organisation, such as morality, safety, internal customers' interests, waste, pollution, and so on.

In considering the meaning of quality as customer satisfaction-oriented, the following should be considered:

- Both the internal and external customers should be satisfied and the stockholders' interest should be recognised.
- When specifying customer needs, they may be expressly stated by the customer or implied (latent) that a customer also expects to be fulfilled (Peach, 1997).
- Quality activity may constitute one of two broad efforts. Firstly, it may involve the elimination of negative features of quality, such as non-conformance to requirements. This is sometimes called negative quality, or reactive quality, because the organisation responds to a negative situation. The aim of reactive quality is to reduce customer dissatisfaction. The other category of quality activities aims at increasing customer satisfaction by, for example, improving a product or service (Galgano, 1994). This kind of quality is also termed positive quality
- Quality is customer-oriented. However, other quality factors are also essential to the quality concept. Each product might have its own array of quality factors (Ozeki & Asaka, 1990). It is important to consider the right combination of factors in a balanced manner in order to achieve customer satisfaction as well as produce a quality product.

Table 2-4 Quality Definition and Quality Factors (source: Galgano, 1994)

Quality Definition	Quality Factors
The total composite product and service characteristics of marketing, engineering, manufacturing and maintenance through which the product and service in use will meet the expectations of customers (Feigenbaum, 1983)	1. Actual use 2. Selling price 3. Specification of dimensions and operating characteristics 4. Life and reliability objectives 5. Safety requirements

	6. Relevant standards 7. Engineering, manufacturing, and quality costs 8. Production conditions under which the article is manufactured 9. Field installation and maintenance and service objectives 10. Energy utilisation and material conservation factors 11. Environmental and other 'side effect' considerations 12. Cost of customer operation and use and product service (Feigenbaum, 1983)
According to ISO 8404 (1994), quality is "the totality of characteristics of an entity that bear on its ability to satisfy stated and implied needs" (Peach, 1997, p.36).	Clause 4.5 of ISO 9000-1 looks at the following four facets: 1. Quality due to the definition of needs for the product 2. Quality due to product design 3. Quality due to conformance to product design 4. Quality due to product support (Peach, 1997)
Japanese Industrial Standard JIS Z8101 (1981) defines quality as a totality of the characteristics or performance that can be used to determine whether or not a product or service fulfils its intended applications (Ozeki & Asaka, 1990).	• The effect of the product or service on society • Quality characteristics which may be unique for each product or service. (Ozeki & Asaka, 1990)
Quality becomes both a reference point and a goal for all activities undertaken by a company. Quality embraces and unifies every element contributing to excellence	Competitiveness, delivery cost, moral, productivity, profit, product quality, or volume performance, service, safety, concern for the environment, the stockholders' interest.

(Galgano, 1994) The eight dimensions of quality together, cover a broad range of concepts. Several of the dimensions involve measurable product attributes; others reflect individual preferences. Some are objective and timeless, others shift with changing fashions. Some are inherent characteristics of goods while others are ascribed characteristics. (Garvin, 1988, p.60)	Performance, features, reliability, conformance, durability, serviceability, aesthetics, perceived quality (Garvin, 1988)

Quality in the management field has been broadened to cover other meanings of product quality. Basically, it embodies all aspects of excellence that ensure the production of a quality product and the achievement of customer satisfaction. Furthermore, quality aspects may be grouped into three broader fields (see Figure 2.4) namely, quality of output, quality to satisfy the customer, and organisational and operational quality. More specifically, these fields are outlined as follows:

- Quality output looks at process output and results measured against pre-specified quality characteristics, requirements and standards.
- Quality to satisfy internal and external customers and,
- Organisational operational quality is mainly concerned with the organisational structure and culture as well as the conduct of managerial functions that achieve quality. Included under this field are engineering, manufacturing, marketing and administration activities.

In the next section, the thesis discusses the relationship between TQM and Quality.

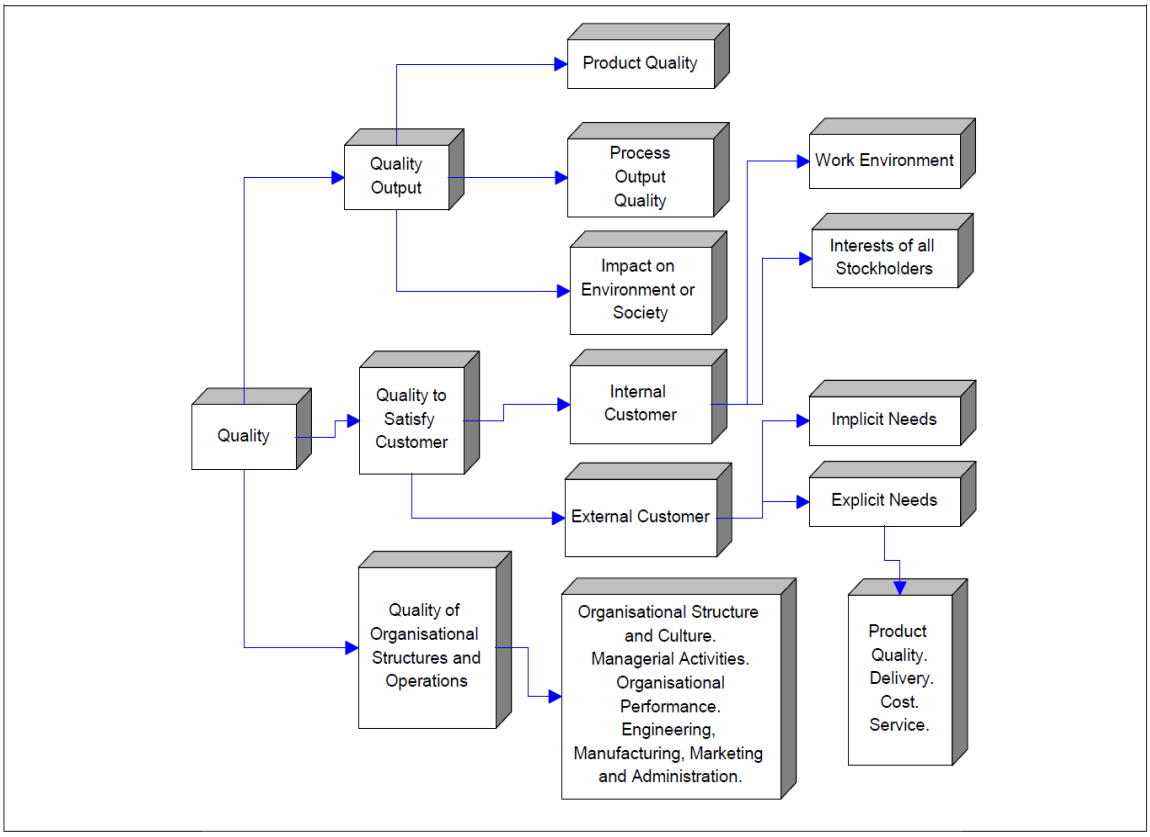


Figure 2-4: A Comprehensive Approach to Quality (source: Ozeki & Asaka, 1990)

2.3.5 Relationship between Quality and TQM

The evolution of TQM in this particular chapter has described how the TQM system originated and how it emerged from Quality Management (QM), which was the initial attempt to improve quality. This attempt, however, did not permanently eliminate the uncertainties of quality, as accomplishments in QM systems were often just for the quality control division, which was conducted merely in the course of the assessment. However, it also might be observed that QM does not encourage the concept as a company-wide exercise, as the sustenance of quality was considered the remit of the quality department and for production only; however, in TQM, all departments are expected to be responsible for the achievement of quality, and quality attainment extends beyond productivity. The rationale for TQM emerged as companies began to acknowledge the extensive scale of quality. TQM is, nevertheless, a people-focused management programme that targets ongoing improvements in client satisfaction and continuously decreases actual cost. TQM is a complement structured approach and an inclusive high-level methodology; it works horizontally across capabilities

and divisions, entails all personnel, top to bottom, and broadens in both a backward and forward direction to incorporate the supply chain and the customer chain. Quality and TQM are more than terms, but alao activities that involve implementation; there are very few organisations that have an understanding of the real essence of the systems and implementation of quality and TQM. Using the knowledge derived from quality and TQM, the next section will discuss quality performance measures.

2.3.6 Quality performance measures

Similar to TQM, quality performance has been reflected and measured in various ways in past empirical studies. In this study, quality performance was maintained as multifaceted, and therefore constructs were preferred over individual items as a means to measure it. This reflects the applications in recent studies on TQM, such as those by Ahire *et al*., (1996), Grandzol and Gershon (1998), Samson and Terziovski (1999), and Dow *et al.*, (1999). Among this variation, the construct for measuring quality performance developed by Ahire *et al*, (1996) was the one that most closely matched the purpose for two major reasons. First, the construct derived its content from the selected items of Garvin's (1984) dimensions of quality, namely: reliability, performance, durability, and conformance to specification. These dimensions have been acknowledged in the area of quality, hence, establishing their content validity. Secondly, the scale has also shown very strong validity and reliability compared to other studies in the area.

To summarise, quality control is a system that mainly contains the components of the Plan-Do-Check-Act (PDCA) cycle. Quality control is preventative and its objectives are to carry out organisations plans and to check the results against the quality objectives. If variations are found, corrective action has to be taken accordingly, and that implies developing new plans for improvement. Ultimately, quality control objectives are achieved when customers are fully satisfied. Quality control is conducted throughout the organisation and forms an essential part of the managerial activities for both quality planning and quality improvement. In fact, the quality control system is an integral part of a business plan. In effect, quality control system organisation may not have a separate structure. However, some structures, such as the quality assurance department and quality council, may be established to pay particular attention to critical quality activities. It remains, however, the responsibility of every person within the organisation to ensure quality in his/her function on the job.

Moreover, activities are better controlled when grouped into sets of processes; thus, a quality product is just a result of a quality process. Therefore, the process should possess specific requirements to be able to deliver its intended product. Nevertheless, the first step in the control process is to design it in such a way that it is capable. Also, the relevant quality factors (process variables) as well as the causes that might disturb process flow should be controlled. Quality control starts with a planning step, which, in turn, is based on data. The seven quality control tools are powerful means to organise, clearly display and analyse data. This facilitates the controller's role in evaluating the actual performance. Information resulting from the use of the seven control tools goes through the feedback loop, which in turn, forms the basis to take relevant corrective action. So far, an elaboration has been made on quality control, in general, and quality process control, in particular. Having explored quality, it is also necessary to examine the quality standards to broaden the knowledge informing this study.

2.3.7 Quality Standards

The term 'standards', as it is used in this context (ISO, 2002), implies documented agreements containing technical specifications or other precise criteria to be used consistently as rules, guidelines or definitions of characteristics, to ensure that materials, products, processes and services are fit for their purpose. From the 1950s, many organisations developed quality standards that suited their businesses since their activities were restricted, mainly to the local economy. By the 1970s, the expansion of an organisation's activities at the national level resulted in the replacement of many firm-specific standards by national standards. However, in the 1990s, Peach (1997) stated that international competition and the globalised marketplace made the incorporation of international standards imperative to facilitate international trade and to unify international quality language, particularly for the international contractual agreements. In this section, an overview of three quality standards is presented.

2.3.8 ISO 9000

The International Organisation for Standards [ISO] is a worldwide federation of one national standard body from each one of more than 140 member countries. ISO 9000 is one of a series of ISO standards, which was first issued in 1987 and qualifies organisations quality management systems. It comprises two basic kinds of standards (Peach, 1997), which are:

- Product standards (quality assurance)
- Quality system (management system)

However, the ISO 9000: 2000 family consists of four primary standards (ISO, 2002), namely:

- ISO 9000: Quality management system; Fundamentals and vocabulary
- ISO 9001: Quality management system requirements that demonstrate its capability to meet customer requirements and enhance customer satisfaction
- ISO 9004: Quality management systems; guidance for performance improvement to enhance satisfaction for interested parties
- ISO 19011: Guidelines on quality and environmental management systems auditing.

2.3.9 The Malcolm Baldridge National Quality Programme (MBNQP)

The Malcolm Baldridge National Quality Programme is an award/recognition system. It was established in 1988 to recognise American organisations that excel in the quality management field (Arcaro, 1995). The criteria are designed to help organisations use an integrated managerial approach to improve organisational management performance systems, which result in:

- The delivery of ever-improving value to the customer, contributing to market success.
- The improvement of overall organisational effectiveness and capabilities.
- Organisational and personal learning (NIST, 2001).

The award is given in categories of manufacturing, service and small business in addition to education and healthcare fields, which were later included in 1999 (NIST, 2002). A review of the applicant‘s quality management is based on seven-point criteria, namely: leadership. strategic planning, customer and market focus, information and analysis, human resource focus, process management and business results. However, each of these criteria is broken down into several clusters.

2.3.10 Deming Prize

The Deming Prize is another award/recognition system; this was established in 1951 by the Union of Japanese Scientists and Engineers (JUSE) in honour of W.E. Deming who introduced basic TQM concepts to the Japanese from the 1950s. The Deming Prize mainly

concentrates on the effective planning of organisational and operational aspects (Foster, 2001). The Prize is an annual award given to individuals and groups that demonstrate successful companywide quality control. Assessment is conducted in ten categories concerning: policies, organisation, information, standardisation, human resources, quality assurance, maintenance, improvement, effects and plans. During the Eighteenth and Nineteenth Centuries there was no quality control as it is known today; however, in the Twentieth Century, quality control development has gone through three broad stages, each stage taking about 20 years. These stages are:

- Inspection quality control
- Statistical quality control
- Total quality control

In the early 1990s, all total quality control concepts emerged as an integrated managerial approach, and most of the leading companies adopt Total Quality Management (TQM) programmes. However, in Japan, TQM had been perfected more than 20 years before. The meaning of quality in the manufacturing field has subsequently broadened to contain several dimensions of construction, engineering, manufacturing, and marketing activities. Also, product reliability aspects are part of the quality concept, as well as economical issues and organisational arrangements, and the impact of production on society and the environment; these are essential components that are contained in the quality concept. All these quality factors that comprise quality should be composed in a balanced way while keeping customer satisfaction as the focal point. TQM is a managerial methodology; therefore it is a principles and system approach. Some of TQM principles are: quality integration, quality first, customer orientation, continuous improvement, prevention rather than inspection, and factual-based decisions and workforce involvement.

TQM can be defined as the totality of ways through which quality planning, quality control, and quality improvement are achieved (Juran, 1989). Moreover, planning, control and improvement comprise the main components of an organisational quality system. Quality planning aims to: determine customer needs, translate these needs into product features, and then develop the processes required to meet those needs. Quality control is therefore a managerial activity with which an organisation achieves its objectives; furthermore, it can be carried out by undertaking the Plan-Do-Check-Act control cycle.

Finally, quality improvement is a necessity in today's organisation especially within the construction environment, which is mainly directed at raising the quality level or eliminating deficiencies. An improvement programme can be carried out on a project-by-project basis. Improvement can also be achieved within routine work on a continuous basis. However, overall organisational quality objectives, organisational structure, culture and quality programme requirements are the basis for a whole TQM system and strategic quality management. The TQM mechanism is based on the premises that quality standards and customer satisfaction are the organisation's top priorities. Also, the entire supplier-customer chain affects quality; therefore, the TQM approach is to maintain and improve customer satisfaction as well as quality standards by integrating and interacting all factors that form the business environment.

2.3.11 Lean, Kaisen and ISO9000 2015

The term 'kaizen' was introduced in America in 1986 with the publication of Masaaki Imai's book, Kaizen: The Key to Japan's Competitive Success, which became widely used and accepted among industrial managers and companies that adopted this philosophy. Imai (2012) explains that, in the Japanese language, kaizen means 'continuous improvement' and that, in practice, it seeks to involve all the participants in a process that is being analysed at a relatively low cost for the company. The continuous improvement of processes is one of the principles that govern the essence of the Toyota Production System (TPS). In this regard, Shingo (1987, 2010) presented a scientific model for the implementation of improvements in industrial processes, which was based on a series of questions and initiatives that encourage the identification, analysis and solution of problems, called the Scientific Thinking Mechanism (STM), which formed the basis for the development of the model. According to Berndtsson and Hansson (2000), and Brunet and New (2003), a kaizen (and the techniques for its development) can be adapted to fit the circumstances of each company or sector. Continuous improvement (kaizen) is one of the concepts that underpin TPS. Authors such as Alukal and Manos (2006), Doolen *et al.,* (2008), Forbes & Ahmed (2011), and Martin & Osterling (2007) consider that kaizen represents an action that promotes beneficial changes in a structure of continuous learning and improvement in the context of the construction industry (CI); thus, the kaizen concept is essentially the same as described previously. However, the major obstacle in applying these concepts to construction are related to the environment in which kaizen events are usually practiced and described, i.e., in the manufacturing industry, which

differ significantly from the CI. Deficiencies in the design process, and hence in the production, cause frequent and unexpected failures in construction. In a way, this promotes rushed decisions, which, in most cases, are based on the practical experience of managers and workers. This takes place without any kind of scientific systematisation to ensure that the decision is the best and that the problem will be effectively solved.

In comparison, Lean production presents a very different model. Production is managed so that actions are aligned to produce unique value for the customer. Project duration and cost are considered in 'project-as-production system' terms, which signifies that project total cost and duration are more important than the cost or duration of any activity. Coordination is accomplished in general by the central schedule while the details of work flow are managed throughout the organisation by people who are aware of and support project goals (as opposed to activities or local performances) (Alukal & Manos 2006). Value to the customer and throughput, the movement of information or materials to completion, are the primary objectives. Improvement results from reducing waste, which is the difference between the current situation and perfection, namely, meeting a customer's unique requirements in zero time with nothing in stores. Lean thinking forces attention on how value is generated rather than how any one activity is managed. Whereas project management views a project as the combination of activities, Lean thinking views the entire project in production system terms; this is why Aized (2012) and Neyastani (2016) ascertained that it is as if the project were one large operation. It is difficult to optimise a large production system in construction because of the complex interaction between a project's parts. Whilst Lean production principles, which are rules for organising and managing production, work in manufacturing, Lean Construction or kaizen in construction (Construction Industry Institute, USA) is all about identifying waste in construction design and building processes, which has been found to represent a large percentage of total project costs. Studies in the U.S.A. and Europe have revealed that quality costs due to non-conformance can represent up to 12% of total project costs. Poor materials management can total up to 10-12% of the total project costs. Excessive consumption of material (on site) is, on average, up to 10% of the total costs. Furthermore, working time on non-value adding activities on sites can be up to 60% of total time.

With over 1.1 million certificates issued worldwide, ISO 9001 helps organisations demonstrate to customers that they can offer products and services of consistently good quality. It also acts as a tool to streamline their processes and make them more efficient at

what they do (ISO9000 2015). Acting ISO Secretary-General, Kevin McKinley, explains: "ISO 9001 allows organisations to adapt to a changing world. It enhances an organisation's ability to satisfy its customers and provides a coherent foundation for growth and sustained success." The 2015 edition of the standard features important changes, which Nigel Croft, Chair of the ISO 9001 Subcommittee that developed and revised the standard, refers to as an "evolutionary rather than a revolutionary" process. "We are just bringing ISO 9001 firmly into the 21st century. The earlier versions of ISO 9001 were quite prescriptive, with many requirements for documented procedures and records. In the 2000 and 2008 editions, it focused more on managing processes, and less on documentation."

2.4 New Ideas Introduced On the Standard

In order to respond to the proposed outcomes of the challenges of the ISO 9001 revision, which was based on ISO 9001 Directives and on the aims of ISO/TC 176 to assure that the future ISO 9001:2015 International Standard reflects the changes to the environment and remains stable for the next 10 years, the following new ideas have been incorporated by the ISO/TC 176 Working Group which is in charge of the revision process (ISO, 2008).

- **Risk-Based thinking**: As already noted, this adds management credibility to the standard. But 'risk experts' should note that this is not ISO 31000 but rather a way of thinking that replaces preventive action and seeks to add some systematic evaluations of potential and actual issues with the aim of making processes more robust and capable.
- **Interested Parties**: This has been added to Clause 4.2 but with the precaution that it involves "relevant interested parties". To be relevant, the interested party must have some actual or potential impact on the quality of the goods and services.
- **Change Control**: This was included in the previous version of the Standard but has since been highlighted as, in practice, many systems fail because of incomplete (or lack of) change management. This is now included in three places within the Standard.
- **Strategic Direction**: This requirement has been added to the Management Review to try to meld the business and quality systems, but it is unclear as to whether auditors will be ready for this
- **Knowledge Management**: Several examples of companies where their Quality Management Systems (QMS) scope no longer matches the expertise available; for example, situations where, due to the economic crisis, older, experienced staff members

in an organisations may have taken early retirement which, in many cases, has created a crisis in knowledge management.

- **Leadership**: 'Top Management' is still included but 'Leadership' does not quite align with the principles (where leadership arises at all levels). The most appropriate wording would be 'everything' and 'everywhere'.

2.4.1 Comparing ISO 9001:2008 versus the Proposed ISO/DIS 9001:2015

The website of ISO/TC 176/SC 2/WG 24/N 112 (www.iso.org) details tables that compare the present ISO 9001:2008 International Standard with the proposed ISO/DIS 9001:2015. In addition, SC2 will develop a guidance document, ISO TS 9002:2015. The clauses in Section 4 require the organisation to determine the issues and requirements that can impact the planning of the quality management system and these can be used as inputs for its development, as presented in Figure 2-5. ISO/DIS 9011:2015 also proposes a processes model showing the links with the clauses of the international standard.

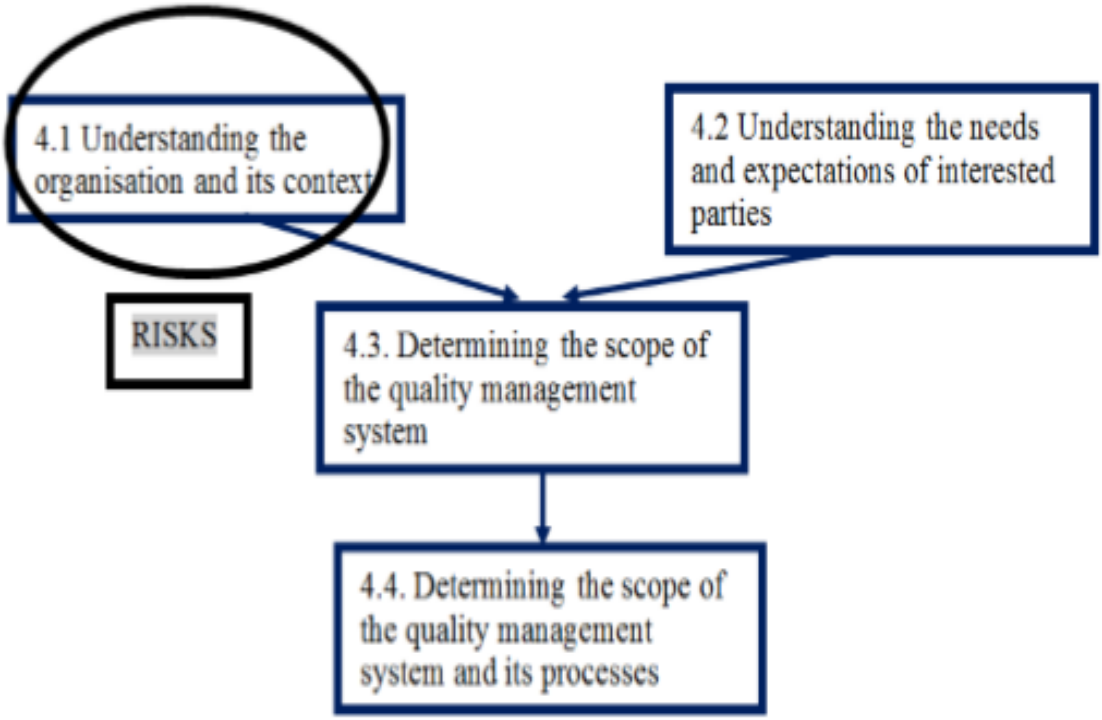


Figure 2-5 Risk- Based Approach (ISO so9001, 2015)

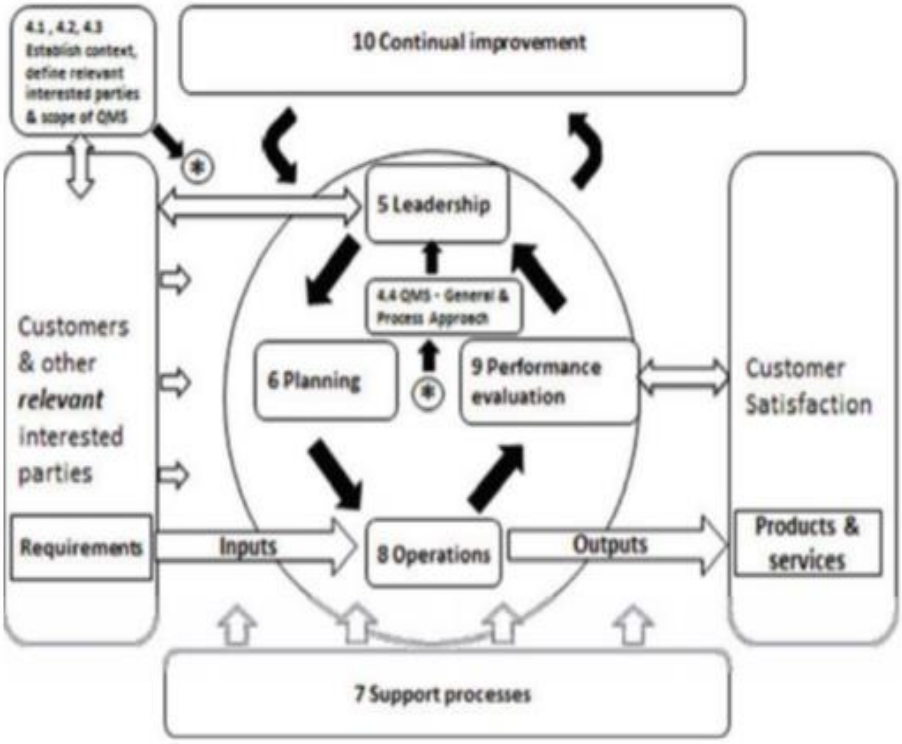


Figure 2-6: ISO 9001: 2015 proposed links - Process Approach (source: ISO 9001, 2015)

2.5 Quality Improvement Techniques

Total Quality Management mainly demands a process of continued improvement aimed at reducing variability. An organisation wishing to support and develop such a process needs to use quality management tools and techniques. It is prudent to start with the more simple tools and techniques, such as a: Check-sheet, Checklist, Histogram, Pareto Diagram, Cause-and-Effect Diagram (Fishbone Diagram), Scatter Chart and Flowchart. These are described in further detail in the following sections.

2.5.1 Cause and Effect Diagrams

Cause-and-effect diagrams are charts that identify potential causes for particular quality problems. They are often called fishbone diagrams because they resemble the bones of a fish. A general cause-and-effect diagram is shown in Figure 2-7. The ‘head’ of the fish is the quality problem, such as damaged zippers on a garment or broken valves on a tyre. The diagram is drawn so that the ‘spine’ of the fish connects the ‘head’ to the possible cause of the problem. These causes could be related to the machines, workers, measurement, suppliers,

materials, and many other aspects of the production process. Each of these possible causes can then have a smaller 'bonus' that addresses specific issues related to each cause. For example, a problem with machines could be due to the need for adjustment, old equipment, or tooling problems. Similarly, a problem with workers could be related to a lack of training, poor supervision, or fatigue. Cause and effect diagrams are problem-solving tools commonly used by quality control teams where specific causes of problems can be explored through brainstorming. The development of a cause-and-effect diagram requires the team to think through all the possible causes of poor quality.

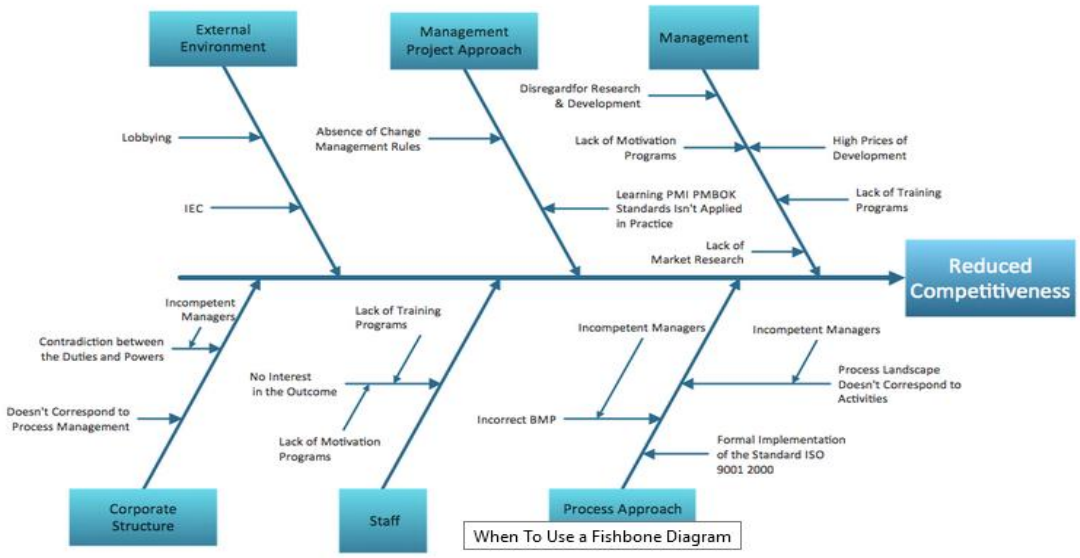


Figure 2-7 A General Cause-And-Effect (Fishbone) (Diagram Moonrakere et al., 2010

Figure 2-7 has two sides; the right- side forms the effect, or quality characteristics, and the left- side is the cause, or factors, that affect the quality characteristics (Ishikawa, 1983). Figure 2-7 shows that there are many factors that influence an effect; therefore, management should investigate and control the root causes to influence the effect.

2.5.2 Stratification

When gathering data for use in further analysis, it is useful to stratify the data by the type of material, type of machine, time, operator, or other categories for a better understanding of the situation. This facilitates an easy isolation of the source of causes and problems (Ozeki & Asaka, 1990). Furthermore, stratified data can be used in other quality control tools, i.e. check

sheets, histograms, and control charts. Figure 2-8 shows the distribution of data arranged in a histogram for a combined two-shift department.

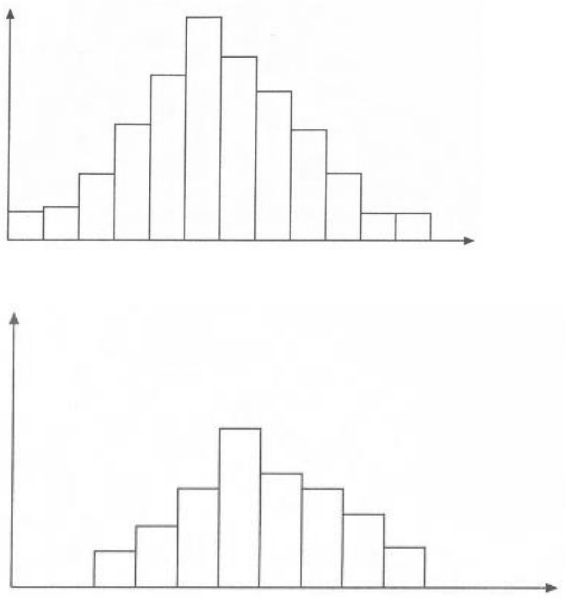


Figure 2-8: Using Histograms to Direct Quality Control Activities (source: Galgano, 1994)

However, diagrams show the data distribution for each shift separately; as a result, this gives more information about the situation and, in turn, directs the quality control activities (Galgano, 1994).

2.5.3 2.4.3 Scatter Diagram

A scatter diagram is a step further beyond the cause and effect diagram. In fact, a cause and effect diagram gives information regarding the set of causes and factors that can influence an effect. However, it does not describe the relationship between individual causes and effects (Ishikawa, 1983). Moreover, it does not expose the weight of each factor. Thus, a scatter diagram explains the correlation between pairs of factors or between a cause and effect (Ozeki & Asaka, 1990). This diagram is important in facilitating the identification of the most influential factors affecting quality characteristics towards which direct control efforts should be concentrated. Figure 2-9, shows a scatter diagram that depicts a moderate positive relationship between temperature and defects.

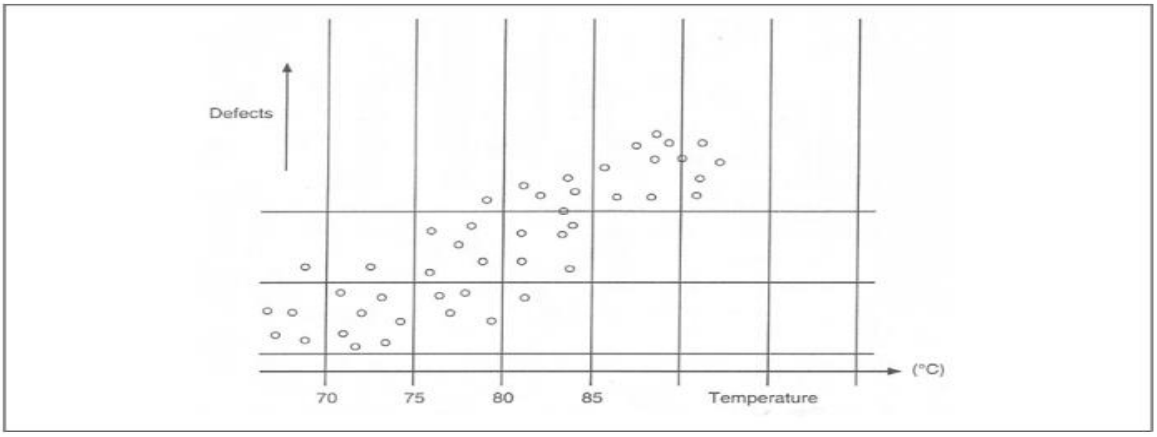


Figure 2-9 Scatter Diagram (source: Galgano, 1994)

2.5.4 Control Chart

A control chart is mainly used to evaluate process stability (Ozeki & Asaka, 1990), and is a two-dimensional graph (See Figure 2-10). For example, the horizontal axis forms measurements over time, and the vertical axis forms the values of quality characteristics.

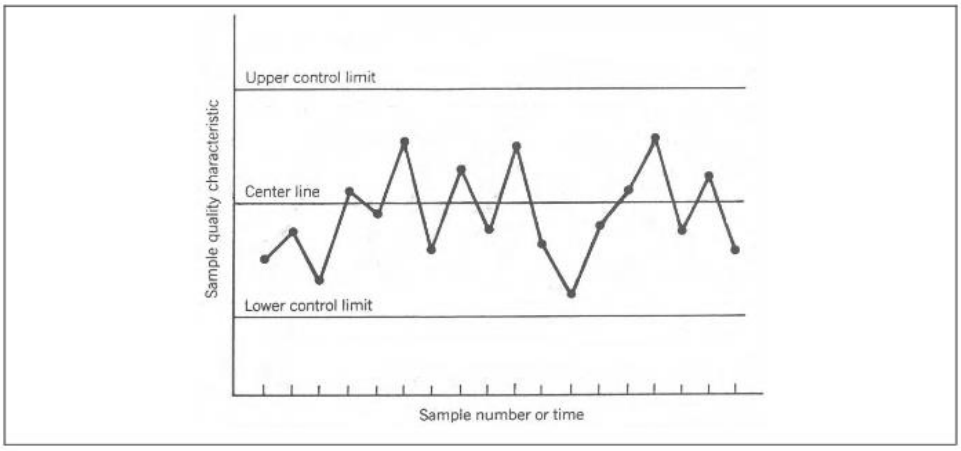


Figure 2-10 A Typical Control Chart (source: Montgomery, 1991)

The chart contains three parallel lines: the centre line indicates the average value of the quality characteristics, whilst the other two lines represent the upper control limit (UCL) and the lower control limit (LCL). Measures are taken over time, and if values of quality characteristics lie within the two limits, it is generally understood that the process is stable. Otherwise, if some values lie beyond the control limits, this would be an indication of an underlying potential problem, and consequently, an investigation is required to identify the

source of the problem, and to eliminate the cause so as to prevent a reoccurrence (Montgomery, 1991). Thus, these seven quality control tools are extremely powerful and, as Ishikawa states, can resolve the great majority of problems in companies (Galgano, 1994). However, the outcomes of these tools are information that needs to be taken into account while improving the process.

2.5.5 Pareto Analysis

A Pareto analysis is a technique used to identify quality problems based on their degree of importance. The logic behind a Pareto analysis is that only a few quality problems are important, whereas many others are not critical. The technique was named after Vilfredo Pareto, a Nineteenth Century Italian economist who determined that only a small percentage of people controlled most of the wealth. This concept has often been called the 80–20 rule and has been extended to many areas. In quality management, the logic behind Pareto's principle is that most quality problems are a result of only a few causes, and the goal is to identify these causes.

One way to use a Pareto analysis is to develop a chart that ranks the causes of poor quality in decreasing order based on the percentage of defects each has caused. For example, a tally can be made of the number of defects that result from different causes, such as operator error, defective parts, or inaccurate machine calibrations. Percentages of defects can be computed from the tally and placed in a chart. The research tend to find that a few causes account for most of the defects.

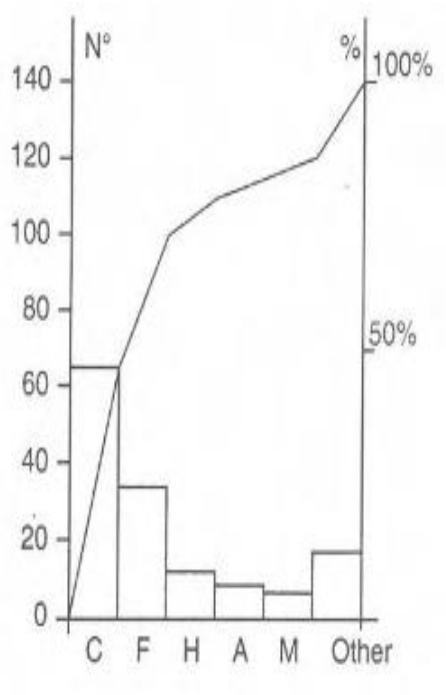


Figure 2-11 Pareto Chart (adapted from: Hoonerlker, Carayin and & Loushine (, 2010)

2.6 Definition of TQM

Just as the concept of quality has no universal acceptance, similarly TQM means different things to different authors, and hence, there are various definitions of this process (Aksu, 2003; Antony *et al.,* 2002; Arasli, 2002; Demirbag *et al.,* 2006; El-Araby & Irgens, 2006; Holmes, 1996; Mosadegh Rad, 2005). In fact, Vouzas (2004) argued that TQM is one of the most controversial concepts in the history of management theory. The term TQM first appeared in 1961 devised by Feigenbaum, who, at that time, called it Total Quality Control (TQC). However, this research also considers current definitions of TQM by several authors. TQM is often referred to as a journey, not a destination. Hoonerlker *et al*. (2010) also believes that greater customer satisfaction, better quality products, and a larger market can be achieved through the implementations of TQM.

TQM is the way of life of an organisation committed to customer satisfaction through continuous improvement (Okuntade, 2015); however, TQM is also a corporate culture characterised by increased customer satisfaction through continuous improvement in which all employees in the firm actively participate (Olatunji, Windapo, & Nureni, 2012). In their

empirical study, Garcia-Bemal and Ramirez-Aleson (2010) show that adopting TQM in a way that is consistent with organisational design increases performance and promotes substantial benefits. Indeed, this finding echoes the claim that it acts as a management philosophy that emphasises the management of the entire organisation so that it excels in all dimensions of its operation (Elmuti *et al.,* 1996). However, the most comprehensive definition of TQM was developed by Wilkinson and Witcher (1991, cited in Ho & Wear, 1996, p. 36), who considered three different components: "Total - Every person in the firm is involved (including customers and suppliers) Quality Customer requirements are satisfied exactly, and Management - senior executives are fully committed". Thus, they regarded leadership TQM as part of the same process.

Indeed, TQM is perceived as an integrated management philosophy aimed at continuously improving the performance of products, processes and services to achieve and exceed customers' expectations (Antony *et al.,* 2002). Also, Demirbag *et al.,* (2006, p. 830) concurred with these ideas, and defined TQM as, "… a holistic management philosophy aimed at continuous improvement in all functions of an organisation to deliver services in line with the customer's needs or requirements under the leadership of top management". The reference to leadership is also present in the definition provided by Saylor (1992) who stated that TQM is, "… leadership and management philosophy and guiding principles stressing continuous improvement through people involvement and quantitative methods focusing on total customer satisfaction".

However, the researcher defines TQM as a philosophy that goes beyond a set of tools, methods, and practices to include (as Deming suggests) a set of generic 'profound and valuable knowledge' which can be tailored in a flexible way to suit specific organisational needs to facilitate the process to serve the explicit and implied needs of customers by combining continuous improvement with large-scale innovation. The core of this definition is precisely the art of mobilising and pulling together the intellectual resources of all employees in the service of the organisation. Only by drawing on the combined intellectual power of all its employees can a firm confront the turbulence and constraints of today's environment.

2.7 Principles of TQM

The principles of Total Quality Management (TQM) can be defined as rules or fundamental and complete convictions in the management of an organisation, oriented towards the

continuous improvement of performance in the long term, by a total customer orientation (Masaaki 2013), while taking into consideration the needs of all other stakeholders. In both theory and practice, it is accepted that the conceptual basis of the TQM philosophy is the principle of continuous improvement. To lead the continuous improvement process, it is necessary to apply some fundamental principles of TQM. Nevertheless, Calingo (1995) stated that there are key principles of TQM that are popular to all establishments specifically:

- **Customer Operating Quality (Customer Focus and Satisfaction)**: TQM is dependent on the beliefs that quality is powered by, and defined by, the customer. Product/service characteristics that generate a perception of quality on the component of the customer strengthen customer satisfaction and, consequently, increase customer demand. Thus, customer satisfaction is the driving force that propels an organisation's existence. Customer Focused Satisfaction entails a supplier partnership; this involves a service relationship with internal customers, never compromising on quality, and adopting customer-driven standards.

  In considering the extent of customer satisfaction in Total Quality practice, the US Department of Commerce in a 1993 quality award criteria examined organisations' relationships with customers, and their knowledge of customer requirements, including the key quality factors that drive marketplace competition. They infer that an understanding of customer requirements derives from organisational thoroughness and objectivity, and understanding customer types and product/service features. Other key excellence indicators for customer satisfaction, according to Ross (1995) involve a resolution by management to empower frontline staff, strategic infrastructure support for frontline employees, and attention to hiring, training, attitude, and morale for frontline employees. Ross indicates that these activities will help employees relate to customers in a highly professional manner and provide services/products that will satisfy their requirements. While the researcher agrees, to some extent, with the propositions of Ross, frontline empowerment and other issues raised are not, in themselves, sufficient conditions to provide focus and satisfaction to the customer. Proactive customer service systems, proactive management of relationships with customers, and the use of all listening posts, surveys, product/service follow-ups complaints, and turnover of customers and employees, should also be adopted as key excellence indicators for customer satisfaction.

Since the quality of a product does not necessarily lie in itself, but in what the customer perceives, customer focus and orientation should provide a common goal for all organisational activities and members. It incorporates the quality of design and conformance to quality specifications. According to Unruh (1996, p. 23), "… even if an organisation is not focused on its customers, its competitors are. And the customers know where to find those competitors". He also believes that, "… customer focus is not a one-time-only program. It requires a permanent ongoing commitment of all organisational resources". For an organisation to achieve success in any customer-focused initiative, it is crucial that it has an understanding of customers. According to Unruh (1996) customer needs and values should influence every aspect of the organisation: strategy, employee staffing and performance, product and service development, sales and marketing programmes, operational procedures, information and measurement systems. Customer focus and satisfaction not only enable organisations to know what customers think about them, their products, and their competitors, but also to know about the personal lives of their customers.

- **Strong Quality Leadership**: Leaders establish a unity of purpose and the direction of an organisation. They should create and maintain an internal environment in which people can become fully involved in achieving the organisation's objectives. Steps in the application of this principle are (Unruh 1996):
    - Be proactive and lead by example
    - Understand and respond to changes in the external environment
    - Consider the needs of all stakeholders, including customers, owners, people, suppliers, local communities and society at large.
    - Establish a clear vision of the organisation's future
    - Establish shared values and an ethical role model at all levels of the organisation
    - Build trust and eliminate fear
    - Provide people with the required resources and freedom to act with responsibility and accountability
    - Inspire, encourage and recognise people's contributions
    - Promote honest and open communication
    - Educate, train and coach people
    - Set challenging goals and target

- Implement a strategy to achieve these goals and targets

Only a formidable authority group dedicated to quality enhancement can conquer the predetermined inertia and resilience to change by generating clear quality objectives and formulating the system and a way of attaining these types of goals.

- **Continuous Improvement**: All procedures and work pursuits can be achieved more efficiently using continuous improvement. However, it requires the continuous growth of a management strategy that promotes the determination and seize of ongoing changes to facilitate the workflow. Implementing continuous improvement in managing everyday business activities is relevant to all those who participate in, and contribute to, the success of organisations. Continuous improvement entails systematic measurement and focuses on products/services, excellent teams, cross-functional process management, attainment, maintenance and the improvement of standards. Moreover, global competition for increasingly demanding customers has necessitated the change of acceptable standards; indeed, what appears to be best products/services for today may be disregarded tomorrow. Customer expectations are increasing and changing the dynamics of global environmental changes. As such, organisations benchmark one another so as to identify the factors underpinning their successes. According to Quirke (1995), the major challenge for organisations is how to acquire customers, retain them, build relationships with them and discover ways of being more valuable to them before the competition. However, no organisation can achieve this without continuously improving both its products (and services) and its processes and people.

  Moreover, continuous improvement refers to "the constant refinement and improvement of products, services and organisational systems to yield an improved value to customers" (Stahl, 1995, p. 261). One unique attribute of continuous improvement to benefit organisations has been focus of organisational activity is the search for ways to continuously improve the quality of products or services in the absence of customer complaints and problems that may preclude a future problem (Stahl, 1995). In the words, "TQM is a necessity. It is a journey. It will never end" (Ho, 1999, p. 30). Continuous improvement involves both innovation and maintenance, and improvement through small steps; however, this often leads to a radical breakthrough (Wilkinson, Redman, Snape & Marchington, 1998). Wilkinson *et al.* (1998) echo the view of Nosakhare, that 'Total

Quality' organisations should embark on benchmarking and self-assessment to drive continuous improvement. This will help to achieve the goal of continuous quality improvement in products or services and delivery processes. It will also avoid the common trap of allowing conformance to become a goal in itself. Thus, TQM is expected within decision-making that utilises dependable data and assessment, and therefore, management has to be prepared to continuously evaluate the quality and to recognise and exact conditions that cause low quality.

- **Employee Participation**: All personnel must be motivated to become involved in assisting in attaining organisational quality goals. In TQM, all workers are understood to be responsible for quality and are presented will tools and coaching to fulfil this accountability (Calingo, 1995). This recognises that workers closest to their organisation's daily functioning strategies are in an ideal position to appreciate and improve the quality of these techniques.
- **Training and Development**: In discussing how he founded Philip Crosby Associates (PSA) in 1979 and the Quality College, Crosby (1996) stated that the idea of ensuring that quality becomes a normal part of an organisation's operating arsenal does not necessarily catch on automatically. It takes the training and development of staff to meet sophisticated customers' needs and excel over their competitors in the global market economy. Organisations should first consider internal customers (namely, employees) in order to create the conditions necessary for them to produce and deliver quality. It will be difficult, if not impossible, to meet and exceed the expectations of the external customers if the quality is not delivered to and through the internal customers. Every employee in an organisation must therefore be provided with the necessary education and training. Although many traditional organisations view employee training and development as an unnecessary overhead and costly, it is the fulcrum in implementing the Total Quality Management process. Many Total Quality organisations view employee education and training in the context of yielding improvements in customers' value and thus the key to organisational success. Nevertheless, TQM will not be effective unless all employees are trained to use the tools. Based on field research, Unruh (1996, p. 85) believes that, "… training is the number one way that organisations focus their employees on serving customers". Moreover, Oakland (1995, p. 309) agrees with the importance of training, stating that "… training is the single most important factor in actually improving quality, once there has been commitment to do so".

In the past, organisations maintained the traditional notion of, "If it is not broken, do not fix it". But in today's changing business environment where competition has increased the awareness and demands of customers, continuous improvement requires more commitment than the traditional method of solving problems, which addresses issues when they arise. Instead, according to Stahl (1995) 'the spirit of continuous improvement' in Total Quality organisations means that, "If it is not perfect, make it better, and it strives for a continuous stream of base hits, rather than waiting for the home run". This approach to improvement requires several tools and different ideas, including an understanding of the kinds of variation in a process. Moreover, it requires a proactive, rather than a reactive, mindset. The spirit of continuous improvement requires men and women to demonstrate a 'can-do' attitude and a desire for excellence. They must be committed to continually "improving a thousand things by one percent rather than one thing by a thousand percent". The most effective means of doing this is to use the employees who do the job to identify and implement appropriate change; however, this can only be achieved if employees are given adequate training and development. In commenting on the effectiveness of continuous improvement in achieving organisational quality objectives, Stahl (1995) posits that training and development should not be seen as a one-time event but a lifelong process. Today, many organisations recognise that, due to the occurrence of substantial changes in the business world, additional training and development are needed throughout employees' careers to help them acquire the necessary skills to initiate improvement strategies to add value to customers.

- **Recognition of staff**: Recognition should be provided for both the suggestions and achievements for teams as well as individuals. Indeed, employees strive to receive recognition for themselves and their teams, and detecting and recognising contributors are arguably the most important functions of a supervisor. As people are recognised, there can be significant changes in self-esteem, productivity, quality and the amount of effort exhorted to the task at hand. Moreover, reward and recognition systems that emphasise the achievement of quality objectives motivate the workforce to fully participate in quality improvement activities (Bhavin, Bhanubhai, Dineshbhai, Nilesh, & Ashish, 2007). Recognition comes in its best form when it immediately follows an action undertaken by an employee.

- **Commitment by senior management and all employees**: Customer focus and satisfaction relates to management commitment. According to Unruh (1996, p. 37),

  > *"Do not start a customer focus initiative without top management commitment. Employees and customers will not take the effort seriously. It will end before it has had a chance to begin."*

  The focus on customer satisfaction applies to both internal and external customers. Ross (1995, p. 208) defines internal customers as, "… the people, the activities, and the functions within the company that are the customers of other people, activities, or functions". Commitment from all employees is required to achieve their involvement; furthermore, commitment requires understanding, whilst understanding requires training, and training requires management commitment, planning and time (Munro, Munro, & Bones, 1993). Thus, every employee needs to understand the reasons for TQM, what it means to them, and how they are equipped to contribute. Commitment and communication by top management also influence the fundamental beliefs, values, and attitudes necessary for employee empowerment and commitment to quality and service (Quirke, 1995; Robertson, 2003). Therefore, according to Mondy and Premeaux (1995, p. 572), "… a TQM culture encourages more employee participation in problem-solving and decision-making."

Based on the above points, the basic principles of TQM must arguably be included in the organisation's culture to generate a climate of open cooperation and teamwork between members, customers and suppliers. Furthermore, managers must understand that implementing total quality management principles can considerably improve the competitiveness of organisations. This research consider that through the implementation of generalised systems of quality management, organisations can record short-term benefits, such as winning new business, increasing customer demand and reducing costs by continuously improving efficiency, reducing losses and increasing labour productivity.

2.8 Roles of Total Quality Management in the construction industry

At this point, the purposes of TQM are considered with regard to the construction industry in Nigeria. As previously indicated, TQM is a procedure that requires consistent transformation of an organisation's activities and routines to render satisfication for clients, whether internal or external, and this results in variations in the ways of thinking, chanes to the operating

atmosphere, and the offer of specific tools, strategies and systems for frequent transformation. The system, moreover, produces a suitable first experience perception of delight customers, and attempts to acknowledge cost, quality as an essential tool, and offers an evaluation for continuous improvement. In contrast, TQM within the Nigerian construction industry, aspires to get rid of waste materials as well as attract attention to the company, which could enable its utilisation as a role model for quality.

A cultural modification that accomplishes transformation through Total Quality Management depends on the measurement of capabilities and the removal of cause and limitations. Frank and Ronald (2006) affirm that TQM produces a culture in the company that aims to consistently enhance all pursuits; it concentrates on the entire knowledge of the business procedure by the usual daily participation of all involved. Total Quality Management thus employs quality data for measurement and continuous improvement in spite of this, it rigours the significance of products and services brought to the customer, whether internal or external, attaining specifications whether specified or not.

2.9 The Implementation of TQM in Construction Organisations

A preparatory part of setting up TQM in a company is to evaluate the organisation's present position. Appropriate preconditions need to be present concerned with the company's background, its current desires, precipitating events towards TQM, and the active employee quality of operating life. Nevertheless, a specific degree of pressure is suitable when starting to develop TQM in that individuals should experience a need for a transformation. Kanter (1983) explains this pressure by discussing building blocks that are found in profitable organisational change. The following outlines …

- Numerous authors, such as Juran, Deming, and Crosby, have already developed several models to represent the Total Quality Management culture and its methods of enhancement. The perfect, or right, choice for a company's intellectuality is one that is assumed to truly acquire the principle of what the organisation plans to accomplish. There is absolutely no fixed model for specific categories, or a framework for organisations. Deming (1998) designed a selection of points that this research can use to support the development of Total Quality Management.

- The list of points creates consistency amongst the objectives concerning the development of products and services, and equally apportions materials to make an extended range available instead of merely those associated with the potential for temporary profit. This starts to make it challenging, to remain in business.
- Adopting the modern perception of rejecting defect, as customers would no longer put up with easily addressed delays and substandard production.
- Ceasing the reliance on mass inspection and relying only on statistical control; this also demanded that suppliers produce statistical confirmations of quality, and to frequently and permanently enhance production and services.
- The model necessitates the end of a performance of awarding businesses exclusively on the concept of the price tag. Instead, substantive actions concerning quality are adopted alongside cost.
- The issue also facilitates the continuous boost and permanent progression of planning, production, and services. Checking consistently for uncertainties can expand every activity in the organisation; this facilitates quality and productivity, and thereby regularly minimises expenses, Moreover, instituting modern techniques of coaching at work for all, which includes management, helps to make more advantageous use of each employee. This is essential as new talents are required (Deming 1998).

2.10 TQM Current Practice in the Nigerian construction industry

The state of QM in developing countries cannot be separated from mainstream economic and industrial development. Business in many of the developing countries has often been sheltered from competition through protectionism at home and government intervention in foreign trades (Madu, 1997; Al-Zamany *et al*., 2002). However, the rapid globalisation of markets and the gradual acceptance of competition are making it more difficult to continue to protect local markets. Developing economies must, therefore, adapt to these environmental changes and develop programmes to enable them to compete effectively (Al-Khalifa & Aspinwall, 2000). Osuagwu (2012) has mentioned that there have been failed attempts at implementing a TQM strategy in Nigeria. According to Osuagwu, the main variables implicated in such failures are early organisational efforts that are only simplistically grasped. These include: quality circles, which are adopted as the only panacea to solve all corporate problems; an

over-reliance on statistical methods; an under-reliance on statistical methods; the bureaucratisation of TQM efforts; the failure to recognise the relationship between TQM objectives and increased employee involvement and participation; and the failure to integrate major organisational functions into TQM activities.

Despite these barriers, many corporate leaders accepted the quality challenge in the 1980s because of the multidimensional benefits it claimed to bring. However, by the 1990s, firms that had not joined the quality movement may have been reluctant to do so because these barriers seemed overwhelming and because organisations believed that joining the quality movement at this time would no longer simplify their corporate agenda (Dory & Scheir, 2002).

Interestingly, Kanji and Asher (1993) focused more directly on the obstacles that hinder the ability of organisations to make a successful transformation to TQM or quality management. From their literature review, it is apparent that many of the obstacles found to hinder TQM efforts could be linked to how effectively the quality transformation is managed, which could be investigated by this paper. The researcher has observed that there is a lack of empirical effort to study the obstacles that impede the implementation of TQM in less developed countries such as Nigeria. Total Quality is a holistic concept that requires the motivation of all people in an organisation to work towards a common goal. Regardless of the organisational structure and management processes, the necessary links must be built between people. Individuals have to learn to accept that employees are not only our greatest and most expensive asset, but that they alone are the creators of quality, i.e. 'People make Quality' (Kanji & Asher, 1993). Thus, the belief is that when people are well motivated they can overcome any difficulties they experience in solving their problems. Furthermore, whatever task an employee undertakes must motivate them to achieve their overall work objective. Quality motivation is all about people because it is people who make quality. There is a common saying that 'an organisation is as good as its people', and it is known that the majority of quality-related problems within organisations are not within the control of the individual employees (Sila & Ebrahimpour, 2002). Insead, as many as 80% of these problems are caused by the way the people are organised and managed. For an organisation to be truly effective, each part must work effectively together towards the same goals, thus recognising that each person and each activity affects, and in turn is affected, by others (Sureshchandar *et al.*, 2001). Some examples of ineffective management are as follows:

- When people are not given the right training to do the job and have to learn the job from others.
- When the job itself is not properly defined and those doing it have to 'make it up' as they go along.
- When paperwork is out of date or otherwise inaccurate.
- When systems do not reflect the work that takes place or are not designed to help to do the job (Sureshchandar *et al*., 2001).

The role of managers within the organisation is to ensure that everything necessary is in place to allow people to assure quality. Various systems and procedures run in organisations enable the smooth and orderly management of activities. However, in recent years, the business world has changed rapidly and business processes have accordingly changed with it (Oakland, 2004). The major activities of managers today are therefore to manage these organisational changes. Most of these changes are due to the modern quality revolution, which, in turn, has created higher expectations of the quality of products and services amongs customers.

For the adoption of these changes, many organisations have followed a streamlined route, i.e. a method to eliminate unnecessary work processes, the duplication of workloads and extra cross-functional cooperation. The impact of TQM on an organisation is, to first, ensure that management adopts a strategic overview of quality (Oakland, 2004). The approach must focus on developing a problem-prevention mentality, but it is easy to underestimate the effort that is required to change attitudes and approaches (Samson & Terziovski, 1999). Although streamlined routes are desirable for many organisations, human systems organised in this way could easily create negative and undesirable activities; for example, the loss of enthusiasm, and a lack of creativity and motivation. Therefore, the leadership of the organisation must play an active role in preserving the positive aspects of the human system and stimulating the individual in their desire to work.

Leadership is the beginning of the quality improvement process, which starts with vision, mission, values, policy and strategy, systems, and so forth. This continues with other principles and concepts of TQM. According to the European Model for TQM, leadership is the driving force behind policy and strategy, people management, resources, and processes, which ultimately leads to excellence in business results. As the definition of TQM suggests, present day leaders and managers are involved in the management of systems and processes

rather than in the formal tasks such as the supervision and control of people. Processes are groups of activities that take an input, add value, and provide an output to an internal or external entity. Frank and Ronald (2006) regarded TQM as a procedure guided by the senior administration to acquire the engagement of every member of staff in the constant transformation of the proficiency of all the exercises, with regard to their regular business. In doing so they thus fulfil the requirements and satisfication of the client, both internal and external. The next sction discusses the benefits of TQM.

2.11 Benefits of TQM

Deming (1996) said, "… in the future, there will be two kinds of the company; those who have implemented Total Quality and those who gone out of business. You don't have to do this “survival is not compulsory". Nonetheless, many organisations have adopted TQM to reap the known benefits, some of which have been identified as follows:

- Reducing the defects and costs (Arasli, 2002; Bayazit & Karpak, 2007; Claver et al., 2003; Dewhurst *et al*., 1999; Kanji & Tambi, 1999; Motwani & Kumar, 1997; Radovilsky *et al.*, 1996). Cost benefits can be obtained through control of financial performance (Juran, 1989);
- Obtaining a high degree of differentiation (Claver *et al.,* 2003);
- Strengthening the brand image (Claver *et al*., 2003);
- Increasing the return on investment, and increasing the market share (Chin *et al.,* 2003);
- Improving the process efficiency (Claver *et al*., 2003; Motwani & Kumar, 1997);
- Increasing the potential to generate competitive advantage, through better customer satisfaction and improved quality of products/services provided at lower prices. This can result in increased sales, profits and business growth, which strengthens an organisation’s competitive advantage (Antony et al., 2002; Bayazit & Karpak, 2007; Reed et al., 2000). Organisations that have adopted TQM have gained competitive advantage by continuously improving every aspect of their organisational culture (Mosadegh Rad, 2005);
- Increasing customer satisfaction (Antony et al., 2002; Claver *et al.,* 2003; Demirbag *et al.*, 2006; Bayazit and Karpak, 2007; Kanji & Tambi, 1999);
- Empowering people (Antony *et al.,* 2002; Bayazit & Karpak, 2007)

- Improving teamwork between departments, which means that employees are motivated and encouraged to control, manage and improve processes (Antony *et al.,* 2002; Elmuti *et al.,* 1996; Michael *et al.,* 1997; Motwani & Kumar, 1997);
- Heightening employee morale (Elmuti *et al.,* 1996; Michael *et al.,* 1997; Motwani & Kumar, 1997);
- Improving communication throughout the organisation as layers of bureaucracy are removed (Antony *et al*., 2002; Arasli *et al.,* 2002; Demirbag *et al*., 2006; Motwani & Kumar, 1997);
- Increasing productivity (Motwani & Kumar, 1997; Siddiqui & Rahman, 2006);
- Improving competitive advantage, as some organisations have claimed that TQM is their best competitive weapon both regarding customer satisfaction and in gaining market share (Peters & Waterman, 1982)
- Adopting TQM offers a significant shift towards improving competitiveness and achieving business excellence (Soltani, 2008). Quality management is considered an important issue for any organisation wishing to generate a competitive advantage.

2.12 Benefits of TQM in the Construction industry

Clients demand improved service quality, faster buildings, and innovations in technology. It is no accident that the construction industry has turned to the manufacturing sector as a point of reference and source of innovation. Successful concepts derived from manufacturing, such as Total Quality Management (TQM), Lean (or Just-in-Time) Production, and Re-engineering, are being adopted and integrated into the construction industry. Implicitly, the successful implementation of these concepts is heavily dependent on a culture of teamwork and cooperation at both intro and inters-organisational levels. Moreover, construction companies have increasingly adopted quality management as an initiative to solve quality problems and to meet the needs of the final customer (Kanji & Wong, 1998). Oakland and Aldridge (1995, p. 1) suggest that, "… if ever an industry needed to take up the concept of TQM it is the construction industry." However, few studies examine the effects of TQM implementation. In their large study involving 1500 construction firms in the mid-western U.S.A., McIntyre and Kirschenman (2000) concluded that substantial economic benefits could be attained through the implementation of TQM. Moreover, Chase's (1998) study concluded, that in the construction industry, the application of TQM to the job site has been

proven to speed up projects while increasing profitability. Meanwhile, Torbica and Stroh (1999, p. 1) examined the ways in which implementing TQM in construction affects customer satisfaction, and concluded that, "For the first time an empirical study has confirmed that implementation of TQM is positively associated with homebuyer satisfaction." Similarly, the results of a study by Liu (2003) on quality implementation in public housing projects in Hong Kong showed an increase in customer satisfaction after the ISO 9000 implementation; thus, the average number of defects in housing projects built by companies with ISO 9000 certification was significantly less than the number of defects in housing projects built by companies without ISO 9000 certification.

Although TQM experts have acknowledged that the implementation of TQM differs from one situation to another, most believe that TQM can be implemented uniformly to all organisations (Crosby, 1979; Deming, 1986; Juran, 1986 cited in Sitkin *et al.*, 1994, p. 539). Furthermore, Kanji and Tambi (1999) suggested that TQM could be applied to achieve continuous improvement in the Nigeria construction industry, regardless of whether the institutions encounter specific problems. Indeed, they believed that TQM has the potential to improve quality in the Nigerian construction sector.

2.13 Benefits of TQM in the Nigerian construction industry

The research conducted by Ayandele and Akpan (2015) investigated whether there were any significant differences in performance between the Pre-total Quality Management and the Post-Total Quality Management of Nigerian Breweries, Plc. This study revealed that 96 (or 76.8%) of the respondents agreed that there had been a significant improvement in the operations of Nigerian Breweries since the introduction of TQM. Moreover, 22 (or 17.6%) disagreed while seven (5.6%) were indifferent. Similarly, respondents were asked to state if TQM had significantly impacted the operational costs of Nigerian Breweries, and 71 (or 56.8%) stated that the application of TQM had drastically reduced the overall operational cost. However, 49 (or 39.3%) had a different opinion, while five (or 4%) had no idea. Also, the overall impact of TQM on quality was assessed, and 113 respondents (or 90.4%) agreed that continuous improvement and innovation from TQM practices positively correlated with quality performance, while only twelve (or 9.6%) had no idea. However, no one absolutely disagreed with this claim. To reinforce the previous claim, 75 (or 60%) respondents said that Nigerian Breweries Management measures and reviews the effectiveness of their

organisational change and shares the knowledge that is collected. However, 21 (or 16.8%) held a differing view, while 29 (or 23.2%) had no idea of the role that management undertook in this regard. Based on their investigation, this research we can cite a range of positive outcomes or benefits as a result of the TQM implementation within the construction industry.

Following its successful implementation worldwide by many highly competitive organisations and its subsequent improvement of performance and productivity (especially within the service and manufacturing industries, TQM is widely recognised as an enabler for performance in the industry (Love, Edwards and Irani, 2004). A similar related study on TQM adoption within a Nigerian construction organisation recognises that it has since become a vital strategy for all organisational aspects after initially being considered an important operational level element amongst some firms (Hendricks and Singhal, 2001). TQM can also be said to be a means of achieving excellence by companies around the world; it can also improve financial performance, enable greater customer satisfaction, and higher product quality in the Nigerian construction industry. Hendricks and Singhal (2001), observed that organisations have already realised that their only way of surviving in today's competitive global market is to become a successful total quality organisation. This therefore means that organisations should start developing a product quality system from which the client or customer can derive reasonable satisfaction.

However, the implementation of TQM in Nigeria is not an easy task, as it requires a total change in organisational culture, the shifting of responsibility to management, and the continuous participation of all the quality improvement processes (Lakhe & Moharty, 1994). Nevertheless, the effective implementation of TQM comes with improved company morale and a companywide spirit of teamwork; more importantly, it comes a heightened sensitivity to the market and customers (Aibinu & Jagboro, 2002; Akpan, *et al.*, 2014; Amade, 2014; Beckwith, 1992, Ubani & Ononuju, 2013). Lakhe & Moharty (1994) also explained that TQM enhances the company's ability to discover potential failures before they become a disaster. In a similar study, Simon (1991) indicated that companies should focus on problem prevention rather than problem-solving, meaning that problems should be found in the design of a construction process, and that workers should be able to perform error-free jobs. Moreover, the implementation of TQM in Nigeria could encourage the enlightenment and empowerment of subordinates as well as open channels of communication that are fostered by the construction company leadership. TQM benefits include: customer improvement, the training

and retaining of staff, customer satisfaction, top management support, defect free products at the first attempt, the elimination of reworks, and cost effectiveness (Iruobe, Ojambati, Akinpade and Iruobe, 2012). The implementation of TQM in the Nigerian construction industry will result in better quality products, services, delivery and administration which ultimately satisfy the client's functional and aesthetic requirements at a defined cost and within a stated completion time.

To summarise, the complex and dynamic nature of the construction industry in Nigeria means the concept of TQM remains ambiguously defined. The objectives of every project are to meet the requirements and satisfaction of the client within the stipulated time and budget without affecting quality. The implementation of TQM in the Nigerian construction industry will enable the detection of any flaws in the industry (Okuntade, 2015). It provides opportunities for improvement, and helps Nigerian organisations to identify the barriers and benefits, serving as a yardstick for performance assessment. This study will evaluate the possible benefits and barriers to the implementation of TQM in the construction industry; it will also entail a thorough review on the ways to improve the Nigerian construction industry through the application of practical TQM approaches. In the next section, the researcher will discuss the 'Critical Success Factors' for the effective implementation of TQM.

2.14 Critical Success Factors for TQM Implementation within the Nigeria Construction Industry

Saraph *et al.*, (1989, p. 811) defines Critical Success Factors (CSFs) as, "… those critical areas of managerial planning and action that must be practised to achieve effective quality management in a business unit". Moreover, Boynton and Zmud (1984) define CSFs as, "… those few things that must go well to ensure the success of a manager or/and organisation". Various studies have been conducted to identify the CSFs of TQM since an understanding would help managers to advance the implementation of TQM (Bayazit & Karpak, 2007). Yusof and Aspinwall (1999) argued that the need to understand CSFs for the successful implementation of TQM is becoming more crucial. However, the main difficulty in studying these factors is how to define and measure them (Zairi, 1996, cited in Yusof & Aspinwall, 1999). Scholars presented different TQM factors, although there are common issues (Bayazit and Karpak, 2007; Claver et al, 2003). According to studies on different industries, these factors may vary from industry to industry, as each has their own generic set of CSFs (Kanji

& Tambi, 1999). However, interestingly, Mellahi and Eyuboglu (2001) state that there are significant similarities between the CSFs for TQM implementation in developed and developing countries. Kanji and Tambi (1999) found from their UK survey that nine TQM CSFs influenced performance and business excellence, which were: leadership; continuous improvement; prevention; the measurement of resources; process improvement; internal customer satisfaction; external customer satisfaction; people management and teamwork. However, Bayazit and Karpak (2007) identified 32 factors that affected TQM implementation, whilst Arasli (2002) noted only five TQM success factors, with these being: leadership, teamwork, employee satisfaction, empowerment, change and training.

Nevertheless, Siddiqui and Rahman (2006) concluded that top management support is the single most crucial factor required for the implementation of TQM. They added that the successful implementation of TQM depends on two key factors, namely customer-centric advancements and support from top management. In his study on TQM in engineering education, Sakthivel (2007) selected seven factors: Commitment of Top Management and Leadership (CTML); Customer Focus (CFOC); Course Delivery (CDEL); Communication (COMM); Campus Facilities (CFAC); Congenial Learning Environment (CLEN); and Continuous Assessment and Improvement (CAAI). Meanwhile, Antony *et al.*, (2002) identified 11 success factors for TQM implementation with subsidiary 72 elements. In comparison, Chin *et al*., (2002) focused their survey on seven key factors, which were: leadership, customer focus, strategic quality planning, design quality, people participation and partnership, fact-based management, and continuous improvement. Mehra *et al.*, (2001), on the other hand, argued that there are at least 45 factors that affect the implementation of TQM, whilst in earlier research, Saraph *et al.*, (1989) identified eight critical factors for the implementation of TQM, which were: top management leadership, the role of the quality department, training, product design, supplier quality management, process management, quality data reporting and employee relations. Nevertheless, Thiagarajan and Zairi (1998) identified 22 critical quality factors that, combined, increase the chances of successful TQM implementation. Also, Weeks *et al*., (1995) reported that seven critical organisational characteristics must be assessed for organisational readiness, and significant differences in the perceptions of such characteristics between management and employees should be considered. Finally, Aksu (2003) identified nine indicators of TQM readiness, namely: leadership, vision, involvement, continuous improvement, training and education, ownership,

rewards and recognition, yearning for success, and customer focus. Despite these different interpretations, it is important to note that most of the CSFs for TQM implementation were developed for the manufacturing sector; very few emanated from observations in the service sector, and even fewer studies have been conducted in the context of the Nigerian construction industry. Nevertheless, Yusof and Aspinwall (1999) believed that CSFs should be interpreted as circumstances or practices which already exist or those that need to be developed to ensure the success of TQM implementation.

In considering the broader package of CSFs, both the 'soft' aspects of management, such as leadership, empowerment and culture (Baidoun, 2003; Wilkinson, 1992), and 'hard' aspects, such as systems and improvement tools and techniques (Baidoun, 2003), should be included. Moreover, Laszlo (1998) argued that the absence of three critical factors, in particular, would either prevent the successful implementation of TQM in an organisation or seriously jeopardise the survival of an established TQM initiative. These factors are: commitment (management leadership, company-wide scope, and involvement at all levels), culture (social responsibility and company culture to do the right things right), and cost (quality, cost approach). However, there are many reasons for TQM failures, such as those given by Thiagarajan and Zairi (1997):

- The absence of, or inadequate attention to, several of the key quality factors discussed; and
- The failure to develop an implementation strategy that fits an organisation's unique characteristics. Sometimes a copy of a system that was successful in another organisation was used.

Based on the literature review, the author has proposed a set of 11 CSFs, which are, in fact, the most common and widely-used, having repeatedly been identified in many previous studies. These are now discussed in more detail in the following sub-sections. Studying and defining CSFs is understood to be crucial in helping organisations to focus on and create a climate for change that in turn facilitates any implementation efforts. In this respect, it has been demonstrated that, while scholars in different sectors have identified different CSFs, there are nonetheless, some common factors that can be used as a starting point in any TQM implementation.

2.14.1 Leadership and Top Management Commitment

Leadership and commitment from top management can be combined as they cover similar concepts (Dale *et al.,* 2001). Despite the overabundance of literature on leadership, there is no consistent definition of this concept (Mello, 1999), as such, Davies *et al.*, (2001) observed that there are different definitions of leadership by different authors, which are:

- A leader can influence a group of individuals towards the achievement of a particular goal;
- Leadership is about coping with complexity;
- Leadership is about coping with change;

Moreover, Peters and Austin (1985, cited in Zairi, 1994b, p. 10) stated that;

> *"Leadership means visions, cheerleading, enthusiasm, love, trust, verve, passion, obsession, consistency, the use of symbols, paying attention as illustrated by one's calendar, out-and-out drama (and the management thereof) creating heroes at all levels, coaching effectively, wandering around, and numerous other things"*

The challenge of leadership is to therefore, radical transform the cultures, attitudes, and methods of working (Zairi, 1994b). Furthermore, leaders need to focus on four areas of operation (Bennis & Nanus, 1985, cited in Zairi, 1994b, p. 10).

- Attention through vision
- Meaning through communication
- Trust through positioning, and
- The development of self - through positive self-regard.

Nevertheless, TQM requires a special type of leadership, which essentially encourages the empowerment of organisational members, provides recognition for their efforts, engages in appropriate coaching, and is committed to developing others (Zairi, 1994b). Indeed, Zaleznik (1996, p.127) concluded that,

> *"A managerial culture emphasises rationality and control whether his/her energies are directed toward goals, resources, organisation structures, or people, a manager is a problem solver."*

In considering the commitment of senior management, Sakthivel (2007) believed this to be "… nothing but the right kind of leadership directed towards addressing the stated and perceived needs of the customers."

In focusing on the leader, Somerville (2006, p. 169) defined this individual as, "Someone with the appropriate knowledge and skills to lead a group to achieve its ends willingly, someone who accompanies people on a journey, guiding them to their destination". Thus, Sakthivel (2007) concluded that the commitment of top management and leadership had the greatest impact on overall engineering excellence. This suggests that overall excellence increases when the commitment of top management is committed to providing the best product or service possible, which in the case of this study involves construction services in Nigeria.

Leadership is important as it establishes an institution's set of principles. The most important factor in the implementation of TQM is the full commitment of leadership; thus, leaders also require training and education in the TQM process (Kanji & Tambi, 1999). It is widely accepted that leadership is important to the success of any organisational change efforts; therefore it is a critical factor for the success of TQM initiatives (Darling, 1992). Moreover, the commitment of top management is highlighted as a crucial factor of TQM by many empirical studies (Baidoun, 2003; Soltani, 2005). Previous studies (as cited by Kanji & Tambi, 1999) on the successful implementation of quality management in the Nigerian construction industry have shown that leaders play an influential role in leading, planning, organising and controlling all organisational resources to achieve their desired goals. However, surprisingly, they found that leadership is not regarded as the most important CSF. It is, nonetheless, a key aspect of the EFQM Excellence Model and is crucial to the success or failure of such an initiative, since effectively sustained change needs substantial commitment from top management, whether the change occurs in a single department or holistically within the organisation (Huq, 2005). Smith (1999) stated that top management must commit to a vision and train people towards a common mission. Similarly, Ahmad and Yusof (2010) recommend that top management should provide the necessary leadership, resources and recognition for employees.

Furthermore, effective leadership from top management is one of the CSFs for TQM in the construction sector; Arasli (2002) regarded leadership as the most critical determinant of successful TQM implementation. Scholars indicate that the difficulty in motivating the lower

levels of an organisation if top management does not fully embrace continuous improvement for better quality, promote organisational commitment, and devote time, energy and resources that will satisfy all interested parties. Thus, implementation of TQM requires special managerial knowledge, skills, efforts, incentives and resources across all sectors, and this is also essential to lead and facilitate the implementation of TQM in the Nigeria construction industry. A lack of top management commitment can result in: (i) poor planning, (ii) workforce resistance, and (iii) a failure to change the organisational culture (Soltani *et al.,* 2008a). Therefore, managers need to be trained and educated for effective leadership in the introduction of TQM (Antony, 2002).

Leaders in organisational change need to act as change agents, demonstrating ongoing commitment to change (Smith, 2005). When a leader of a school loses interest in quality, quality efforts have little chance to survive (Johnson and Golomski, 1999). Weeks *et al*. (1995) emphasised that, if top management does not provide support, or only provides weak support, the TQM process is likely to fail or not function (Baba *et al.,* 2001). Thus, leaders should provide unity of purpose and direction within education. Herguner and Reeves (2000) concluded from their study of TQM implementation in a Turkish University that, without sustained commitment from the University leadership, implementation would be insufficient to secure long-term cultural change, whilst Haug and Keleman (1996) concluded that, without proper commitment, TQM efforts could fail. Furthermore, Mosadegh Rad (2005) asserted that the barriers to the successful implementation of TQM included: a lack of commitment and involvement from senior management; the instability of senior management; the inability to change organisational culture; the inflexibility of organisational culture toward quality changes; the inflexibility of the organisation towards environmental and technological change; and incorrect planning. These are all the result of poor leadership. Furthermore, Soltani *et al*. (2003) identified that the lack of commitment from top management could lead to a lack of commitment of employees, which can prove to be a major barrier to TQM success.

Additionally, Pascale *et al.,* (1997) argued that the success of any change programme depends on the quality of leadership. Hence, the success of TQM initiatives depend upon the quality of the organisational leaders (Mohanty & Sethi, 1996). Senior management is responsible for the development of a corporate quality policy incorporating a statement of mission/vision, quality goals and guiding principles. These missions must be effectively communicated to ensure that all people understand and are committed to the organisation's direction

(Thiagarajan *et al.*, 2001). This is significant as top management drives policy and strategy through the management of people, processes and resources to deliver excellent people satisfaction (Osseo-Asare & Longbottom, 2002). One of the difficulties that have been reported about quality management initiatives is that strong leadership is required at each level to maintain focus (Sarvan & Anafarta, 2005). This implies the coaching of those further down the hierarchy by individuals in leadership positions. Hence, there must be consistent and continuous support from senior leaders, who should be able to understand TQM, support it, be willing to provide the resources needed and be patient enough to wait for the culture-change process to mature before accessing the benefits (Sakthivel & Rajendran, 2005).

According to Dewhurst *et al.* (1999), top management commitment has to be the first step in implementing a TQM approach and top management has to accept the most responsibility for the services offered. The responsibility also lies with top management to provide leadership in establishing a vision and organisational values and in motivating people. If a TQM initiative is to be successful it must be owned, designed and implemented by top management. To achieve that goal, top managers need to find time to understand the concept and investigate its appropriateness for their organisation (Harte & Dale, 1995). However, TQM requires a leadership commitment that many organisations are unwilling to provide. Forbes (1994) argued that not all organisations that now practise TQM started with a commitment from top management. Ideally, the initiative should commence at the management level and be implemented from the top down; however, in some cases, workers at the shop floor level have initiated quality improvement. In these cases, management has not obstructed employees' efforts in the formative stages. In such cases, the main barrier to TQM effectiveness lies in the low level to top management commitment (Soltani *et al.*, 2008a).

Soltani *et al.* argued that, in the case of management mobility, senior management do not remain in their positions long enough to understand how to make a significant impact. There is agreement among most scholars that leadership and top management commitment are crucial elements in any organisational change efforts, but particularly in attempts to implement TQM. The commitment of top management is perceived as the first step in implementing TQM, and without this, the initiative may fail. Hence, it is important that knowledge of TQM among top management is essential if the benefits of TQM are to be realised.

2.14.2 Customer Focus

The term customer is derived from the Latin 'Consuescere' which means 'to become acquainted with' (Sax, 2004). Customers are persons who evaluate the product or service quality (Kottler, 1991, cited in Hung *et al.,* 2003). Moreover, Tsinidou *et al.,* (2010, p. 228) defined customer satisfaction as, "… the attitude or feeling of a customer towards a product or service following the usage of it". Although it could be assumed that the customer is an easily identifiable being, there is a significant debate within the literature as to who is the customer within the construction industry. In fact, there is no specific definition of the customer (Davies *et al.*, 2001; Michael *et al.*, 1997; Motwani & Kumar, 1997; Sirvanci, 2004). Moreover, authors (Claver *et al.*, 2003) also use the term customer management, which includes activities aimed at enhancing customer satisfaction, whilst others use the term customer centric (Siddiqui & Rahman, 2006). Nevertheless, a customer-orientated culture is considered essential to the concept of TQM (Motwani & Kumar, 1997), in which the customer themselves are involved in designing and assessing the products and services (Siddiqui & Rahman, 2006).

In the manufacturing sector, customers do not normally deal with the production process; however, in the service sector, they do often have some involvement in the process of service delivery (Lehtinen & Lehtinen, 1991, cited in Owlia and Aspinwall, 1996), where such involvement in itself is a matter for careful management. However, in construction, the situation is further complicated by the fact that the customer group is diverse, embracing parents, employers, businesses, government organisations, and so forth (Koch, 2003; Kwan, 1996; Owlia & Aspinwall, 1996). Meeting the varying needs and expectations of these diverse customer groups is a special challenge peculiar to the construction environment. Many authors, such as Sirvanci (2004) and Somerville (2006), considered that a customer focus is the most important success factor for TQM. This is reflected by the weight assigned by different quality award criteria.

Moreover, Sirvanci (2004) and Somerville (2006) argued that customer identification is one of the critical steps in TQM implementation, and without a well-defined customer, quality efforts may easily fail. Mosadegh Rad (2005) observed that the barriers to the successful implementation of TQM include a lack of attention to the needs of both internal and external customers. Hence, identifying the diverse needs of construction sector customers and

determining the process to satisfy them could be crucial steps (Venkatraman, 2007). Organisations committed to TQM need to satisfy their customer's needs; however, identifying the customer and their needs in governmental organisations can be complex. In the case of public organisations, the customer could be the whole of society, who pay the budget of the organisation in question with the expectation of its satisfaction of needs (Dewhurst *et al.*, 1999). In the case of construction, the satisfaction of user needs does not necessarily increase the satisfaction of social needs. For example, a student could wish to be awarded a degree without achieving the minimum academic requirements and this would conflict with the satisfaction of social needs concerning the development of construction standards. Therefore, the concern of public organisations is not based on the individual needs of their direct users, but the needs of society as a whole (Dewhurst *et al.*, 1999). Thus, from this discussion it is apparent that TQM is a customer-oriented management approach, and that organisations recognise customers as their highest priority, thus adopting TQM as a means of achieving satisfaction in this regard.

Hence, the identification of customers is the first step in any quality effort since, without a well-defined customer, quality initiatives may easily fail. In the construction sector, a variety of customers is identified. Having identified its customers or 'stakeholders', an organisation's top management needs to determine the requirements of those stakeholders in order to satisfy them.

2.14.3 People Satisfaction

Job satisfaction can be defined as an emotional reaction that "results from the perception that one's job fulfils or allows the fulfilment of one's important job values, provided that it is to the degree that those values are congruent with one's needs" (Locke, 1976, cited in Ooi *et al.*, 2007, p. 67). It is important because of its implications for job-related behaviours, such as productivity, absenteeism or turnover (Oshagbemi, 2000a). Strong satisfaction leads to high internal work motivation, which, in turn, is associated with high-quality levels of work performance, high satisfaction with the job, and low absenteeism. Moreover, satisfaction can arise from fairness in job performance assessments, the offer of praise over criticism, promotion systems for advancement, and fairness in promotion decisions (Weeks *et al.*, 1995). Furthermore, Ooi *et al*. (2007) stated that the rewards offered by an organisation have a positive influence on employees' satisfaction towards their jobs and the organisation for

which they work. Arasli (2002) argues that employee satisfaction is a prerequisite for a successful TQM process and, without it, organisational objectives cannot be reached since a dissatisfied employee cannot be expected to serve the customer in the best way or to make a full contribution to the organisational plans, programmes, policies or objectives.

In addition, Oshagbemi (1997) identified other aspects of the job which can lead to satisfaction, namely: relative job security, opportunity for consultancy, time flexibility in terms of working hours, foreign travel, contact with industry through consultancy, long holidays, and access to computing networks and library facilities. In their empirical study on Malaysian organisations, Ooi *et al.*, (2007) concluded that employees are more likely to perform better and experience higher levels of job satisfaction if they are provided with appropriate training. Moreover, job satisfaction is known to favourably influence job performance, and reduce absenteeism, turnover, and psychological distress (Andrisani, 1978; Davis, 1992; Spector, 1997, cited in Chen *et al*., 2006).

In contrast, a perception amongst construction workers that they are underpaid for their efforts and expertise may well cause them to lower their contributions (e.g. diminished performance, 'calling in' sick), increase their outcomes (e.g. stealing), and/or decrease the organisation's outcomes (e.g. sabotage equipment) (Okpara *et al.*, 2005). It may also generate unfavourable job attitudes (Okpara *et al.*, 2005). Such enhancements are interpreted as employee benefits and it is accepted that these influence job satisfaction by, for example, raising staff confidence (Williams, 1995, cited in Chen *et al.*, 2006). Chen *et al.* (2006) found in their study that the top five quality attributes for employees were: the provision of good salary systems; the provision of fair promotion systems; the promotion of good retirement systems; the provision of work security systems; and the provision of abundant research resources. They concluded that the construction workers are concerned with promotion opportunities at a higher level; therefore, fair promotion systems are critical. Organisations that want to successfully implement TQM need to stimulate positive work attitudes, including loyalty to the organisation, pride in work, creativity, a focus on common organisational goals, and the ability to work across departments (Dewhurst *et al.*, 1999). In this respect, it is established that fairness in the work environment, that encourages employee empowerment, can lead to employee satisfaction, and hence favourable work attitudes (Mani *et al.*, 2003; Mosadegh Rad, 2006). This demonstrates that people satisfaction is a prerequisite for a successful TQM initiative since many aspects of implementation have a direct impact on job satisfaction, and,

where this can be raised, there is the potential to retaining staff and guarantee their continued contribution.

2.14.4 Empowerment

The literature confirms that empowerment is one of the critical factors for the successful implementation of TQM (Baidoun 2003; Dainty *et al*., 2002; Kumar & Sankaran, 2007; Samat *et al*., 2006). Empowerment is considered in many quality awards, such as the Malcolm Baldrige National Quality Award, and the term refers to "giving peoples the authority and responsibility to make decisions and take actions" (MBNQA, 2009). This factor has also appeared in the work of quality experts, such as Deming (1986), who emphasised that the workforce needs to participate in decision-making, including planning, goal setting, and performance monitoring. Additionally, employees need to be encouraged to make suggestions and to take a high degree of responsibility. Feigenbaum (1991) believed that people's knowledge and skills are organisational key resources, whilst a job becomes more interesting for employees as their knowledge and skills are improved and when they are increasingly able to influence decisions affecting their jobs.

The concept of empowerment can be seen as a comprehensive contemporary inheritance from the participation and industrial democracy movement of the 1970s (Baruch, 1998). It refers to the degree to which employees are encouraged to make decisions without approval from their supervisors (Humbrstad *et al*., 2008). Undoubtedly, each employee has knowledge, skills and experience, and all of these can contribute to an organisation's effectiveness; however, the traditional management style provides little opportunity for the workforce to participate, which militates against increased employee input and the accompanying commitment to quality (Dale *et al.,* 1997). Instead, empowered people require information to make appropriate decisions; thus, an institution needs to provide that information in a timely and useful way. Creating an environment of empowerment leads to improvements in commitment, innovation, and organisational sustainability (MBNQA, 2009). Moreover, empowerment is recognised as a way of encouraging, training, and recognising diversified customer contact situations so that service personnel can use their judgement to make prompt decisions (Lovelock, 1992, cited in Humbretad *et al*., 2008). In a climate of empowerment, employees have developed good judgement because they are encouraged to detect emerging patterns of errors before they can escalate out of control (Martin-Crawford, 1999). Empowerment is

therefore associated with trust, motivation, decision-making and in breaking down the managerial boundaries between management and employees (Baruch, 1998).

Moreover, empowerment functions as a way of encouraging and increasing decision-making at lower levels in an organisation and, simultaneously, improving the work experience of employees (Liden *et al.*, 2000, cited in Moye *et al*., 2005). Thus employees need to be provided with freedom, democracy and flexibility (Cook, 1994; Greasley *et al.*, 2008). .According to Weeks *et al*. (1995) empowerment involves decision-making authority or, at least, responsibility to recommend changes and action. A constant need for approval for decisions enhances hierarchical decision-making, which limits the responsibility of individuals to help identify solutions to problems or opportunities for improvement. Moreover, hierarchical decision-making can result in frustration and diminished participation in TQM efforts. Instead, Total Quality Management is an empowering approach and a force for a more democratic organisation (Hill and Wilkinson, 1995).

Empowerment in service organisations leads to improved customer service because employees can be more efficient in solving customers' problems (Hancer & George, 2003). Furthermore, management, in general, improves when members of staff are appropriately empowered (Idrus, 1999). Employee participation is known to precipitate higher employee satisfaction (Manoochehri, 1988), and other benefits are suggested, such as the reduction of the need for supervisors, which leads to a reduction in costs. Moreover, empowerment offers a sense of ownership (Mehra *et al.*, 2001). Thus, there are two culture requirements for successful TQM implementation: a collectivist culture and an empowering and participative style of management (Kumar & Sankaran, 2007). This can be achieved through decentralisation, which enhances employee involvement, communication and participation in decision-making and serves to reduce the power distance within an organisation (Curry & Kadasah, 2002; Mosadegh Rad, 2006).

However, people need to be well trained to take on the responsibilities associated with empowerment, especially in a situation where they have previously been subjected to a very strong centralised management (Idrus, 1999). In this respect, training is required to improve interactive skills (such as communication, undertaking effective meetings, empowerment and leadership skills), and to develop skills in problem-solving, quality and other technical areas. Baidoun (2003) and Abdullah *et al*. (2008) believe that training and education can maximise

the empowerment of people, and that a true TQM approach will can be achieved when all people within an organisation are involved (Evans & Lindsay, 1993, cited in Curry & Kadasah, 2002). According to Srikanthan and Dalrymple (2003), TQM demands that people need to be empowered and sufficiently skilled in managing the quality of the processes in autonomous teams.

One way that empowerment can be fostered, as noted by Weeks *et al.*, (1995), is through the reduction of the required approval levels. They found that an increased perception of empowerment results in increased commitment by individuals to their work, which, in turn, helps to foster continuous quality improvement. Encouraging ideas from employees for improvements within the organisation (e.g. suggestion schemes) is another way to facilitate empowerment (Thiagarajan *et al*., 2001) because such participation enables employees to better understand basic day-to-day issues (Tsang & Antony, 2001).

It is vital, however, to abandon traditional hierarchal decision-making systems with their need for many layers of approval, since if these remain, the result can be frustration and a diminished obligation to TQM. The removal of these bureaucratic strata can enhance innovation and promote an increased perception of empowerment that, in turn, increases the commitment of individuals in their work, and ultimately helps to foster continuous quality improvement (Arasli, 2002). People should be allowed and encouraged to identify and diagnose quality problems and take appropriate decisions and corrective actions without further approval through the management hierarchy (Mellahi & Eyuboglu, 2001). Therefore, to implement a culture of empowerment and to achieve the benefits from it, fundamental changes need to take place within traditional hierarchal organisational structures.

Despite the apparent benefits to employees of empowerment, Mosadegh Rad (2005) has highlighted that employee resistance to TQM may become apparent, simply because employees may perceive TQM as controlling rather than empowering. Moreover, a lack of management support is a common barrier to the encouragement of empowerment (Wysocki, 1990, cited in Dainty *et al.,* 2002). Where it does exist, empowerment leads to increasing people participation in quality improvement efforts (Sureshchandar *et al.*, 200I). In the service sector, services are produced and consumed simultaneously; therefore, empowerment in these organisations means that employees are expected and authorised to undertake spontaneous problem-solving for those issues experienced the customers.

Empowerment consists of the re-distribution of four key elements throughout the organisation, from top to bottom: power, information, rewards and knowledge (Schneider & Bowen, 1992, cited in Sureshchandar *et al.,* 2001c). Empowerment refers to the level to which people can make decisions related to quality and customer satisfaction without having to seek approval from top management. For empowerment to be effective, however, individuals must receive training on quality management principles. Moreover, they must possess knowledge, information, and be trusted by management, in order for their decision-making to be effective and delivered in a responsible way. These mean that empowerment also comes with responsibility. Hence, those empowered must also be prepared to accept that obligation.

2.14.5 Reward and Recognition

An important critical success factor for TQM is the reward and recognition system in operation, and, on this basis, Rowley (1996) argued that construction workers are motivated in different ways that depend on their length of service in the sector, their other work experience, and their age. Additionally, favourable outcomes from performance appraisals and promotions can be perceived as rewards (Weeks *et al.,* 1995). Harte and Dale (1995) indicated that a reward scheme might include extra pay, holidays and other benefits to recognise employees' outstanding performances. Moreover, recognition can also be given through acknowledgements in newspapers and fliers (Mehra *et al.,* 2001).

Demirbag *et al.,* (2006) suggested that organisations should develop formal reward and recognition systems to encourage people's involvement and participation, to support teamwork, and to provide feedback to the employees. Nevertheless, Calvo-Mora *et al.,* (2006) indicated that an entire workforce needs to participate in improvement activities and that efforts made must be reward and recognise, since Tsang and Antony, (2001) state that people need to be recognised for their contribution and should feel that they are part of an organisation. Indeed, recognition can be a valuable tool for improving employee morale, self-interest and interest in TQM (Mehra *et al.,* 2001; Motwani & Kumar, 1997). Benefits, such as increased salary, bonuses and promotions resulting from the review of performance, are awarded as a public acknowledgement of superior performance concerning goals (Juran & Gryna, 1993, cited in Ooi *et al*., 2007). For example, motivated academic staff can build a national and international reputation for themselves and for the institution through their research, publishing and professional contributions. Such contributions can have a significant

impact on the capability of the institution to attract high calibre students, research funds and consultancy contracts (Rowley, 1996). A reward and recognition system can therefore result in increases to the level of motivation among people, and can be used as a training device to deploy solutions that have been proven to work.

Thus, a successful TQM environment depends on committed and well-trained employees who participate fully in quality improvement activities. Such participation must be reinforced by reward and recognition systems which emphasise the achievement of quality objectives (Mosadegh Rad, 2005). Furthermore, to recognise achievement, management needs to provide effective performance measurement systems to assess how successfully employees perform their jobs (Arasli, 2002). A recognition system is fundamental in increasing the involvement of all employees in the operation of the business (Kemp *et al.,* 1997). However, this type of reward is individualistic rather than collectivistic, as noted by some scholars (Motwani & Kumar, 1997; Weeks *et al.,* 1995). Thus, the reward and recognition of employees need to be approached with caution, since if recognition of individual contributions is not handled correctly, it has the potential to undermine team efforts. Nevertheless, Deming (1986) claimed that the fair reward and recognition of individual employees is difficult due to manager bias, worker competition and organisational politics. Organisations must realise that employees are more likely to share their ideas and knowledge for work improvement if managers give credit and recognition for their contributions. A rewards and recognition scheme can enhance effective employee relations by communicating to all employees that the organisation cares about their ideas and is willing to reward them for their efforts (Abdullah *et al.,* 2008). Organisations acknowledge reward and recognition as key in motivating individual employees (Capcioppe, 1999). The reward can either be given based on individual contributions and performances or it can be given to the whole team and divided equally among its members. Whatever components exist in a reward scheme, there must be a regular modification of the scheme so that it remains aligned with the organisational strategies and goals.

However, Scholtes (1995, cited in London and Higgot, 1997) identified some difficulties when implementing a reward scheme, such as:

- It can encourage internal competition;
- It may undermine teamwork and co-operation;

- It may reward those who are lucky and bypass those who are unlucky; and
- It can create ‘winners’ and ‘losers’.

Dewhurst (1999) argued that monetary incentives are difficult to implement for several reasons: difficulties in the objective measurement of individual or group performance, fixed budgets and occasionally, trade union opposition. He added that, in governmental organisations, promotion is often related to seniority instead of performance. Thus, based on the discussion above, there are many ways of rewarding and recognising the contributions of individuals and groups, which are documented. Indeed, it is emphasised that the achievement of quality objectives must be properly rewarded if employees are to be continually motivated. However, the reward and recognition of individuals' contributions should be handled with caution to sustain the spirit of co-operation and teamwork.

2.14.6 Teamwork and Individualism

Teamwork is another CSF for implementing TQM; the involvement of top management, middle management, and shop floor employees is crucial in this respect. As noted by Mosadegh Rad (2005), the most common vehicle for employee participation is the ‘team’. A team can be viewed as a group of individuals who work interdependently to solve problems or accomplish tasks (Gibson & Kirkman, 1999; Manz & Sims, 1993, cited in Park *et al.*, 2005). Katzenbach and Smith (2005, p. 165) define a team as, "… a small number of people with complementary skills who are committed to a common purpose, set of performance goals, and approach for which they hold themselves mutually accountable". Meanwhile, individualism can be defined as "the extent to which individuals are supposed to be self-reliant and look after themselves, versus being more integrated into a group" (Mosadegh Rad, 2006, p. 611). According to Capcioppe (1999), there are many types of the team, such as: full-time department teams, project teams, or part-time special teams.

- A full-time department team is the most common and does not have a target date for discontinuation. This team provides on-going work or services so it is not planned for elimination or obsolescence.
- A project team is a full-time team that disperses when the project is complete. Team members usually come from various departments and have varying background experience.

- A part-time special team is pulled together for a partial or limited time. The members of this type of team often have other jobs (e.g. safety teams, quality teams).

Coyle-Shapiro (1995) considered teamwork from three perspectives: within a natural working group, between different departments, and between managers and employees. Furthermore, Katzenbach and Smith (2005) classify teams into three varieties, which are: teams that recommend things, teams that make or do things, and teams that run things. Teamwork is broadly accepted as a tool for change. It brings trust and delivers a synergistic augmentation of the TQM process. This concept offers higher morale, recognition, self-fulfilment, and strengthens the spirit of the organisational integration (Arasli, 2002), whilst simultaneously helping to create employee ownership of a project (Huq, 2005). During teamwork, the skills of individuals are combined in a powerful way to create synergism and solve organisational problems or respond to opportunities (Weeks *et al.,* 1995). Hence, teamwork is considered one of the best ways to deliver a superior performance and further benefits include: increased workplace productivity, improvements to service quality, a reduced management structure, lower levels of absenteeism, and reduced employee turnover. Furthermore, through teamwork, other benefits can be realised, such as better responsiveness to co-workers, greater approachability of supervisors, better communication of changes, the reduction of conflict between units and co-operation between departments (Weeks *et al.,* 1995). Conversely, Mosadegh Rad (2005) indicated that the barriers to a successful implementation of TQM include poor teamwork and an inappropriate evaluation of teamwork. To strengthen teamwork, an organisation needs to identify its deterrents and cross-functional co-operation in order to develop processes to overcome these problems (Weeks *et al.,* 1995). In recognising these deterrents, it should ensure that employees receive appropriate team-work training to improve their interaction skills (Thiagarajan *et al.,* 2001).

Stawicki *et al.,* (1999) believed that a facilitative organisational culture is crucial to any successful change process, and referred to what they called ‘hidden rules’ as one element of organisational culture that relates to ways of operating. They noted that, in the construction sector, two of these rules relate to individualism. In such organisations, co-operation is not a declared goal, and hence, not rewarded. Raisbeck (2001, cited in Davies *et al.,* 2007) also found a tendency towards individualism in the construction sector, over teamwork and argued that this is an inhibitor to the effective introduction of TQM. Moreover, Somerville (2006) identified some potential barriers associated with the introduction of TQM principles in

construction, which includes the fact that organisational staff can be highly individualistic. Teamwork is seen as a vehicle for the effective implementation of TQM, and thus, poor teamwork is represents a barrier. Working in teams is not, however, a natural tendency for all individuals, and organisations must provide training for employees to develop their teamwork skills. Construction workers tend to work alone rather than in teams as, ultimately, they are responsible for the delivery of their projects. This tendency is considered a potential barrier to the effective implementation of TQM in the Nigerian construction industry since the initiative could be regarded as a threat to their autonomy.

2.14.7 Training and Education

Many studies, such as those of Antony *et al.,* (2002) and Mosadegh Rad (2005), have revealed that training and education are critical to the successful implementation of TQM. Antony *et al.,* (2002) discovered that organisations tht made a substantial investment in terms of time and finance in the development of employees and teamwork did so in the belief that trained employees would contribute to the success of the business. Thus, Mosadegh Rad (2005) argued that, in order to implement the TQM philosophy successfully, top management must provide the resources to educate the workforce. With training, it is possible to change the performance of people and their behaviour, and such training should be delivered in the form of awareness programmes, cultural change programmes, teamwork, the use of statistical tools, and philosophy improvement techniques, all of which are important for the development of organisational members and the success of TQM (Arasli, 2002). Training is essential for promoting and developing skills relating to an organisation's beliefs and values, and for consolidating a culture that places a high value on quality (Mosadegh Rad, 2006). Furthermore, Zhang *et al*., (2000) believe that investment in training and education is very important for TQM success.

Training also helps organisations to convey messages about their priorities (Sureshchandar *et al.,* 200Ib), both internally and externally. In doing so, it improves the interpersonal relationships between the service provider and the customer (Padhi, 2004, cited in Ngware *et al*., 2006). However, cultural change following quality-based initiatives is hard to sustain, especially in the face of internal change and external threats; therefore, in order to overcome these threats, organisations need to use training, and reward and support systems (Buch & Rivers, 2001), since it has been demonstrated that a lack of continuous education and training

for employees and managers, and a lack of knowledge and understanding of the TQM philosophy represent obstacles to the successful implementation of TQM (Mosadegh Rad, 2005).

Therefore, training should be of a continuous nature (Ishikawa, 1985) and include instruction on problem identification and solving skills, teamwork and decision-making, human relations and statistics, and training for job requirements, such that employees can effect continuous improvement (Baidoun & Zairi, 2003; Yusof & Aspinwall, 2000b). It should also cover team skills, communication, interpersonal relations, Statistical Process Control (SPC), leadership and how to build a quality-based environment (Curry & Kadasah, 2002). However, training in problem-solving and continuous improvement are seen as the most important areas in terms of quality (Thiagarajan & Zairi, 1998). People will understand the concepts of quality only when they are well trained in the quality theories, tools and principles. Many researchers have identified the crucial role played by training in changing the culture of employees such that they can take new ideas on board, especially in relation to quality (Dewhurst *et al.,* 1999; Sullivan-Taylor & Wilson, 1998; Sureshchandar *et al.,* 200Ib; Yusof and Aspinwall, 2000b); furthermore, it is confirmed as a key step in TQM implementation (Oakland, 2003; Sullivan-Taylor & Wilson, 1998).

An education and training programme must not be selective; instead, it should address the needs of all staff members to assist them through the change period (Mann & Kehoe, 1995). Training can be approached from many ways: Firstly, basic training should be given to explain quality concepts; secondly, training in quality tools, techniques, teamwork and problem-solving should be provided, and thirdly, training should occur at an individual level to ensure the development of the required technical skills of each employee. Thus, management needs to provide appropriate training for employees to use appropriate facts in decision-making. This may include training in the use of analysis tools, such as the seven basic quality control tools and the seven management and planning tools (Thiagarajan *et al.,* 2001). Additionally, Mohanty (1995) perceived training and education as a tool to encourage the acceptance of TQM by all employees. This is a belief confirmed by Osseo-Asare and Longbottom (2002) who state that these inputs are essential in improving the understanding of the terminology and the way in which to implement TQM initiatives; without such inputs quality movement initiatives are likely to fail.

According to the results of studies undertaken by Demirbag *et al.,* (2006), the most important requirements for the successful implementation of quality initiatives, are: training, good employee relations, the provision of quality data, and effective reporting. Managers need to ensure that employees should be continuously developed and give adequate training and education on quality concepts, teamwork skills, communication skills and problem-solving skills (Abdullah *et al.,* 2008). Indeed, an empirical study carried out by Mellahi and Eyuboglu (2001) stressed the importance of training in understanding the philosophy and principles of TQM, as well as the specific skills required to handle quality issues. They also concluded that, without training, it is difficult for management to communicate TQM effectively throughout the organisation. In fact, training is a primary step towards developing particular skills in employees (Tsang & Antony, 2001). Moreover, Baba *et al.,* (2001) argued that the ultimate goal of quality control is to make training a habit, whilst, in their empirical study of the barriers to TQM implementation in Indian industries, Bhat and Rajashekhar (2009) noted that proper training can overcome employee resistance to change. Hence, it can be understood that training represents a Critical Success Factor with regard to the implementation of TQM.

In summary, it can be understood that top management has an obligation to provide appropriate training and education for any workforce that is to be involved in TQM. Such training may include awareness programmes, the development of teamwork, communication, and problem-solving skills. Education and training programmes can thus be provided to ensure the development of the required technical skills of individuals.

2.14.8 Communications

Communication is defined as an, "exchange of information and understanding between two or more persons or groups" (Omachonu & Ross, 2004, p. 28), and this concept is illustrated in Figure 2.10. Goetsch and Davis (1997, p. 307) provide a more general definition of communication: "the transfer of a message (information, idea, emotion, intent, feeling, or something else) that is both received and understood". Furthermore, Omachonu and Ross (2004) listed the many ways in which employees obtain information, with these being: monthly meetings between top management and staff; monthly departmental meetings; emails; organisation newsletters; memos; verbal and written feedback from a manager or supervisor. Despite the variety of available communication forms, the construction sector predominantly uses the written form of communication (Barnett, 1992). However, using a

variety of media can enhance communication within and across departments. Thus, both high-tech methods, such as emails, and low-tech media, such as posters and graphs posted on a wall, can be beneficial communication tools (Evans and Dean, 2000).

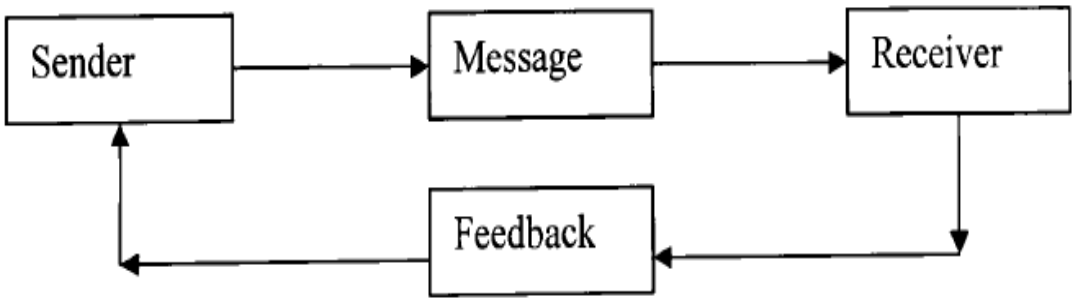


Figure 2-12: Simple Communication Model (Source: Omachonu & Ross, 2004)

The future organisational vision needs to be communicated, understood and interwoven through all for successful TQM efforts (Weeks *et al.*, 1995). The top management's plan and vision for quality can lose both clarity and momentum when it is not communicated to all people (Omachonu & Ross, 2004). Therefore, it is recommended that management should gather all employees together to communicate and explain the organisation's mission. This communication should be conducted through face-to-face meetings, rather than through other means of communication, and within this context, discussion and feedback should be encouraged (Thiagarajan *et al.*, 2001). Without well-functioning feedback channels, employees do not receive appropriate information in order to make suitable modifications to their performances (Weeks *et al.*, 1995). A lack of appropriate communication among management and staff has a significant negative impact on the overall organisational performance (Sakthivel, 2007).

Moreover, TQM requires that communication systems are adapted to the needs of the work, rather than to the needs of the hierarchy. Effective communication and effective planning for change can overcome much of the apprehension that may be felt by staff (Weeks *et al.*, 1995). In fact, communication has become an important issue in the debate on improving the quality of the construction industry. It can be inhibited by cultural or political issues, which prevent viewpoints from being expressed (Beckford, 2002). However, each disciplinary community

has its characteristic forms of communication, and Omachonu and Ross (2004) listed the difficulties of communication, for example, when:

- Construction workers find the need to communicate to staff in other departments;
- Organisational staff wish to communicate to wider society.

Weeks *et al.* (1995) argued that supportive communication is a competitive advantage, in that it strengthens satisfaction, innovation, teamwork and emphasises a common vision. Management need, therefore, to improve cross-functional communication, by, for example, setting up new modes, improving meetings, and using information technology (Thiagarajan *et al*., 2001). In comparison, it is known that vertical hierarchical communication combined with a competitive culture forms a serious barrier to collaborative efforts (Sarvan & Anafarta, 2005).

Undoubtedly, communication has a positive impact on service quality; when an organisation disseminates the correct information throughout all its departments, it ensures that all people within it understand its processes (Samat *et al.*, 2006). In TQM, people are supposed to communicate more openly and frequently with each other, in order to guarantee that there is complete and common understanding about issues that impact upon service quality. Hence, a proper communication system that delivers accurate information which can be easily accessed and understood by all employee levels is an essential ingredient of TQM. These arguments are supported earlier contentions in this respect (Martinez-Lorente *et al*., 1998), that effective communication is part of the cement that binds the bricks of the total quality process. Poor communication, on the other hand, can cause many problems for a quality management system in any organisation (Wosik, 2009). Therefore, top management must, put significant effort into developing a commitment to TQM through effective dialogue with the workforce explaining why TQM should be adopted as a solution to the institution's quality and management problems (Huq, 2005). Such open communication is needed for all members of an organisation to freely exchange ideas and attain common goals without restraint by status or authority (Baba *et al*., 2001).

In summary, various forms of communication are available within and across departments. However, the organisational vision and mission must be effectively communicated to, and understood by, all those involved ensuring the successful implementation and conduct of

TQM. This is particularly important as ineffective communication can cause many problems for TQM in any organisation and pose a serious barrier to effective implementation.

2.14.9 Performance Measurement

In any quality improvement programme, measurement plays an important role as it provides information for decision-making. Performance measurement is an important aspect of the effective management of an organisation. According to Deming, without measuring something, it is impossible to improve it. Therefore, Nigerian construction organisations need to measure their performance to enhance their business (Demirbag *et al*., 2006). Management needs to be aware of how individuals carry out their jobs and needs also to be able to evaluate work and effectively communicate performance evaluations. Additionally, the organisation must establish the gap between 'where it wants to be and where it is now' (Weeks *et al.*, 1995). Such assessment relies on the conduct of performance reviews at various levels and at different intervals in time (Zairi, 1994b). The quality of a service, in general, is subjective, unlike the quality of products, which can be measured objectively; therefore, an appropriate way of measuring the characteristics of a service is to assess the perception of customers (Owlia & Aspinwall, 1998). However, in the Nigerian construction context, the notion of customers is complex, as has already been discussed. TQM practice requires the assessment and measurement of performance against pre-specified criteria, and hence to evaluate whether they are provided appropriate services/products. It is, therefore, important to develop consistent, reliable and applicable measurement tools (Sarvan & Anafarta, 2005).

In devising such measurements, Johnson and Kaplan (1991, cited in Me Adam & Saulters, 2000) noted that management need to consider non-financial measures, including employee satisfaction and customer service measures, in order to develop a complete understanding of organisational performance. The key indicators in a business can be easily quantified and controlled because the organisation has a direct economic purpose and a process can be subject to cost-benefit analysis. Self-assessment of TQM originated with the quality award programmes and business excellence models, such MBNQA and EFQM. Self-assessment can provide a form of gap analysis providing the opportunity for improvement; moreover, it is required for the continuous improvement of organisational performance, which is necessary to gain competitive advantage, and to remain competitive (Arumugam *et al.*, 2009). To determine the effectiveness of its processes, an organisation needs to develop a continuous

monitoring system at all levels. Performance data is thus generated using quality tools (James, 1996), where a quality audit can provide an independent and formal review of quality-related performance. Quality assessors who have the authority to gather information that will allow them to make an effective assessment of the organisation's quality conduct such an audit. Furthermore, Statistical Process Control (SPC) can be used to monitor the process; for this method, the effectiveness and efficiency of the process performance are monitored by customer feedback (Zink, 1997). Another technique used to monitor performance is benchmarking, which has been defined as,

> *"… measuring your performance against that of best-in-class companies, determining how the best-in-class achieve those performance levels, and using the information as the basis for your own company's targets, strategies and implementation"* (Bemowski, 1991, cited in James, 1996, p. 104).

From the above discussion, it is understood that management must develop performance indicators to measure the improvements made. Such performance measurements can provide factual information for decision-makers, for benchmarking practices, and enable a continuous improvement approach. It is necessary to conduct performance measurement at various levels and at different intervals of time. Client/customer feedback, a quality audit, and self-assessment are considered performance measurement practices that help to assess the quality of construction within the sector, and hence, can be used to improve the effectiveness of the TQM process.

2.14.10 Continuous Improvement (CI)

According to Claver *et al.* (2003) continuous improvement corresponds to improvement-related activities that underline the importance of improvements made through in terms of time, cost and product, and in identifying opportunities and actions for improvement through an adequate structure. Tsang and Antony (2001) believed process performance and the performance of employees need to be monitored and improved in a continuous manner. Furthermore, Colling and Harvey (1995) highlighted that quality improvement should be clearly identified and understood, and should be perceived as mutually beneficial to clients and construction professionals.

Continuous improvement in the construction sector involves exploring the needs and expectations of the customer base and re-assessing the effectiveness of programmes and total

quality initiatives at large (Temponi, 2006). It may include issues related to employees and the environment. A critical part of the CI process is the identification of improvement opportunities and the allocation of resources. Therefore, an organisation must prioritise its improvement opportunities (Kanji, 2001). The CI process is based on the Deming cycle of Plan-Do-Check and Act (PDCA), as shown in Figure 2.6:

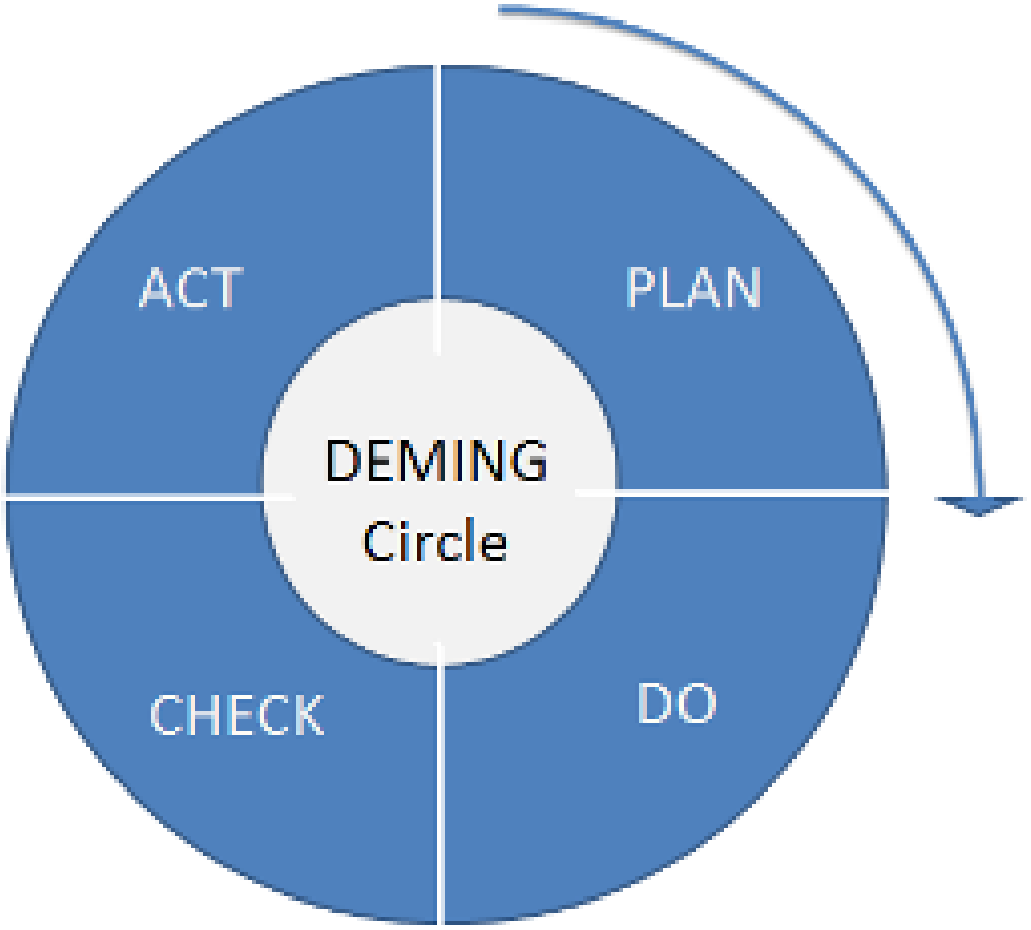


Figure 2-13 Plan-Do-Check-Act Diagram

Temponi *et al., (*2006) identified some barriers to the effective implementation of CI initiatives, such as the lack of knowledge and understanding of quality management principles amongst top management; departments' failures to follow through with agreed actions and objectives; a lack of support for teamwork, and a failure to provide the skills and resources necessary to improve a project team. Continuous improvement in the Nigerian construction sector covers many areas, such as revising schedules according to rapid changes that happen in practice. Barriers to the implementation of CI programmes in construction may include:

the unique nature and characteristics of the construction environment; the typical management style; the variety of customers, and a continuous improvement process which is people- rather than process-oriented.

2.14.11 Professionalism

Professionals may be defined as,

> *"... occupational groups that provide services by drawing on their expert knowledge and specialised training and who use their knowledge to control the work processes to achieve both operational and strategic autonomy"* (Ritsema & Brokuis, 1991, cited in Harte & Dale, 1995, p. 44).

Professions are characterised by, and in possession of, particular kinds of knowledge, which are abstract and practical, substantial in extent, difficult to master, and have a lengthy period of foundation during which to attain (Winch, 2004; Wall, 1998, cited by Krishnaveni and Anitha, 2007). Savolainen (1999) argued that resistance to the introduction of TQM initiatives is embedded in the professional culture. Moreover, Silvestro (2001) pointed out that TQM is difficult to implement within professional services as it tends to be manufacturing-orientated and there is an element of professional snobbery towards the customer. For example, Sarvan and Anafarta (2005, p. 12) stated that, "the sense of professional identity of [academic] professors can be a barrier to accepting that students and business can have valid input to assess both curriculum design and education delivery". Conversely, TQM emphasises improvement, and might thus be perceived by construction practitioners as one of the aspects of professionalism as it is concerned with continual self-improvement.

2.15 The Rationale for the Selection of Critical Success Factors for this Research

The understanding from the literature has evolved from three main sources, which are: scholars' experiences and theories about the subject, TQM universal models (such as EFQM, MBNQA) and the related empirical studies. The literature review also covered TQM related topics within the manufacturing and service sectors with a special focus on the construction industry. Most of the literature related to TQM originated in, or referred to, Western countries, and only a few studies were reported from developing economies, with even fewer conducted within the Nigerian construction context.

The literature review has identified more than 55 CSFs for TQM implementation. The researcher has selected ten factors for the purpose of this study based on the following criteria: firstly, these are the most frequently cited in the literature, and secondly, these factors represent the TQM principles, as described in Table 2-5. To investigate the effective implementation of TQM within the Nigerian construction industry, it is important to consider the background and environment of the context, namely the construction sector.

Table 2-5: Illustration of the CSFs adopted for this study

No	Factor	Authors and Year of Publication of Study (listed from earliest to most recent)
	Leadership and/or Top management commitment	Saraph et al., 1989; Weeks *et al*, 1995; Motwani & Kumar, 1997; Laszlo, 1998; Kanji & Tambi, 1999 ; Yusof & Aspinwall, 1999; Brah *et al*., 2000; Herguner & Reeves, 2000; Buch & River, 2001; Lau & Idris, 2001; Mellahi & Eyuboglu, 2001; Thiagarajan *et al*., 2001; Tsang & Antony; 2001; Antony *et al*, 2002; Arasli, 2002; Chin *et al*., 2002; Aksu, 2003; Baidoun, 2003; Claver *et al*, 2003; Sirvanci, 2004; Lameei, 2005; Najeh *et al*, 2005; Siddiqui & Rahman, 2006; Tari, 2006; Sakthivel, 2007; Ahmed & Yusof, 2010
	Customer Focus	Motwani & Kumar, 1997; Kanji & Tambi, 1999; Brah *etal*., 2000; Herguner & Reeves, 2000; Lau & Idris, 2001; Mellahi & Eyuboglu, 2001; Thiagarajan *et al*., 2001; Tsang & Antony; 2001; Antony *et al*., 2002; Chin *et al*., 2002; Aksu, 2003; Baidoun, 2003; Sirvanci, 2004; Najeh *et al*., 2005; Samat *et al*., 2006; Siddiqui & Rahman, 2006; Sakthivel, 2007
	People Satisfaction	Weeks *et al*., 1995; Brah *et al*., 2000; Lau & Idris, 2001;Mellahi & Eyuboglu, 2001; Thiagarajan *et al*., 2001; Antony *et al*., 2002; Arasli, 2002; Aksu, 2003; Baidoun, 2003; Sirvanci, 2004; Najeh *et al*., 2005

	Empowerment	Weeks *et al.*, 1995; Motwani & Kumar, 1997; Brah *et al.*, 2000; Arsli, 2002; Chin *et al.*, 2002; Baidoun, 2003; Samat *et al.*, 2006
	Reward and Recognition	Weeks *et al.*, 1995; Brah *et al.*, 2000; Thiagarajan *et al.*, 2001; Aksu, 2003; Baidoun, 2003; Najeh *et al.*, 2005
	Teamwork and Individualism	Weeks *et al*, 1995; Motwani & Kumar, 1997; Kanji & Tambi, 1999; Herguner & Reeves, 2000; Lau & Idris, 2001; Tsang & Antony; 2001; Arsli, 2002; Aksu, 2003; Baidoun, 2003; Sirvanci, 2004; Najeh *et al.*, 2005
	Training and Education	Saraph *et al.*, 1989; Yusof & Aspinwall, 1999; Brah *et al.*, 2000; Herguner & Reeves, 2000; Lau & Idris, 2001; Mellahi & Eyuboglu, 2001; Thiagarajan *et al.*, 2001; Tsang & Antony; 2001; Antony *et al*, 2002; Arsli, 2002; Aksu, 2003; Baidoun, 2003; Claver *et al.*, 2003; Sirvanci, 2004; Najeh *et al.*, 2005; Ahmed & Yusof, 2010
	Communication	Martinez-Lorente *et al.*, 1998; Herguner & Reeves, 2000; Thiagarajan *et al.*, 2001; Tsang & Antony, 2001; Antony *et al.*, 2002; Baidoun, 2003; Najeh *et al.*, 2005; Samat *et al.*, 2006; Sakthivel, 2007
	Performance Measurement	Motwani & Kumar, 1997; Yusof & Aspinwall, 1999;Thiagarajan *et al.*, 2001; Tsang & Antony, 2001; Ahmad & Yusof, 2010
	Continuous Improvement	Yusof & Aspinwall, 1999; Mellahi & Eyuboglu, 2001;Thiagarajan *et al.*, 2001; Tsang & Antony, 2001; Antony *et al.*, 2002; Chin *et al.*, 2002; Aksu, 2003; Baidoun, 2003; Claver *et al.*, 2003; Sirvanci, 2004; Samat *et al.*, 2006; Sakthivel, 2007; Ahmad & Yusof, 2010

	Professionalism	Davies *et al.*, 2007

The appropriateness of TQM within construction has been highlighted, and finally, a detailed consideration of the Critical Success Factors for the implementation of TQM has been provided. From this thorough review, a list of factors was compiled and each factor justified by the researcher. These factors will be used as a guide for the data collection. In the next section, the barriers to TQM implementation will be discussed.

2.16 Barriers to TQM Implementation

Salaheldin *et al.* (2013) reports that, in any situation, there are both driving and restraining forces that influence any change that may occur within an organisation. Therefore, it could be argued that there are some factors that may influence the successful implementation of a total quality programme. However, the importance of the factors may vary within different firms; indeed, Pierard (1994) argues that each company has its particular characteristics, such as size, technology, background and type of activity, which have an impact on the quality process. Moreover, to avoid typical mistakes, companies should be aware of their organisation's characteristics, and the common barriers experienced in the implementation of total quality. However, there is lack of literature and empirical research on TQM implementation, although there have been many studies that have focused on the obstacles to TQM implementation (Ngai & Cheng, 1997; Salegna & Fazel, 2000). Others have narrowed their scope to concentrate on specific barriers to TQM, such as the organisational culture (Kuei *et al*., 2001), management style (Mann & Kehoe, 1995), employee factors (Fok *et al*., 2000), and ineffective project management (Hides *et al.*, 2004). Therefore, this research focuses on the implementation and develops a framework, which can help in the identification of some key impediments to TQM implementation. These factors will provide the focus of the following section.

2.16.1 Lack of Awareness and TQM Concepts and Purposes

Crosby (1979) states that the purpose of awareness is to encourage everyone to feel that they belong, and can contribute to, a quality organisation; moreover, awareness means that staff in an organisation understands management's quality policy and the current status of QMS (Chin *et al.,* 2000). Also, Withers and Ebrahimpour (2001) indicated in their study that one of the most common obstacles faced by eleven European organisations is the difficulty in interpreting organisational standards. However, top management should educate all staff before taking action to implement or adopt TQM (Lee, 1999). Chin *et al*., (2000) found that most barriers that result in an organisation's failure to continue their quality management journey emanate from a lack of understanding of the TQM purposes. Nagi and Cheng (1997) found that inadequate knowledge and understanding of the QMS was one of the impediments to TQM implementation. Furthermore, Yahya and Goh (2001) identified the lack of awareness and understanding as one of the most important factors that hinder the implementation of quality management, whether it involves ISO 9000 or TQM. While Oakland (2013) advocates an intellectual understanding of quality as the first of his fourteen steps to implementing TQM.

2.16.2 Lack of Top Management Commitment, Support and Leadership

Quality experts, such as Deming, Juran and Crosby, mentioned that top management is one of the most important factors to impact on the successful implementation of a QMS in an organisation (Tari, 2005). Moreover, top management's commitment to TQM is a milestone in providing all types of support for its success (Curry & Kadasah, 2002), whilst this commitment is the only way to implement and maintain the culture necessary for TQM (Al-Khalifa & Aspinwall, 2000). Temtime and Solomon (2012) stressed that the success of the implementation of TQM is often down to the manager of the business who constitutes the driving force, and acts as a driver for TQM implementation by creating values, goals and systems to satisfy customer expectations and to improve the organisation's performance. According to Antony *et al*., (2012) commitment is also necessary to support any changes required in the style, structure, and policies, to set goals, and to change responsibilities and roles to promote the new culture. Furthermore, Ugboro and Obeng (2010) conducted research among 800 members of the Association for Quality and Participation, finding that top management, leadership and commitment were among the critical strategies for successful

TQM programmes. In this era of rapidly changing business trends and increased customer demands, the role of leadership is more crucial today. Organisations need strategic leadership that is capable of predicting the essential alterations and changes in advance, and encouraging the required commitment and conducive atmosphere for worker and teams to understand and adopt these changes successfully. These capabilities are not only decisive for the effectiveness of the organisation but also for its survival (Bass, 1990; Burke & Cooper, 2004). As business goals cannot be achieved without adopting any strategic TQM implementation process, organisational success and sustainability also cannot be accomplished without the strategic role of leaders. This role includes: the allocation of resources, an appropriate organisational alignment, a thorough understanding of the initiative, the ability to focus on the organisational future, the ability to secure the commitment and motivation of teams to achieve the goals of an organisation, and the ability to confirm sustainable growth.

Capable leadership has also been observed to handle, manage and implement these changes successfully (McGuire, 2003). Moreover, scholars have examined the kind of leadership needed for organisations to handle situations involving more demanding and rapidly changing business trends. Bass *et al*. (1990) asserted that many such questions were addressed by highlighting the role of visionary leadership with innovative approaches as a key component. To explain and identify the characteristics and effectiveness of leadership in an organisation, different theories are presented as follows.

2.16.2.1 Contingency Theory**:**

Fiedler (1996) presents the contingency or situational theory of leadership by highlighting the three important factors that have an effect on the performance of leaders. Some of these factors are listed below:

- Leader-Member Relations: It describes the relationship between employees and the leader, including the extent to which employees trust their leader, how effectively the leader can attract employees and subordinates, and to what level the leadership is a source of inspiration for staff.
- Task Structure: This factor examines the nature of jobs for employees, including whether they are routine or non-routine, in order to manage and secure the maximum output from employees at work.

- Position Power: The position power concerns the power of leadership within the organisation. The leadership with the power for decisions and their implementation needs to handle and manage organisational issues with confidence (Fiedler, 1996).

2.16.2.2 Path-Goal Theory**:**

Path-Goal theory claims that the most successful leaders are those who keep their employees and subordinates motivated by defining and making the path of work clear to them through a clear vision. The main characteristics of this leadership are to motivate teams to meet the organisation's goals by keeping control of the outcome of their work and activities. Leaders also appreciate employees and offer rewards for good work, and raise and maintain their enthusiasm by giving them confidence in their ability and in their work (House, 1971).

2.16.2.3 Managerial Grid Theory:

Blake and Adams (1991) developed the theory of the leadership grid. This theory describes the concern of leadership as being the customer's demand-based production, and focuses on the better management of teams through particular leadership styles. This approach may be difficult to implement in certain circumstances. Blake and Adams advocate that leaders keep their teams motivated and flexible to in order realise the need for, and acceptance of, change.

2.16.3 Inadequate Organisational Culture/ Climate Dimension:

Jeffries *et al.* (1996, p.78) define the culture of an organisation as: "All the interactions, which take place between people, their relationships, and the feeling engendered by their behaviour". Moreover, Oakland (2013, p.32) states that: "Culture in any business may be defined as the beliefs that pervade the organisation about how business should be conducted, and how employees should behave and should be treated". Temtime and Solomon (2012) also noted that culture is the glue that binds the activities and efforts of people in the workplace. They also stressed that TQM is an educational process aiming at changing the behaviour and attitudes of organisational members and at then developing a quality-sensitive organisational culture. Additionally, Ghobadian and Gallear (1997) argued that the culture of an organisation can be influenced by education and training. Whilst Dunn (1995) states that the culture that results in a reluctance to change could be considered one of the factors that affect the successful implementation of TQM. According to Master (1996), an inability to change

organisational culture was identified as an impediment to the implementation of TQM. Furthermore, in a study of Malcolm Baldrige National Quality Award (MBNQA) winners, Matta *et al.* (1996), found that difficulties in implementing TQM are rooted in three causes:

- The holistic change of corporate culture;
- Achieving and maintaining employee acceptance of TQM;
- Integration with suppliers and customers;

In a survey on quality issues in Greece, Gotzamani and Tsiotras (2002) found that the change of culture was found to be the first most significant obstacle for TQM implementation, while it is also said to be one of the main determinants of the success of any programme. This echoes the findings of Laszlo (1999) who concluded that the successful implementation of a quality management approach within any organisation requires a culture change. However, a study by Adebanjo and Kehoe (1998) INTO quality culture problems amongst UK companies supports these claims. They found that 48 percent of respondents mentioned that middle managers were responsible for the resistance to change. However, QM implementation does not require a redesign of a country's culture; instead, it requires adherence to its principles, practices and techniques (Juran, 1993). Kano (1993) pointed out that culture should be considered when initiating a TQM programme, although, stressed that culture is not a barrier to the TQM implementation process. Furthermore, Kruger (2001) states that there are many case studies demonstrating that TQM is not limited only to Japanese business organisations and their particular culture, from which the quality approaches initially emerged, but can be successfully realised in the USA, the UK, Germany, and elsewhere.

2.16.4 Lack of Reward and Recognition

Motwani (200l) indicated seven critical success factors for TQM implementation after examining six empirical studies, and reward and recognition systems were among the factors that he recommended were addressed. Bayazit (2003) and Conca *et al*. (2004) agreed with this recommendation, although Deming (1986) disagreed, stating that, the use of rating and merit systems are not fair and can work against a company, because these systems label only a few employees as winners and may encourage unwanted, harmful competition within the organisation. Nevertheless, Whalen and Rahim (1994) mentioned that the lack of a proper reward and recognition system was one of the barriers affecting the implementation of quality

management. Nagi and Cheng (1997) supported this finding stating that the lack of such a system was among the impediments to TQM implementation. Moreover, Najmi and Kehoe (2010) affirmed that one of the barriers to successful quality development is the lack of appropriate performance measurement systems.

2.16.5 Lack of Training and Education

Many writers (e.g Fok *et al.,* 2000; Lau & Idris, 2001; Oakland, 2013) have emphasised the role of human resources and the importance of training, which have proved to be critical factors for the successful implementation of QM and the improvement of business performance. Also, training and education are two important elements, not just for TQM success, but also for all activities of any organisation (Al- Zamany et al., 2002). Training in the view of all quality experts is a vital aspect of implementing quality and requires the commitment of financial resources (Deming, 1986; Crosby, 1979; Feginbaum, 1991; Ishikawa, 1989; Juran, 1974 ;). Moreover, Oakland (2013, p.319) believed that:

> *"Education and training are the single most important factor in actually improving quality and business performance, once there has been commitment to do so. For education and training to be effective, however, it must be planned in a systematic and objective manner to provide the right sort of learning experience".*

The adequate and appropriate training of quality managers is essential to the development and implementation of effective QMSs (Stewart & Waddell, 2003). In comparison, a lack of continuous training and education, as stated by Master (1996), is one of the eight barriers that most often plague organisations. Nagi and Cheng (1997) also cite insufficient quality training and education as an impediment to TQM implementation. Whilst, Tamimi and Sebastianelli (1998), similarly argued that the top barrier to TQM implementation was the lack of employee training. Furthermore, Ahire *et al*., (1996), believe that employee empowerment and an involvement framework are not effective unless employees have received formal, systematic training in quality management, whilst Ishikawa (1985) believed that education was crucial in determining the success of quality control. Moreover, Ishikawa (1989) states that, quality begins and ends with training. Moreover, Crosby (1979) considers the education of the workforce as key to developing awareness and understanding of the new quality philosophy.

However, according to Rao *et al.* (1996) TQM training should be directed at all levels of the organisation since managers who understand the TQM process are not only able to break

down barriers within their organisations, but they can also serve as role models for others who may resist change. Thus, an educational process should precede training in quality management practices, and all employees should first be exposed to the principles of the TQM philosophy followed by training in the techniques to bring those philosophies into practice.

2.16.6 Lack of Employee Empowerment and Involvement

Employee involvement is a process of empowering organisational members to make decisions and to solve problems appropriate to their level (Temtime & Solomon, 2012). The logic is that the people closest to the problem or opportunities are in the best position to make decisions for the improvement process. TQM requires the involvement of all employees and their commitment to the success of the programme, working together as components in one system. Thus, TQM must be truly organisation-wide to be successful in achieving business efficiency and effectiveness (Baidon, 2004), and as such, it must start with top management. This means the senior managers must demonstrate that they are serious about quality, and that everyone in the organisation has to be involved in quality management improvement. Thus, management must enable all employees to participate in the preparation, implementation and evaluation of improvement activities (Lau & Idris, 2001). To achieve employee involvement, firms can use teamwork, suggestion systems, and the empowerment of employees to act in quality matters and communicate across the organisation (Baidoun, 2004). Sila and Ebrahimpor (2012) found that employee involvement, as a critical success factor of TQM, was among the issues that had the highest coverage in the literature (220 out of 347 surveys). Moreover, Low and Ling-Pan (2004) note the converse by stating that low employee participation is a barrier to the implementation and maintenance of effective QM in Singapore organisations.

2.16.7 Infrastructure Factors

Infrastructure factors include: apparent benefits; the International Standard Organisation as the endpoint in the company quality drive; insufficient resources; the traditional belief that quality costs money; a lack of expertise; the holistic nature of TQM; the company is not ready for TQM; and that TQM is not necessary. Macdonal (1998) identified the lack of resources as one of nine key reasons for TQM failure. A study conducted by Sebastianelli and Tamimi (2003) identified inadequate resources for TQM implementation as an obstacle to its success. Parkin and Parkin (1996) suggest that, although many construction practitioners like and agree

with the concept of TQM, they are not willing, or sufficiently competent, to implement them effectively. Nagi and Cheng (1997) similarly stated that the lack of expertise in QM is among the impediments to a TQM implementation, whilst Yousef and Aspinwall (2001) reported that a lack of experience in quality management, and a lack of resources are among the most significant impediments to TQM implementation. Indeed, implementing TQM can be much more difficult when there is widespread confusion about the elements of TQM and how they can be introduced. This was because TQM is a rather abstract philosophy and does not have clear guidelines for its implementation. Nevertheless, this problem has become easier to solve, as TQM elements have become more clearly understood through the development and the worldwide acceptance of quality award models. Researchers have reported that the implementation of TQM has faced many obstacles, such as a lack of experience in quality management, a lack of resources, a lack of strategy and overall objectives, and resistance to change. Thus, TQM challenges will be discussed in the next section.

2.17 Challenging Aspects of a TQM Implementation

Failure within implementation can be due to many reasons, such as the failure to realise that the introduction of TQM requires different approaches, starting from the leadership of the organisation, and from nation to nation according to the cultural imperatives involved. Moreover, the benefits of TQM are not immediately apparent and it may take two to three years for these to materialise; hence, the initiative is sometimes perceived as a process which is too time-consuming for the eventual return.

One of the drawbacks and difficulties of TQM leadership that scholars have acknowledged is that the implementation of TQM differs from one situation to another. TQM models are developed by institutions to serve their particular needs and may not be suitable for use by other institutions (Kanji & Tambi, 1999). Hence, such programmes should be tailored to suit individuals (Michael *et al.,* 1997). McAdam and Welsh (2000) noted that the application of the EFQM Excellence Model usually involves negotiation over how it should be used, how key terms should be constructed, and whether particular elements are even appropriate. Meanwhile, Martinez-Lorente *et al.* (1998) indicated that there is a lack of agreement among quality experts about how to implement TQM, and it is evident that there are differences in the application of TQM in different nations according to the cultural imperatives involved.

Consequently, every quality initiative needs to be designed to suit the local conditions, culture and experience.

Another negative aspect of TQM is that its implementation is time-consuming, and many scholars have argued that the development and implementation process may require at least two to three years to complete (Atchison, 1992, cited in Arasli, 2002; Weeks *et al.*, 1995). However, many people expect results immediately or soon after their efforts, and are disappointed that no instant major results can be observed. The fact that the TQM implementation process takes a longer time than the organisations initially predict is one of the key reasons why some organisations abandon their quality programmes without achieving the expected benefits; this can be due to the difficulty of maintaining enthusiasm and commitment over a long period (Batley, 1999). Indeed, staff are crucial in the whole process, and the study by Elmuti *et al.* (1996) revealed that the unique characteristics of the construction sector may create problems when attempting to implement a TQM initiative, because the industry's culture (particularly in the Nigerian context) encourages behaviour which is contrary to the principles of TQM. Nevertheless, this is where leadership within the organisation can play an important role in maintaining an effective implementation process. Deducted from the above discussion of these factors, it can be appreciated that the individual, Leadership within the organisational environment promotes the need for a TQM model that is appropriate, and consequently it is understandable that, despite the progress that has been made through research and debate about TQM, there is still no universal model appropriate for the construction sector.

2.18 Barriers affecting TQM implementation in Nigeria

The construction industry is a significant part of the Nigerian economy. Indeed, in the first and second quarters of 2014 respectively, it contributed approximately N627, 28600.61 Million (4.06%) (Equivalent to £1,353,649.50) and N695,565.83 Million (4.32%) (Equivalent to £1,493,728.75) as its share of the nation's GDP (National Bureau of Statistics, 2014). This demonstrates that the sector is a significant contributor to the national economy. However, the construction industry inevitably faces many challenges (Ahn, Pearce, Kwon and Shin, 2010; Akinola *et al*., 2014), for which today's construction manager needs to develop solutions. Some challenges are relatively new to the industry, whilst some are centuries old (Ling, 2012). The nature of the industry further complicates these challenges in that it is fragmented and often inefficient. It is also slow to adopt, implement and integrate new information technologies and products, to devote few resources to research and development (R&D) compared to other sectors (Muir 2005). Furthermore, the industry is full of complex interdependencies and uncertainties, which makes any prospect of achieving project objectives uncertain.

Shane and Gransberg (2012), note that, in the past two decades, investors and owners of construction projects have been demanding that the design and construction industries enhance quality, decrease cost, and compress the delivery period for projects. As a result, both owners and the industry have experimented with various forms of project delivery methods. Nevertheless, as alternative project delivery methods have proliferated, the construction industry has coined names for variations on basic themes; in particular, some of these have been codified to enable legislation. Notwithstanding, construction projects represent a unique set of activities that must take place to produce unique products, the success of a project is judged by whether it meets the criteria of cost, time, safety, resource allocation, and quality, as determined by the owner (Egwu, 2014; Muir 2005).

Thus, the purpose of construction project management is to achieve goals and objectives through the planned expenditure of resources that meet the project's requirements. The construction manager must control, deflect, or mitigate the effects of any occurrence or situation that could affect the project success. Hence, the major tasks in construction management include: planning, organising, scheduling, implementing, managing, monitoring, controlling, and tracking construction projects (Farooqui, Ahmed and Saqib,

2010; Nyastani *et al.*, 2017). It is therefore essential for construction activities to be accomplished successfully in an effective and efficient way. This requires various strategic and management capabilities. Therefore, it is also critical for construction managers to understand the demanding realities facing them in the planning and control of construction operations, especially in developing countries like Nigeria. Hence, this study needs to identify and rank the challenges facing the management of construction projects in Nigeria, the skills required, and management strategies for mitigating challenges facing construction managers in delivering efficient construction projects in Nigeria.

2.19 Adoption of TQM in Developing Countries

The state of QM in developing countries cannot be separated from the mainstream economic and industrial development. Business in many of the developing countries has often been sheltered from competition through protectionism at home and government intervention in foreign trades (Al-Zamany *et al.*, 2002; Madu, 1997). However, the rapid globalisation of markets, and the gradual acceptance of competition mean that it is difficult to continue to protect local markets. Developing economies must, therefore, adapt to these environmental changes and develop programmes to enable them to compete effectively (Al-Khalifa & Aspinwall, 2000). Despite the number of publications and the amount of research into TQM, little empirical work has been carried out in developing countries, particularly in the Arab World generally, and Nigeria specifically. Lakhe and Mohanty (1994) have stressed that most organisations in the developing world suffer from the following: a lack of management commitment and motivation; the perception that quality is an optional extra and not a necessity for development; the traditional belief that quality costs money; a lack of communication and trust between suppliers, dealers, management, and trade unions; disorganized and indifferent customers; a lack of political support; a lack of established quality standards and inadequate test facilities; obsolete technologies; a low level of education; negligible capital investment in technologies, research, and development, and employee education; and finally, customers so far as quality is concerned. In comparison, Sandholm (1999) refers to certain inhibiting factors to QM in developing countries as: low purchasing power, a shortage of goods, foreign exchange constraints, an incomplete infrastructure, inadequate leadership and insufficient knowledge. Bruun and Mefford (1996) believe that customer expectations of quality in these countries tend to be low, thus causing further problems regarding export and competition in general.

Osuagwu (2012) mentioned that there have been failed attempts at implementing a TQM strategy in Nigeria. Osuagwu stated that the main variables implicated in such failures are: early organisational efforts that are simplistically grasped, such as quality circles being the only panacea to solve all corporate problems; the failure to recognise the relationship between TQM objectives and increased employee involvement, and participation and failure to integrate major organisational functions into TQM activities. Moreover, a study conducted by Amar and Mohd Zain (2002) to examine the barriers faced by Indonesian manufacturing organisations in the implementation of TQM uncovered eleven pertinent factors perceived as barriers that are most frequently faced by the local organisations. These are issues related to human resource management, attitude towards quality, organisational culture, interdepartmental relations, raw materials, machines and equipment, information, method and training. Several of these factors are similar to those found to impede TQM implementation in other countries, as reported by other researchers such as Adebanjo and Kehoe (1998), Masters (1996), Selena and (Fazel 2000), and Tamimi and Sebastianelli (1998).

2.20 Management of Construction Projects in Nigeria

According to Arditi and Balci (2009), construction management services are aligned with the activities and tasks associated with building design, construction documentation, construction procurement, and construction. The scope and approach to construction management are largely determined by the contractual arrangement established between the firm providing construction management services and the client. Managing a project, according to PMBOK Guides, includes:

- Identifying requirements
- Establishing clear and achievable objectives
- Balancing the competing demands for quality, scope, time and cost
- Adapting the specifications, plans, and approach to the different concerns and expectations of the various stakeholders.

However, construction projects are somewhat difficult to manage and to challenge due to the nature of the industry, which include factors such as: its complex and unique nature, a mobile workforce, an ingrained culture, working conditions, and project-based setup, diverse sub-contractors and suppliers (Arditi and Balci, 2009). This is in addition to regulatory bodies

and changes in government policies during the production process. These factors significantly affect the efficient performance of the construction site management team (Fapohunda & Stephenson 2010) and in most cases lead to project failure. The reasons for such failure are complex and it is not wise to pinpoint specific reasons to ensure project success. However, it is felt the main reasons for failure in developing countries are: a lack of planning, the absence of a holistic approach, a lack of comprehensive engineering and management strategy, inconsistency in monitoring and follow-up, coordination and communication lapses, and above all, the absence of a methodical approach.

Besides technical issues, Arditi and Balci (2009) posit that professionals in the construction industry also need to handle managerial issues. Agundu, Okwandu and Mba (2003) attest that various factors have been adduced for an unhealthy scenario in the management of construction projects in Nigeria, with the most notable being poor project analysis and management. However, Bowen, Hall, Edwards, Pearl and Cattellargue (2002) argue that the concept of managing construction projects is deeply embedded in the traditional building procurement system. This continues despite emerging project management methods for construction projects and the generation of new kinds of challenges for construction practitioners. Ogege (2014) stresses that the success of any project implementation process in the construction industry, in both the public and private sectors, depend largely on the project manager's concept of staff appointments and control, and the strict monitoring of time, cost, materials, quality and environmental constraints. Conversely, Kar (2009) contends that managing complex, multi-disciplinary projects in a developing country presents some special problems that vary from one project to another. However, Kar, considers that, regardless of whether an organisation manages stand-alone or multiple projects, small or large projects, internal or external customers, or whether the nature of the work is product development, construction, design, IT, or service, most projects are difficult to manage because of two factors:

- They involve uncertainty, and
- They involve three different and opposing commitments, which are: due date, budget, and content.

Furthermore, in organisations that attempt to manage multiple concurrent projects with common, shared resources, the job is even more challenging. Hence, managers can quickly

find themselves on ‘project overload’ with continual resource shortages and great difficulty in determining which tasks are the most important.

2.21 Management Challenges in Construction Practice in Nigeria

As the demand for highly innovative construction managers continues to increase, it has been acknowledged that the management of construction projects, from conception to disposal, is difficult and accompanied by substantial challenges, (Ahn, Pearce, Kwon & Shin, 2010; Ala-Risk & Kärkkäinen, 2005; Hashim, Chileshe, & Baroudi, 2012; Laryea, 2010; Muir, 2005). Construction managers deal with time, money, equipment, technology, people and materials in managing a construction project. They organise these resources into activities, execute the activities in logical sequences and aim to complete the projects within the stipulated time, budget and specified standard. The construction manager also manages the construction process to meet the clients’ needs within legal, cost, time, quality and environmental constraints. Also, the construction manager takes the whole building cycle, from inception to the end of its economic life, dealing with the procurement, construction, design or property management, recycling, and disposal of the building. This means balancing the often conflicting requirements of clients, users and the community.

Unfortunately, the complex nature of construction makes it one of the most adverse industries. Thus, construction projects have often and long suffered from high fragmentation, large waste, poor productivity, cost and time overruns, and conflicts and disputes (Hai, Yusof, Ismail & Wei, 2012). Moreover, Amalraj, Hernani, Ladouceur and Verma, (2007) agree that the challenges facing today’s construction managers are bound to be formidable, and identify quality, cost and schedule as some of the most challenging aspects of project management. Many of these challenges are a direct result of construction operations, while others are a result of indirect, peripheral activities. Othman (2013) classifies the challenges encountered in mega-construction projects in developing countries into four categories: Engineering challenges, human development challenges, managerial and political challenges and sustainability challenges. A surprising number of these challenges are not construction issues but must be addressed and managed by the construction manager to ensure project success. Meanwhile some of the construction issues include: workforce considerations, safety, time constraints, the changing nature of the work, whilst non-construction challenges are part of

the business landscape and include legal issues, government regulations, environmental concerns, and socio-political pressures.

2.22 Conceptual Framework for this Research

This section of the report presents the conceptual framework developed in this research. The conceptual framework highlights the main issues for study and thus for the effective implementation of TQM in the Nigerian construction industry. The conceptual framework has been developed based from a preliminary literature review undertaken in TQM implementation.

Therefore, the discussion focuses on the development and components of the framework. Jabareen (2009) defines a conceptual framework as a network, or 'a plane' of interlinked concepts that together provide a comprehensive understanding of a phenomenon or phenomena. According to Miles and Huberman (1994a), a conceptual framework explains, either graphically or in narrative form, the main things to be studied, the key factors, constructs or variables and the presumed relationships among them. They further categorised the framework under three classifications, namely: rudimentary or elaborate, theory-driven or common sense, descriptive or casual. In addition, Yin (2014) suggests that a study should use existing theory to formulate research questions and objectives, thus this study will adopt theoretical propositions, to help devise a framework that will organise and direct the primary data collection and analysis.

2.22.1 The Role Conceptual Framework

To devise a theoretical, or descriptive, framework a study needs to identify the main variables, components, themes and issues and the predicted or presumed relationships between them (Miles & Huberman, 1994; Robson, 2002; Yin, 20014). To achieve the research aim and objectives, and based on the arguments and discussions of literature surveys, the researcher generated some aspects related to the research purpose. Thus, this section summarises the factors that emerged from the literature review and organises them into a conceptual framework. Therefore, this provides the basis for proceeding further in the data collection, and links this research to the existing body of knowledge. The primary purpose of this conceptual framework is to help to identify the key factors that could that hinder the effective implementation of TQM in the Nigerian Construction Industry.

As a result of the literature review, and in particular in sections 2.12, 2.13 and 2.15, the main structure of the research model was developed. However, the researcher generated the most common factors to effective TQM implementation, which have been mentioned within existing literature. Therefore, this research evaluated the factors to develop a framework, including the awareness and understanding of the purpose of TQM, top management commitment and support, organisational culture/climate, reward and recognition, training and education, employee empowerment and involvement, and infrastructure. The conceptual framework for this study and the relationship between its elements are shown in Figure 2.14

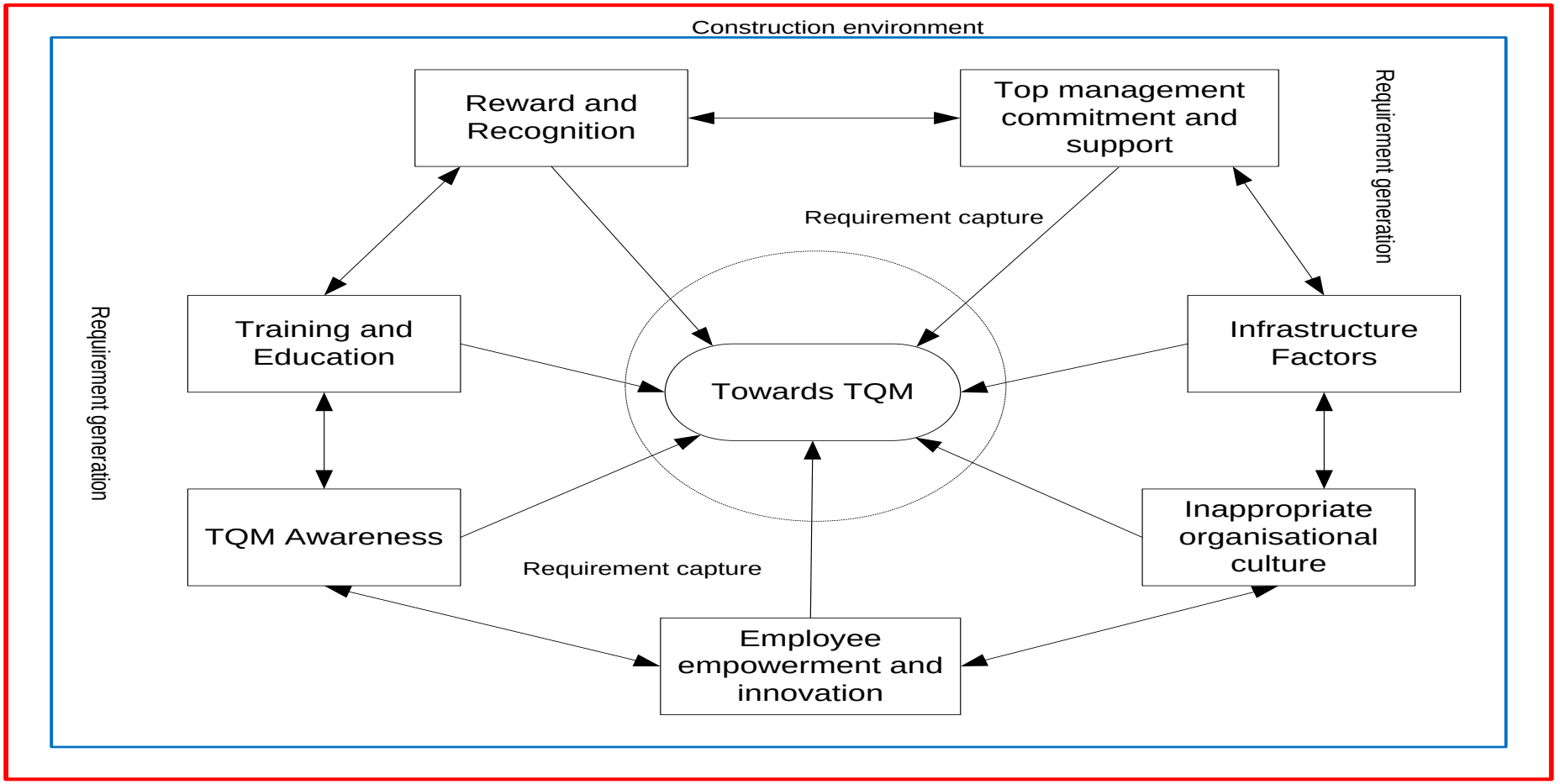


Figure 2-14 Framework for TQM implementation

The framework is to be used when introducing TQM and when designing implementation plans for quality improvement within the Nigerian construction industry. The purpose of the framework is to provide guidance to institutions introducing TQM in order to indicate to them the way in which the various dimensions and features of TQM fit together. The framework has been customized to fit the needs of the Nigerian construction industry. The framework has been constructed in such a manner that it will provide a directional structure for using the seven dimensions when implementing TQM. The framework provides an overall view of the integrative manner of the seven dimensions when considering the TQM implementation issues within the organisation. Figure 2.7 identifies the key dimensions in the TQM framework and the way in which the dimensions are interconnected. The framework can be regarded as a "total quality journey" tearing down outdated TQM models and frameworks, arguing instead for the need to build a whole new TQM framework. The aim of this research is to develop a conceptual framework to help in the effective implementation of TQM within the Nigerian construction industry. Thus, to achieve this goal, and based on the arguments and discussions of literature review, the researcher has generated factors related to the research's purpose. Thus, the purpose of this section is to summarise the impediments that emerged from the literature review and to incorporate them into a conceptual framework, represented in Figure 2.7. Therefore, it provides the basis for proceeding further in this study. Within the framework, these seven key components are interlinked in a collaborative environment where a strategic link between the generation of requirements and the capture process (see Figure 2.7) is provided to ensure that the effective implementation of TQM within the Nigerian construction industry is appropriate to the context. In essence, the TQM concept can only take place in an organisation that is ready to transform its processes and culture to conform to the requirement of any new quality management improvement.

The framework provides a multi-dimensional TQM vision for studying the construction industry sector status, or against which a particular approach to TQM implementation can be compared and weaknesses highlighted. Strong relationships and linkages exist between the seven primary dimensions which are employee empowerment and innovation, TQM awareness, training and education, reward and recognition, top management commitment and support, infrastructure factors and inappropriate organisational culture.

2.23 Summary

This chapter has reviewed the extensive literature on QM and TQM, and in doing so, the researcher has recognised that the emphasis on quality has led organisations to adopt QMS. From reviewing the literature, the researcher believes that the term quality means different things to different people. This is why defining quality is often the first step in most quality improvement journeys. A common understanding and vision of what is meant by quality helps the organisation to focus its quality improvement efforts. This is based on the fact that commitment from top management is an important part of TQM principles, and the implementation of these principles could lead to organisational success and competitive advantage. It is clear that both approaches tend to complement each other. TQM awareness can be implemented first to create knowledge and consistency in the organisation's work, then the implementation of TQM can enhance employee motivation and operational efficiency, and achieve overall organisational success and performance. Investigating TQM was difficult as there was widespread confusion about the elements of TQM and how they could be implemented. This was because TQM is a rather abstract philosophy and does not have clear guidelines on its implementation. This became easier as TQM elements were more clearly understood through the development and the worldwide acceptance of quality award models. Researchers have reported that TQM implementations have faced many obstacles, such as a lack of experience in quality management, a lack of resources, a lack of strategies and overall objectives, and resistance to change. The chapter also discusses the IS0 9001 2015, Lean construction and Kaizen to further understand construction and quality processes, standards and models for the construction sector.

3 RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes and justifies the research design and methodology that has been followed to fulfil the research aim and objectives, as outlined in sections 1.3.1, and 1.3.2. The main objective of this chapter is to explore the various inquiry strategies and research methodologies available in order to appreciate the different assumptions, paradigms and techniques that underlie this study. This step is important in providing an insight into the weaknesses and strengths of the different perspectives, and the ways of counterbalancing them within the context of this study.

The purpose of the research methodology is to discover answers to questions through the application of scientific procedures. Such procedures have been developed to increase the likelihood that the information gathered will be relevant to the question as well as reliable and unbiased. Robson (2002) comments that the task of carrying out an inquiry is made more difficult by the fact that there is no clear consensus about how to conceptualise the process of conducting research. However, it could be argued that the research process is always a compromise between options and choices, which are frequently determined by the availability of resources. Thus, researchers usually take the pragmatic view that there are no clear-cut rules in carrying out research and that the various research strategies and methods that are available and might seem appropriate to an inquiry, should still be flexiblly adopted.

The chapter starts with an introduction to the research in general, followed by a reminder of the research aim, objectives and questions. An overview of the research design is presented; this includes the research methodology, which involves: the research paradigms (philosophies), strategies, approaches, and methods of data collection and data analysis. Finally, the research population, sampling technique, and the statistical methods that have been used for this research are discussed as well as the ethics.

3.2 Concept of Research

Research can be defined as the process followed by a researcher to systematically achieve the aims and objectives of a particular study. In other words, this process consists of methods that are used to collect data, the reasons why the results obtained are meaningful, and an explanation

of any related limitations (Zikmund, 2012). Boris, Donald and Pamelas (2014) stated that research methods furnish the researcher with adequate ideas, tools and models that substantiate how to conduct sound research. However, Saunders *et al.* (2012) argued that there is a distinctive difference between research methods and methodology. The stated that the research method is concerned with the techniques and procedures used in obtaining and analysing data (such as questionnaires, observations and interviews, quantitative and qualitative analysing techniques), whilst the research methodology is concerned with theories of how research should be carried out.

Thus, research encompasses the processes of inquiry, investigation, examination, and experimentation. These processes have to be carried out systematically, diligently, critically, objectively, and logically. The expected end results could be to discover new facts that would help to address with the problem. For Sekaran (2003), the main purpose for conducting basic research is to generate more knowledge and understanding of the phenomena that occurs, and to build theories based on the study of the phenomenon. Thus, the aim of this research is to develop a framework for the effective implementation of TQM within the Nigerian construction industry. However, the aim also requires the identification of factors for the effective implementation of TQM within the Nigerian construction industry. Therefore, in this chapter, various research designs and methodological issues are discussed to determine the most appropriate principle research technique for this study.

According to Ghauri and Grohaug (2010), research methodology can be conceived as a system of rules and procedures which are vital,for several reasons. For example, these can be understood as rules of communication, where the processes and procedures adopted in the research are made available to other researchers for criticism or to replicate the procedures used in the work. Furthermore, a methodology can be developed as a set of rules for reasoning, which has proven important for inter-subjectivity, where the research can evaluate the completed work (Ghauri & Grohaug, 2010). Hussey & Hussey (1997) summarised the purpose of research as follows:

- To review and synthesise existing knowledge;
- To investigate some existing situation or problem;
- To provide solutions to a problem;
- To explore and analyse more general issues;

- To construct or create a new procedure or system;
- To explain a new phenomenon;
- To generate new knowledge;
- A combination of any of the above;

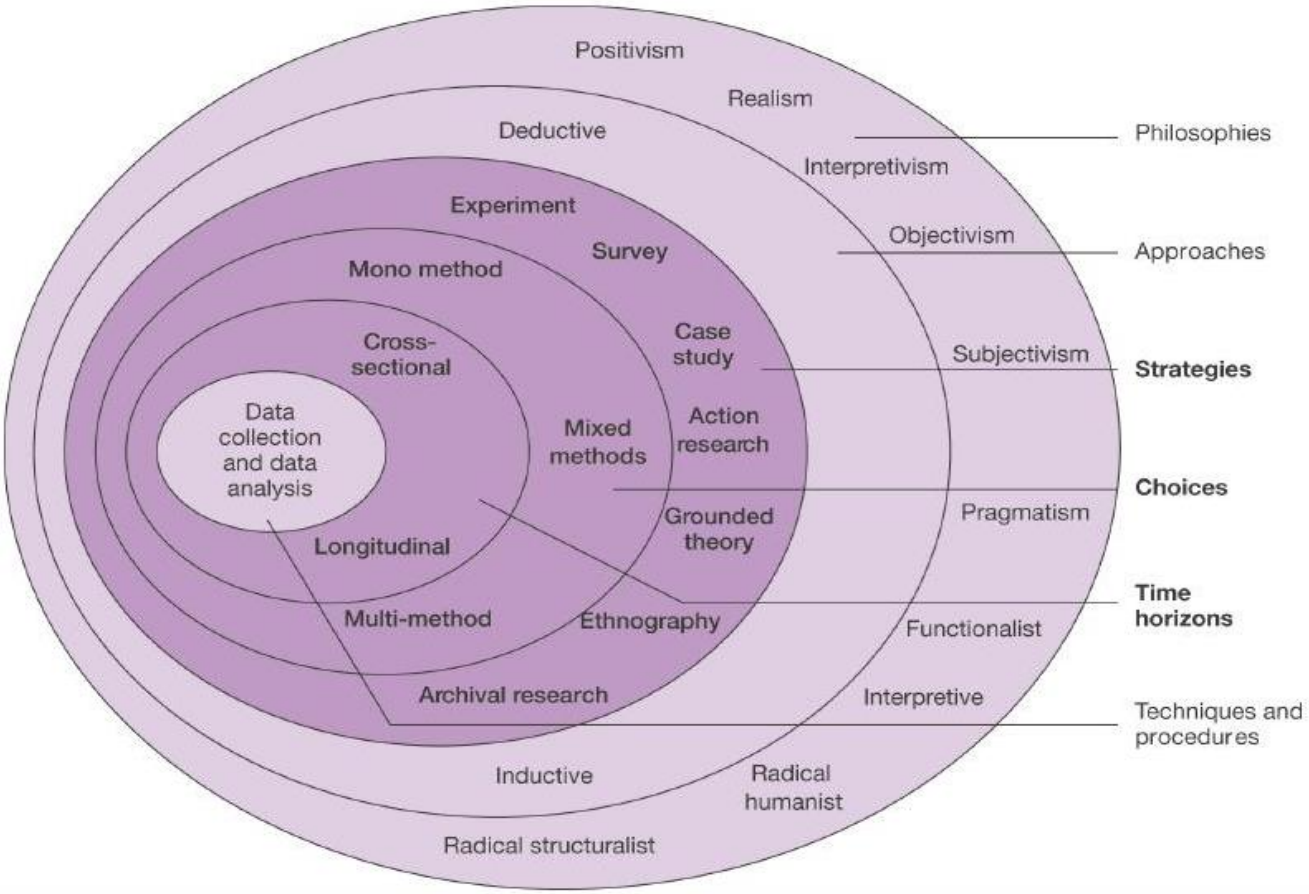


Figure 3-1: Research Onion (adapted from Saunders *et al.*, 2012)

Figure 3.1 shows the research design framework adopted in this study. Issues related to the research philosophy, approach, strategy and data collection are discussed in the next sections and their relevance is examined in detail to justify the choices made. The Research Onion (see Figure 3-1) illustrates the research process, starting from the philosophical stance through to the core concerning the data collection and analysis. This image makes the process easier to understand and apply as the various layers are clearly defined. Moreover, it is assumed that every layer of the onion defines a particular research activity. The structure of the chapter follows the Research Onion approach, where the rest of the sections explain the relevant research methodology factors, beginning from the first layer.

3.3 Types of Research

According to Saunders *et al.* (2012), there are three main types of research, which are; exploratory, descriptive and explanatory. Determining the type of research undertaken is usually based on the aim and objectives of the study; moreover, this step is important as it enables the researcher to develop a better understanding of structure the research methodology and the assumptions underpinning their research.

Exploratory research is defined as a valuable way to discover and gain in-depth knowledge about a topic of interest; this is often achieved by asking open questions (Saunders *et al*., 2012). This type of research could be conducted through interviewing 'experts' in the subject, conducting a critical literature review, and holding focus group interviews. The selection will rely on the quality and volume of information required from the participants. Furthermore, this type of research could help to clarify, as well as give in depth understanding of, an existing situation to ascertain the problems and to create avenues for more accurate future investigations. According to Collis and Hussey (2003), exploratory research is likely adopted for qualitative measures; furthermore, this type of research is used to generate theories from the study of a situation or to find and investigate hypotheses, ideas and patterns. The advantage of exploratory research is its flexibility and adaptability to change.

In comparison, Chapman and McNeil (2005) stated that descriptive research seeks to answer questions on what, who and how many; it, "describes in detail a situation or set of circumstances". This type of research provides an accurate profile of people, events or situations. The study aims to inform about the status of a wide range of social indicators, and initiates questions that may further necessitate the need to explore and explain why such a phenomenon exists (Saunders *et al*., 2012). Furthermore, statistical or quantitative techniques can be used in descriptive research in order to collect and summarise data. This means it aims towards an overview of the various characteristics that exists in a phenomenon and not necessarily the reasons why the phenomenon exists (De Vaus, 2001). However, this type of research can facilitate the conduct of exploratory and explanatory research.

Finally, Collis and Hussy, (2003) stated that explanatory research may adopt qualitative and quantitative methods to investigate and explain why and how a phenomenon is happening or has happened. Saunders *et al*., (2012) argued that the purpose of explanatory research is to explain the situation based on establishing 'causal relationships between variables' by

investigating into a phenomenon. However, it is difficult to differentiate explanatory research from descriptive research as it also seeks to answer 'why' questions, and any explanation involves description. To clarify the difference, DeVaus (2001) states that an explanation is used to determine why a phenomenon exists in order to suggest solutions, while a description only provides an overview of a phenomenon. In fact, explanatory research is used to explain the relationships between variables in a situation or a problem.

3.4 Research Philosophy

A research philosophy contains important assumptions about the way in which a particular researcher views the world, and these assumptions will underpin the research strategy and the methods that a researcher chooses within their research strategy (Saunders *et al.,* 2012). Thus, it is important to assess these assumptions, as they will determine the course of the study.

Moreover, Saunders *et al.* (2007) identify epistemology, ontology and axiology as the three main ways of thinking about research philosophy. Epistemology concerns what constitutes acceptable knowledge in a field of study (Saunders *et al.,* 2012, Collis and Hussey, 2009). In comparison, ontology is concerned with the nature of reality, and axiology is concerned with judgments about the value (Saunders *et al.,* 2007). According to Saunders *et al*., (2012) research philosophy is an over-arching term that relates to the development and nature of knowledge. Several authors argued that researchers must adequately understand research philosophies to apply them appropriately. For example, Easterby-Smith *et al*. (2012) noted that there are three reasons that underscore the understanding of philosophical research issues in management research. First, they stated that it can help to clarify research designs; this does not only involve a consideration of the kind of evidence required and how it is to be gathered and interpreted, but also how this will provide appropriate answers to the questions under investigation. Second, they argued that knowledge of philosophy can help the researcher to recognise which designs work and which do not. This enables the researcher to avoid dead ends, and should indicate the limitations of particular approaches. Third, Easterby-Smith *et al*. stated that knowledge of philosophy can help the researcher identify, and even create, designs that may be outside their previous experience. It may enable insights into ways to adapt research designs according to the constraints of different subjects or knowledge structures.

Research philosophies are considered important within studies, and have been the focus of many debates and arguments between contrasting views within the research community.

Therefore, a failure to consider the philosophical issues within a research design can seriously affect the quality of the research outcome (Easterby-Smith *et al*., 2012). Therefore, to enable a clear and sufficient understanding of the various philosophical positions, Saunders *et al*. (2012) classified research philosophies into three main perspectives, namely: ontology, epistemology and axiology. The following sections provide a summary of these philosophical research considerations. These summaries provide the basis for a clear description and understanding of the philosophical stance adopted for this research.

3.4.1 Ontology

Ontology is a branch of philosophy that is concerned with nature of reality; it relates to the assumptions the researcher has about the way the world operates and the commitment held to a particular view (Blaikie, 2011; Saunders *et al.,* 2012). This philosophical assumption makes claims about the kind of social phenomena that exists, the conditions of their existence, and the way in which they are related (Blaikie, 2011). Thus, ontology is also about the nature of reality and existence (Easterby-Smith *et al.*, 2012). Saunders *et al*., (2009) highlighted the two contrasting ends of the philosophical continuum of ontology, namely, objectivism and subjectivism. According to Crotty (1998), an objectivist argues that social entities exist in reality external to social actors concerned with their existence. In other words, an objectivist asserts that social phenomena and their meaning have an existence that is independent of social actors (Grix, 2001). In contrast, subjectivism holds the view that social phenomena are created from the perceptions and consequent actions of those social actors concerned with their existence (Saunders *et al*., 2012). Furthermore, Saunders *et al.,* (2012) assets that social interactions between actors are a continual process, and that social phenomena are in a constant state of revision, meaning it is necessary to study the details of a situation to understand what is happening, or even the 'reality' occurring behind what is happening.

3.4.2 Epistemology

Epistemology is concerned what constitutes acceptable knowledge in a field of study (Saunders *et al.,* 2009). According to Grix (2001), epistemology is one of the core branches of philosophy and is concerned with the theory of knowledge, especially with regard to its methods, validation, and the range of ways to gather knowledge about social reality, whatever that is understood to be. Easterby-Smith *et al,* (2012) recently simplified this definition by explaining that epistemology concerns the best ways to enquire into the nature of the physical and social

worlds. Eriksson and Kovalainen (2008) define epistemology according to four different perspectives; thus epistemology:

- Defines how knowledge can be produced and argued for;
- Defines the criteria by which knowledge is possible;
- Defines and gives structure to the kind of scientific knowledge is available, and the limits of that knowledge;
- Offers an answer to the question of what constitutes scientific practice and process;

Furthermore, Eriksson and Kovalainen (2008) mentioned that there are two main contrasting philosophical positions within epistemology, namely objectivist and subjectivist. Saunders *et al*. (2009) and Grix (2001) classified these positions as positivism and interpretivism. According to Grix (2001), research adopting a position advocates the application of the methods of natural sciences to the study of social reality and beyond. Myers (2013) further explained that positivist researchers assume that reality is objectively given and can be described or explained by measurable properties, which are independent of the researcher and their instruments. Additionally, unlike interpretive studies, positivist research attempts to test the theory to try to increase the predictive understanding of phenomena. Typically, in practice, it is often assumed that the units of analysis that make up reality can be classified objectively into subjects and predicates; subjects are also often referred to as entities or objects (Myers, 2013). This is done by formulating propositions that portray the subject matter regarding independent variables, dependent variables, and the relationship between them (Myers, 2013; Saunders *et al*., 2012). Saunders *et al*. (2012) point out that a researcher using positivist philosophy is concerned with facts rather than impressions and an important component of this approach to research is that the research is undertaken, as far as possible, in a value-free way. In furtherance to this, Easterby-Smith *et al.* (2012) emphasise that the key idea of positivism is that the social world exists externally and that its properties should be measured through objective methods, rather than inferred subjectively through sensation, reflection or intuition.

In contrast, interpretivism, according to Bryman (2004), is predicated upon the view that a strategy is required that respects the differences between people and the objects of natural sciences and therefore requires the social scientist to grasp the subjective meaning of social action. The interpretive researcher assumes that access to reality is only possible through social

constructions, such as language, consciousness, shared meanings and instruments (Myers, 2013). Whereas positivist research or studies attempt to test theory in an attempt to increase the predictive understanding of phenomena, interpretive research or studies attempt to understand phenomena through the meanings people assign to them (Creswell, 1994, Myers, 2013). The researcher seeks to listen to participants and to build a picture based on their ideas; this cannot be achieved by standing outside the subject matter looking in; instead, the only way an interpretive researcher can understand a particular social or cultural phenomenon is to look at it from the inside.

As this research involves the study of the effective implementation of TQM, it focuses on organisational behaviour, especially that within the construction industry, which is, by definition, managed generally by owner managers in a more personal way than a large business organisation (Analoui and Karami, 2003; Bolton, 1971; Holmes and Gibson, 2001). It can be argued that the epistemological positioning is more narrowed towards interpretivism than towards positivism.

3.4.3 Axiology

Axiology is a branch of philosophy that studies judgements about value (Saunders *et al.*, 2009). The role that the researcher's value plays in the entire research process is of importance if the researcher wishes to present credible results. This tends to affect the research administration, as the philosophical approach is a reflection of the researcher's values, and influences the choice of data collection techniques (Saunders *et al.*, 2009). As argued by Heron (1996, cited in Saunders *et al*., 2009), values are the guiding reason for all human action; therefore, researchers demonstrate axiological skill by being able to articulate their values as a basis for making judgements about what research they are conducting and how to go about it. A comparison of research philosophies (ontology, epistemology and axiology) adopted for this research are summarised in Table 3-1.

Table 3-1 Comparisons of Research Philosophies (Saunders *et al.*, 2012)

Philosophy	Definition	Positivism	Interpretivism
Ontology	The researcher's view of nature of reality	External, objective and independent of social actors	Socially constructed, subjective, may change multiple
Epistemology	The researcher's view regarding what constitutes acceptable knowledge	Only observable phenomena can provide credible data, facts. Focus on causality and law like generalisation, reducing phenomenon to simplest elements	Subjective meanings and social phenomena. Focus upon the details of situation, a reality behind these details, subjective meaning motivating actions
Axiology	The researcher's view of the role of values in research	Research is undertaken in a value-free way, the researcher is independent of the data and maintains an objective stance	Values play a large role in interpreting results, the researcher adopting both objective and subjective points of view

3.4.4 Operationalising the Research Philosophies

This research has developed a framework for the effective implementation of Total Quality Management in the Nigerian construction industry. It is expected that this framework could help to improve the awareness and understanding of individuals and organisations about the implementation of TQM in the Nigeria construction industry, and appreciate its potential impact on project performance.

As this research involves the study of organisational behaviour, more specifically amongst the Nigeria construction industry, which is, by definition, generally directed by managers in a more personal way than a large business organisation (Analoui & Karami, 2003; Bolton, 1971; Holmes & Gibson, 2001), it can be argued that the epistemological positioning of this research

work leans more towards interpretivism than positivism. In terms of its ontological position, it has to be identified if the study is objective and external to the researcher, or socially constructed and only understood by examining the perceptions of the human actors (Collis & Hussey, 2009). This research addresses both subjective and objective issues and thus falls in between the two extremes of the ontology spectrum. Hence, for this study, the (dominant) philosophical stance adopted by the researcher to explore a real life situation based on practitioners' experiences and knowledge (as illustrated in Figure 3-2) is interpretivism. Thus, the epistemological position is subjective. Moreover, in terms of axiology, it assumes a value-laden stance, while the adopted methodology combines qualitative and quantitative (mixed method) approaches, as shown by the red dotted circled lines in Figure 3-3. When considering mixed methods research, identifying such philosophical assumptions is of paramount importance as it informs the selection of the research approach, which transcends the epistemological and ontological categories by combining both inductive and deductive research paradigms.

Alongside these philosophical inferences, the researcher can select both the research methodology and data analysis method that are consistent with the research paradigm. Morgan (2007) suggested that a strong appreciation and application of such inferences is crucial in creating the appropriate reality of knowledge, which is relevant to the research paradigm and, in this study, rests on the utilisation of a mixed research method approach. The distinctive characteristics of mixed research methods are clearly defined by the linkages/cooperation between the philosophical inferences and the research paradigm. Having discussed the research philosophy, the next section discusses the Research approach.

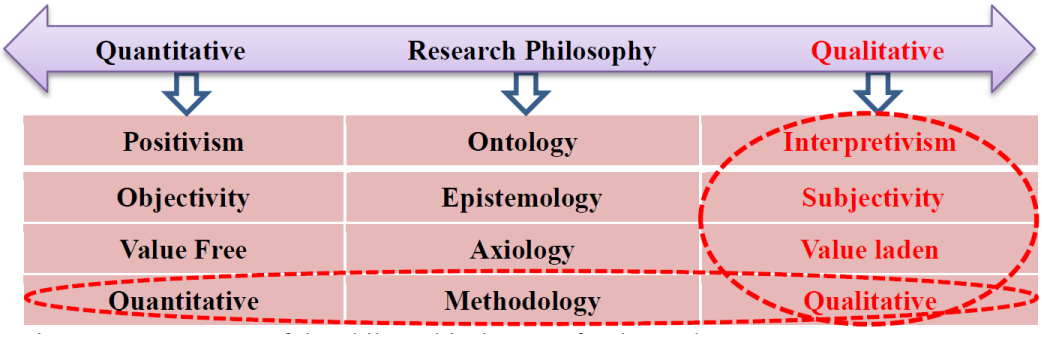


Figure 3-2 Philosophical Stance of this Research (adapted from Saunders *et al.*, 2012)

3.5 Research Approach

When considering research approach, there are two alternatives, namely deductive and inductive. According to Saunders *et al.* (2012), the deductive approach leads the researcher to develop a theory and hypothesis (or hypotheses) and design a research strategy to test the hypothesis. According to Collis and Hussey (2003, cited in Saunders *et al*., 2009) a deductive research approach is the dominant approach in the natural sciences, where laws present the basis of explanation, allowing for the anticipation of phenomena, the prediction of their occurrence, and therefore the ability to control them. From an ontological perspective, this research approach lies in the objectivist tendency; meanwhile, from an epistemological perspective, adopts the positivist tendency of epistemological philosophy. In comparison, inductive research approach is the process where the researcher collects data and develops a theory based on the analysis of data collected (Bryman, 2004; Saunders *et al.*, 2012). Saunders *et al.* (2009) found that, unlike deductive approach which enables a cause-effect link between particular variables without necessarily understanding the way in which humans interpret their social world, the inductive approach (as has been consistently argued) provides a better understanding of the nature of the problem under investigation, and this understanding represents the strength of an inductive approach.

From a philosophical perspective, an inductive research approach lies in the subjectivism end of the ontological tradition while it fits into the interpretivism persuasion in the epistemological stance. Ardalan (2009) suggested that different research paradigms are established based on different propositions about the nature of the scientific and social world, and each of these paradigms generate their own assumptions and theories. Mertens (2010) and Morgan (2007) suggested that the epistemological and ontological features inherent in the mixed method approach provide the philosophical basis and motivation for the choice of the pragmatic research paradigm. Researchers, such as Wing *et al.* (1998), Love *et al.* (2002) and Dainty (2008) argued for methodological pluralism in construction management research, as it provides the basis to fully understand the phenomena that influence performance in the field. Although this research leans towards an interpretivist philosophy, the data collection for this research employed inductive approaches, positioning the data collection techniques within a pragmatic philosophy.

Accordingly, adopting such philosophical perspectives facilitates the creation of knowledge in a manner that is consistent with the mixed method research approach. Moreover, Dainty (2008) and Wedawatta *et al.* (2011) believe that use of mixed methods are considered appropriate as this provides tools for deeper knowledge and understanding of the research area, and supports the call for a pragmatic approach in construction management research over traditional singular approaches.

3.6 Research Strategy

According to Remenyi *et al*. (2003), research strategy provides the overall direction of the study, including the process by which the research is conducted. Saunders *et al*., (2007) mention that an appropriate research strategy has to be selected based on research questions and objectives, the extent of existing knowledge of the subject area to be researched, the amount of time and resources available, and the philosophical underpinnings of the researcher. Adopting a quite different approach, Yin (2014) recommends that a particular research strategy has to be selected based on three conditions; the type of research question, the extent of control an investigator has over actual behavioural events, and the degree of focus on contemporary or historical events. There are various research strategies with distinctive characteristics from which a researcher may select, and these are based on the aforementioned criteria.

For example, Saunders *et al.* (2012) defined a survey as a common research strategy in management and business research, and mostly used to answer 'what', 'who', 'where', 'how much' and 'how many' questions. It is also used for descriptive and exploratory research. This strategy is appropriate when considering studies with limited time and finance; this is because the researcher does not need to collect data for whole population bit rather can use the sampling, which enables the researcher to generate findings that are representative.

This research used the incorporation of both qualitative and quantitative data collection techniques to clarify the different aspects of the phenomenon, reduce the number of key reasonable alternative conclusions obtained from the findings, and to obtain verification of the findings (Saunders *et al*., 2012). The researcher needs to collect data through the use of interviews and questionnaires to form the background information and build the project. Furthermore, an expert opinion survey was used to collect qualitative data through interviews with twelve experts for the whole population, ranging from architects, engineers, builders and project managers. Also, experts were selected from the construction industry based on their

experience of construction projects. This enabled the researcher to investigate the second objective of this research. A questionnaire survey technique was used in this study before the interview stage to gain a clearer understanding of the study area. The results of the questionnaire survey formed the interview stage during which the important aspects identified were addressed in detail. A questionnaire is cheaper and less time-consuming than conducting interviews and very large samples can be taken. Furthermore, Bryman (2004) stated that the questionnaire method is probably be the most appropriate form of information gathering from both staff and managers, as it tends to be less time consuming and it better allows for anonymity among the respondents. Thus, there is the likelihood that using a questionnaire yielded some truthful and unbiased data.

In general, business and management research literature have shown that there are four types of scale used in these research contexts; these are nominal, ordinal, interval and ratio. Each scale has its features, specifications, assumptions and constraints. For this study, the five-point Likert scale has been used to overcome the problem of narrowness connected with a small scale and the confusion associated with a big scale. Moreover, the five-point Likert-type scale was adopted as it was noticed that it has been extensively used by researchers in quality management, and was found to be appropriate in rating all relevant alternatives along the continuum, allowing respondents to express their opinions and enabling a good scale of discrimination. Yin (2014) pointed out that there are three conditions that determine when to use each of these strategies, these are (illustrated in Table 3-2): the type of research question posed; the extent of control an investigator has over actual behavioural events, and the degree of focus on contemporary as opposed to historical events. Both Yin (2014) and Saunders *et al*. (2012) acknowledge that, although various research strategies exist, there are large overlaps and hence an important consideration would be to select the most advantageous strategy for a particular research study.

Table 3-2 Relevant Situations for Different Research Strategies (adopted from Yin, 2014)

Strategy	Form of Research Question	Requires Control of Behavioral Event?	Focuses on Contemporary Events?
Experiment	How, why?	Yes	Yes
Survey	Who, what, where, how many, how much?	No	Yes
Archival	Who, what, where, how many, how much?	No	Yes/No
History	How, why?	No	No
Case study	How, why?	No	Yes

Some of the common research strategies used in business and management are: experiment, survey, case study, action research, grounded theory, ethnography, archival research, cross-sectional studies, longitudinal studies and participative enquiry (Collis and Hussey, 2009; Easterby-Smith *et al*., 2008; Saunders *et al*., 2007). From these range, this research seeks to adopt survey research as the appropriate strategy.

Table 3-3: Research Strategy Characteristics (source: Saunders *et al.*, 2012)

Research Strategies	**Characteristics**
Experiment	• Suitable for laboratory research rather than the field • Unlikely to be related to the 'real' world of organisation
Survey	• Most frequently used to answer 'what', 'who', 'where', 'how much' and 'how many' questions • Used for exploratory and descriptive research • An easy to explain and understand research strategy
Archival research	• This strategy makes use of administrative records and documents as the principal source of data • Allows for research questions which focus upon the past and changes over time

Case Study	• It is suitable for research which wishes to gain a rich understanding of the research context and processes • Has considerable ability to generate answers to the question 'why', 'what', and 'how' • Not suitable for the collection of data for generalisation
Ethnography	• It is used to study groups • It requires a longer term of field work study
Action Research	• Provides in-depth understanding of specific phenomena, but the literature advises its use in the education context
Grounded Theory	• Has been used by many academic research studies in the building environment field • Has been criticised widely due to its confusing process and the time required for completion • Collecting data processes might require several visits to the field
Narrative Inquiry	• Suitable for small, purposive samples • This strategy is intensive and time-consuming
Mixed methods	• Allows answers to questions on what, how and why • Adopted to describe, explain and explore a phenomenon • Allows for a diversity of views to aid interpretations • Allows for the generalisation of the study or its relative importance • Allows for both qualitative and quantitative data to be employed in a single research • Allows for a combination of inductive and deductive approaches to a single research

These research strategies could be either used alone or combined through a mixed method. The next section will discuss the research methodological choices.

3.7 Methodological Research Choices

The term research choices refer to the combination of quantitative and qualitative techniques and procedures (Saunders *et al*., 2012). The terms, quantitative and qualitative are frequently used in business and management research to differentiate both the data collection techniques and data analysis procedures (Saunders *et al.,* 2012). Moreover, quantitative and qualitative techniques do not exist in isolation. Researchers can select a single data collection technique and corresponding analysis procedure (this is referred to as mono method), or more than one data collection techniques and analysis procedures (this is known as multiple methods).

Moreover, the mono-method combines either a single quantitative data collection technique, such as questionnaires, with quantitative data analysis procedures, or a single qualitative data collection technique, such as in-depth interviews with qualitative data analysis procedures. It is applicable to both quantitative and qualitative techniques. Similarly, the multiple methods refer to combinations where more than one data technique is used to answer research questions (illustrated in Table 3-4).

Table 3-4: Methodological choices (source: Saunders *et al.,* 2012)

Methodological choices	**Research design**	**Example**
Mono method	A single data collection technique and analytical procedure	Questionnaires (Quantitative) In-depth interviews (Qualitative)
Multi-method	Use of multiple data collection techniques and analytical procedures	Questionnaire (Quantitative) In-depth interview, observation and diary accounts (Qualitative)

Mixed method	Use of single and multiple data collection techniques and analytical procedures	Questionnaires and in-depth interviews (Quantitative and Qualitative)

This method is further broken down into two forms, namely the multi-method and mixed-methods. The multi-method refers to the combinations of more than one data collection technique with its associated analysis techniques but is restricted to either a quantitative or qualitative research environment. This means that the researcher can choose to use quantitative techniques by using questionnaires, and use quantitative analysis techniques; this approach is known as a multi-method quantitative study. Alternatively, a researcher can choose to collect qualitative data using in-depth interviews and analyse these data using qualitative procedures; this is known as a multi-method qualitative study. Furthermore, if a multi-method is adopted, the researcher cannot mix quantitative and qualitative techniques and procedures. Whereas, a mixed-methods approach uses quantitative and qualitative techniques and analysis procedures; these are either used at the same time or one after the other, but they are not combined. This method tends to base knowledge claims on pragmatic grounds (Creswell, 2003). For this research, and to understand the perceptions of TQM amongst construction industry practitioners in Nigeria, the study adopts mixed methods, including both interview and questionnaire survey techniques, and the implementation of quantitative and qualitative data analysis techniques.

3.8 Time horizon

Saunders *et al.* (2012) state that there are two types of research time horizons: cross-sectional and longitudinal. The former is used to study a particular phenomenon at a particular time, whilst the latter examines a phenomenon over an extended period of time. This research investigates the effective implementation of TQM in the Nigeria construction industry; therefore, the time horizon stance of this research is cross-sectional. Saunders *et al.* (2009) articulate that time taken to research the phenomena is independent of the research methodology chosen or choice of research technique/method. The characteristics of these two time horizons are detailed in the following sections.

3.8.1 Longitudinal Studies

- It is a study over time, of a variable or group of subjects
- The aim is to research the dynamics of the problem
- This research is undertaken by investigating the same situation or people continuously, over the period in which the problem runs its course
- Repeated observations are taken with the view to revealing the relative stability of the phenomena

3.8.2 Cross-Sectional Studies

- These are designed to obtain information on variables in different contexts but at the same time
- Normally, different organisations or groups of people are selected and a study conducted to ascertain how factors differ
- The collection of data can occur on more than one case at a single point in time (Bryman, 2007, p.44); for example, if investigating labour turnover, a researcher will need to select a sample of work groups where it is known that labour turnover differs.
- It is possible to conduct statistical tests to determine whether there is any correlation between variables
- Cross-sectional studies are conducted when there are constraints on time or resources
- The data is collected once and over a short period before it is analysed and interpreted
- Cross-sectional studies take a snapshot of an ongoing situation

3.9 Research Techniques and Data Collection

Research techniques refer to the systematic, focused and orderly collection of data for the purpose of obtaining information or to solve/answer a research problem/s or question/s (Blaxter *et al.*, 2002). Silverman (2001) and Aaker *et al.* (2001) argue that there are no techniques suitable for all situations or specific types of research, but judgment is utilised to employ the methods that will best achieve the research objectives. Moreover, Sapsford and Jupp (1998) stress that there is no single best way of collecting data; the method chosen depends on the nature of the research questions posed and the specific questions the researcher wants to ask

the respondents. Kumar (1999) agrees with Sapsford and Jupp (1998) that no data collection method provides 100 percent accurate and reliable information. However, in general, there are two sources of data collection that can be used by researchers: secondary data sources and primary data sources. Accordingly, this research adopts techniques, such as interviews, documentary analysis and questionnaires. Data collected from the interviews will be analysed using qualitative data analysis methods, such as content analysis. Furthermore, survey research strategy is adopted to collect generic views and a set of opinions about the approaches and techniques of knowledge integration that are currently used in projects.

As mentioned in section 3-19, this research is incorporating both qualitative and quantitative research methods to clarify the different aspects of the phenomenon under research, to reduce the number of key reasonable alternative conclusions that are obtained from the findings, and to verify the findings. There are different techniques to collect data, among which the most common are secondary data, interviews and questionnaires. These techniques will be discussed in the context of this research. It should be mentioned that secondary data include both qualitative and quantitative data and are used most frequently in case study and survey research strategies (Saunders *et al.*, 2012).

3.9.1 Secondary Data Sources

Secondary data are information collected by others for different purposes than the current study (Ghauri *et al*., 1995). The secondary sources for this study have included the review of academic journal articles, textbooks, conference papers and proceedings, British dissertations/theses, specialised CD-ROMS, the Internet, and on-line databases such as the Emerald-Library, and Science Direct. In addition to reading for the research methodology, the review has involved the review of a wide spectrum of field-based topics, including Quality Management Systems, Management of Change, Total Quality Management (TQM), Quality Awards, Business Process Re-engineering (BPR), Organisational Change, Corporate Culture and National Culture. The secondary data helps the researcher to formulate and better understand the research problem and it broadens the base of knowledge about the research issues. Moreover, it gives a good basic framework to proceed further with the investigation and helps in determining suitable methods for the research problem. Furthermore, secondary data can provide an instrument to easily interpret and understand the primary data. In this respect, this research is being conducted through detailed literature review, utilising relevant documents

relevant to the research. To gain multiple perspectives, relevant government policy documents have been reviewed leading to the development of a data collection instrument. Furthermore, the review process has led to the arrival at key issues that were used to develop the conceptual framework for this research.

3.9.2 Primary Data Sources

Ghauri (1995) and Sekaran (2003) state that primary data refer to information obtained first-hand by the researcher for the purpose of the research problem at hand. They argue that, when secondary data are not sufficient to answer the research questions, the researcher should collect primary data. Several methods can be used to collect primary data, including questionnaires, observations, and interviews (Collis & Hussey, 2003; Ghauri *et al*., 1995; Gray, 2004; Saunders *et al.,* 2003; Sekaran, 2003). The primary data collection methods must be understood in both quantitative and qualitative approaches; however, the choice of method depends upon the purpose of the study, the resources available, and the skills of the researcher. For the purpose of this research, the questionnaire survey was the cornerstone of primary data collection; thus, primary data refers to when the researcher implements the data collection instruments developed within the targeted industry.

Thus, soon after obtaining ethical approval, the researcher distributed the questionnaire survey instrument to mostly indigenous construction firms within the Nigerian construction industry. The questionnaire survey aimed to explore the capacity and understanding of TQM amongst indigenous firms within the Nigerian construction industry, and to capture data that the interviews could not cover. The interviews with expert consultants were either with foreign or local firms, or indigenes in most cases. Key issues that emerged from the results of the questionnaire survey were further explored through in-depth interviews with key participants within the industry. Indeed, 12 semi-structured interviews with experts based on their experience in the construction sector and 173 completed questionnaires were analysed. The questionnaire survey aimed to explore the capacity for, and understanding of, TQM amongst indigenous firms within the Nigerian construction industry. The research explored two private construction firms and one government parastatal responsible for construction activities within the federal capital city of Nigeria.

3.9.3 Quantitative Techniques of Data Collection

Ghauri *et al.* (1995) stressed that questionnaires are the most popular data collection method in business studies. Collis and Hussey (2003) reported questionnaires are a popular method for collecting data and that a positivistic paradigm suggests that closed questions should be used in designing the questionnaire. A questionnaire is cheaper and less time-consuming than interviews, and very large samples can be taken. Furthermore, Bryman (2004) stated that the questionnaire method would probably be the most appropriate form of information gathering from both staff and managers, especially as it is less time-consuming and better enables anonymity among the respondents. Thus, there is the likelihood that using a questionnaire will yield some truthful and unbiased data. According to Sekaran (2003, p.236): "Questionnaires are an efficient data-collection mechanism when the researcher knows exactly what is required and how to measure the variables of interest".

Gray (2004) emphasises that questionnaires are perhaps one of the most popular data collection methods, probably because they are thought by many researchers to be easy to design. Saunders *et al*. (2003) argue that questionnaires are authoritative and generally collect standardised data; thus, it is easy to make comparisons. Therefore, a personally administered questionnaire has been chosen to target the right audience in the right profession within the construction industry, and for the following additional reasons (Ghauri *et al*., 1995; Robson, 2002; Sekaran, 2003; Collis and Hussey, 2003; Bryman, 2004):

- It is considered a good data collection method when a survey strategy is utilised
- It is the most effective and efficient method for collecting primary data from the research respondents (managers) who are very busy most of the time and cannot spare much time to provide primary data by other methods
- It is cost effective and can be administered successfully to a large number of individuals at the same time knowing their professional backgrounds
- It is not very time consuming to administer for either the researcher compared to other data collection methods, such as interviews
- It does not require as much skill to administer a questionnaire as it does to conduct interviews

- It provides a relatively simple and straightforward approach to the study of attitudes, values, beliefs and motives, which aligned with the aim of this study.

Saunders *et al.* (2012) state that 'questionnaire' is a general term to include all data collection techniques in which the researcher distributes the same set of questions in a predetermined order to a sample group, expecting to receive a large number of respondents. It includes structured interviews, telephone, and online questionnaires. According to Collis and Hussey (2003), the questionnaire can be distributed via post, telephones, online and face-to-face, but it is important to develop a good questionnaire to ensure that the collected data are precise, and enable the researcher to achieve research objectives and answer the research question(s). Following the discussion of the aim of the study with the Nigerian construction industry, the personally administered questionnaire was found to be the most efficient way for collecting data compared with other methods e.g. mailing questionnaires. Moreover, the rationale for employing this approach was to increase the volume of participants and the respondents would consider a personally administered questionnaire as a method that paid 'respect'.

3.9.4 Sampling Technique

Saunders *et al.* (2012) state that sampling techniques provide a range of methods that enable the researcher to reduce the amount of data needed by considering only those from a specific sub-group. In other words, data sampling is used to generalise all the possible cases from which the sample has been selected. This technique requires the identification of the population and sample size. Furthermore, the need for sampling emerges when time and budget constraints prevent the researcher from surveying a larger population, and when it is not possible and practicable to survey the entire population (Saunders *et al.*, 2012). Sampling techniques are divided into two categories; probability or representative sampling, and non-probability or judgmental sampling. Saunders *et al.* (2012) expressed that probability sampling is mostly used in survey-based research strategies and the target samples are selected from the population with an equal chance (probability) of participation. In other words, probability sampling enables the researcher to estimate the characteristics of the population statistically from the sample, which can help to achieve the objectives and answer the research question(s) of the study. According to Saunders *et al.*, (2012), probability sampling process includes four stages:

1. Identifying a suitable sampling frame based on the research question(s) or objectives
2. Decide on a suitable sample size
3. Select the most appropriate sampling techniques and select the sample
4. Check that the sample is representative of the population

There are five main probability sampling techniques, which are; Simple Random, Systematic, Stratified Random, Cluster and Multi-stage (Saunders *et al*., 2012). Non-probability sampling does not rely on statistical theory and the probability of the selected sample from the population is not known (Saunders *et al.,* 2012). The sampling techniques will be selected based on the researcher's subjective judgement. Furthermore, the researcher may be dictated by particular non-probability sampling techniques based on the research question(s), objectives, and choice of research strategy, limited resources, or the inability to specify a sampling frame. This type of sampling has five techniques: Quota, Purposive, Snowball, Self-selection and Convenience (Saunders *et al.,* 2012). The selection of experts to answer the questionnaire was based on a purposive sampling technique; the purpose is to invite experts (quantity surveyors, architects, engineers, project managers, etc.) with experience of working in the Nigerian construction industry, and with a specific role within working with the constructor sector and the Nigerian government office responsible for physical development.

The purposive technique was used deliberately in order to select experts based on the qualities and expertise they possessed. The interview was conducted in the participant's office, and lasted between 35 to 60 minutes for each session. English was used during the interview, and a voice recorder was used to capture the encounter, which was later saved within a password-locked computer for data protection. The data was transcribed verbatim and whilst SPSS was used to analyse the questionnaire, Nvivo was used to analyse the data collected during the interview.

3.9.5 Questionnaire Development

This section deals with the questionnaire development and includes the questionnaire design and content, the format, the inspiration for the questions, the scales of measurement and types of questions, and the translation of the questionnaire.

3.9.6 Questionnaire Design and Content

The questionnaire should be very carefully designed, using the clear wording, avoiding slang, and, when using rating systems, it should specify their use and purpose in order to extract the necessary information (Oppenheim, 1992). With the main objectives in mind, the measurement instrument is based on the literature review on effective TQM implementation. The researcher also investigated previous studies in TQM and used them in addition to the literature review when designing the questionnaire. At this stage the questionnaire was derived from a number of different studies (e.g. Al- Khalifa & Aspinwall, 2000; Bayazit, 2003; Beaumont, 1997; Curry & Kadasah, 2002; Magd & Curry, 2003; Meegan, 1997; Meegan & Taylor, 1997; Pan, 2003; Taylor & Adair, 1993). However, many modifications were made to the original text so as to suit the Nigerian environment. The most critical point in developing and designing a questionnaire is visiting and revisiting the research objectives as an effective research questionnaire is one that accomplishes its objectives (Aakeretal, 2001; Churchill, 2001; Sekaran, 2003). Oppenheim (1992) argues that, when designing a questionnaire, the researcher should observe three attributes: the questionnaire should be focused on the topic of the research; the questions should be short enough to convey the meaning, and the questions should be simple and clear. Ghauri *et al.* (1995) contended that, when designing a questionnaire, the researcher should ask the questions in very simple and concise language, ensure that everybody understands the questions in the same manner, and avoid double-barrelled questions. Furthermore, Bourque and Fielder (1995) recommended that the questions should be specific, abstract terms and jargon should be avoided, and that the questionnaire should start with easier questions progressing to more complicated ones, and thus present questions in a logical order. The researcher observed the advice given by Creswell (2003), that the questionnaires should be long enough to cover the essential elements of the research, but not too long to the degree that the respondents might consider them as too time-consuming. Thus, the questionnaire was designed in a manner that all the essential elements of the research are covered.

3.9.7 How the Questionnaire was derived

The format was such that it would engage the respondent's interest, encourage cooperation and extract reliable and accurate data. It was constructed and designed specifically to suit the study's aims. Various questions were developed from the literature review concerning: TQM principles, organisational culture, benefits/barriers of TQM, CSFs and challenges of TQM. The selection from various sections for example from the literature review are used to compile the questionnaire.

Several questionnaire drafts were produced and critically reviewed and evaluated by the author, the author's supervisor and colleagues in the School of the Built Environment at the University of Salford. The researcher received a few responses with some corrections to refine the instrument. For this study, the five-point Likert scale was used to overcome the problem of narrowness connected with a small-scale method, and the confusion associated with the large-scale method. Moreover, the five-point Likert-type scale has been extensively used by the researchers in quality management, and was found appropriate to rate all relevant alternatives along the continuum for the respondents to express their opinions and permit a good scale discrimination. In the Likert scale, respondents were asked to indicate the degree of agreement or disagreement with some key statements.

3.9.8 Scales Used in the Questionnaire

Each scale has its features, specifications, assumptions and constraints. However, choosing or using one or more scale depends on several factors that specify the rationale for the choice. Some of these factors are the nature of the research problem, objectives and design, the judgment of the researcher, the nature of the required data, the research population and the required statistical analysis (Easterby-Smith *et al*., 2002; Sekaran, 2003). Three types of scale were used in the research, which were: the nominal scale, the ordinal scale and the interval scale. The nominal scale is where a number does not mean the difference between the alternatives; each number is merely a form of identification of the alternative that has been used in many questions, such as for yes/no questions and questions for certain categories, such as: age, experience, education level, and occupation of the respondents, type of ownership of the organisation, type of industry.

The ordinal scale was used for one question to rank the importance of quality compared to other strategies in the organisation. The interval scale has been used for most parts of the questionnaire to measure the research constructs. On this scale, a number represents the degree of doing or agreeing on something. In general, smaller scales (i.e. a three-point scale) place less burden on the respondents compared to bigger scales, but pose a problem of narrowness. On the other hand, a bigger scale (i.e. seven-point scale) will make the responses more reliable but could be confusing for the respondents. Thus, when choosing a scale, it is a trade-off between brevity and reliability. The statements were worded both positively and negatively to safeguard against response bias in specific directions. However, for the results to be comparable across statements, ratings for the negatively worded items were re-coded. For this study, the researcher used number '5' to represent the strongest agreement and number ' 1' to represent the strongest disagreement.

The use of scales instead of forced questions, such as yes/no questions, help in ascertaining the degree of agreement or the extent to which the respondent evaluates or does something. Moreover, a scale helps to establish numeric results that can be substituted for interval or ratio scales. Such results can be used for statistical analysis, such as non-parametric tests, in measuring differences and correlations. Without the use of scales, the calculations of such tests would have been almost impossible. Anderson *et al.* (1983) mentioned that the Likert scale has a number of advantages, such as: its ease of completion, it contains fewer assumptions, and it can be evaluated through standard analysis techniques, including item analysis, factor analysis and reliability analysis. Therefore, the Likert scale was employed in the research for the following reasons (Easterby-Smith *et al.*, 2002; Oppenheim, 1992; Sekaran, 2003):

- The Likert scale is the most common and widely-used attitude-scaling technique in research,
- Using a Likert scale allows the research to use a variety of statistical techniques and conduct powerful statistical analysis (e.g. using correlation)
- The Likert scale is a widely-used scale technique because it has demonstrated good reliability in research
- The research statement can be classified as unfavourable on the left side of the scale midpoint and favourable on the right side

- It is easy for respondents to respond to the Likert scale because the response categories allow for the expression of the intensity of the feeling
- A Likert scale is relatively easy to construct, administer and understand
- The five-point Likert scale does not confuse the respondents with choices on its continuum scale.

However, a Likert scale has some limitations, which are:

- The most common limitation on Likert scales is that the location of the zero point is fixed arbitrarily, which, in turn, may require a substantial attention for the interpretation of its results;
- The Likert scale that was used in this research has only five response categories which may limit respondents' choice and force them to choose a response, which may not completely reflect their attitudes;
- There is also evidence that an unevenly-numbered Likert scale yields many useless answers because people opt for the middle rather than seriously thinking and giving an opinion;

3.10 Qualitative Techniques of Data Collection

According to Saunders *et al.* (2012) and Collis and Hussey (2003), a qualitative data collection method is the process of generating, obtaining, recording or using non-numerical data through in-depth semi-structured and grouped interviews, and direct observation. Although the qualitative data collection method provides in-depth data and information, it might be costly and consume more time than quantitative data collection methods.

3.10.1 Observation

Observation is the systematic process of observing, recording, describing, analysing and interpreting people's behaviour (Saunders *et al.,* 2012). There are two types of observation; participant and structured. Whilst participant observation is qualitative and used to discover 'the meanings that people attach to their actions', structured observation is quantitative and is used to record the frequency of those actions (Saunders *et al.,* 2012).

3.10.2 Interview

Interviews are one of the principal methods for collecting factual information or data as well as opinions. The interview is a form of interaction between an interviewer and interviewee or a respondent purposely to solicit fact or enquire about something of a particular interest (Wengraf, 2001). It usually involves a face-to-face, interpersonal encounter where an interviewer asks interviewees questions designed to elicit answers pertinent to a particular research (Naoum, 2013). According to Zhang and Wildemuth (2008), interviews are a widely used tool to access people's experiences and their inner perceptions, attitudes, and feelings concerning reality. The interview is considered an effective means of qualitative data collection, representing one of the most common methods in qualitative research (Drever, 1995). The use of interviews for data collection can help the researcher to gather valid and reliable data that are relevant to the research questions and objectives (Saunders *et al.*, 2009). Yin (2009) noted that interviews are one of the most important sources of case study data gathering, and this is because it provides in-depth variety leading to the social actor's meanings and interpretations of their account concerning the social interaction in which they have been involved (Blaikie, 2011). Moreover, Kvale (1983) asserts that:

> *"… technically the qualitative research-interview is semi-structured; it is neither a free conversation nor a highly structured questionnaire. It is carried through following an interview-guide, which rather than containing exact questions focuses on certain themes".*

However, the main task in undertaking an interview is to understand the meanings and expressions of the interviewee (Kvale, 1996). Furthermore, Britten (1995) argues that the interview data collection technique addresses different research questions depending on whether adopted within quantitative research and qualitative research. This means that interviews can be associated with positivist and interpretivist philosophies.

Therefore, interview is a purposeful discussion between two or more individuals in which one individual (the interviewer) asks questions and others (interviewees) willingly answer questions. Furthermore, interviews enable the researcher to collect reliable and valid data that are relevant to the research question(s) and objectives. There are three classifications of interview: structured, semi-structured and unstructured interviews (Saunders *et al.*, 2012).

3.10.3 Structured interviews

Questionnaires, which are developed by a predetermined and standardised set of questions, are called 'interviewer-administered questionnaires' (Saunders *et al*., 2012). Furthermore, this type of interviews is also referred as a 'quantitative research interview', because structured interviews are usually used to collect quantifiable data.

3.10.4 Semi-structured interviews

Semi-structure interviews are non-standardised and are referred to as 'qualitative research interviews' (Saunders *et al.*, 2012). In this type of interview, the researcher uses a list of themes and questions which might be changed in each interview based on the answers given by the interviewee.

3.10.5 Unstructured interviews:

Unstructured interviews are informal and used to explore in-depth a general area of interest. The interviewer only needs to have a clear idea about an interesting topic that they want to explore; there is no need to have a predetermined list of questions, and the interviewees are free to talk about their beliefs about the topic area (Saunders *et al.*, 2012). This research employed a semi-structured interview technique to collect data for qualitative analysis; this entailed the collection of relevant information from identified construction organisations in Nigeria. The next section discusses how the interview questions were derived.

3.11 How the Interview Questions were derived

The questions from the interviews are derived from the literature, concerning: the leadership perspective within the organisation, TQM awareness, TQM implementation with the Nigerian context, and the benefits and factors of TQM.

3.12 Research Techniques and Data Analysis

Irrespective of the philosophical stance, research techniques can come from a combination of techniques, such as combining qualitative and quantitative input into data-generating activities (Hussey & Hussey, 1997). The purposes of research techniques are to ensure the use of logical approaches to obtain information about a specific subject, and research techniques can be applied to a broad range of topics or areas of research. Therefore, data can be collected using structured questionnaires, observations, structured or unstructured interviews, or any other technique (de Vaus, 2001). In the context of this research, the research techniques adopted consisted of a combination of qualitative, quantitative and documents for data collection and analysis; these were applied to each of the techniques used for data collection (Clifford *et al*., 2010). The following section discusses the research techniques adopted for this research and data analysis techniques.

3.12.1 Techniques of Data Analysis

A critical stage of a research process is the analysis of data collected. Saunders *et al*., (2009) argued that the use of analytical methods provides a better platform for researchers to collect answers to their research questions. In ensuring that data analysis is carried out in a systematic and logical manner, Sarantakos (2013) outlined six steps for following when undertaking computer-aided analysis for quantitative research. These were:

- Preparing the collected data by cleaning and checking for possible errors and omissions;
- Entering the prepared data into SPSS for analysis;
- Presenting the findings from the analysis in graphical and table forms;
- Conducting inferential statistical analysis of the data;
- Presenting the data in tables and figures, and explaining the findings, and finally,
- Drawing conclusions from the analysis of the findings;

According to Saunders *et al.* (2009), paying attention to such steps has the potential to reduce the possibility for errors, opportunities for misinterpretation, and the drawing of wrong conclusions from the research findings. Hence, for this study and in line with the above steps, the preparation of data was the first approach towards the data analysis process as it allowed the researcher to check and edit the raw data obtained for any possible errors or omissions and inconsistencies within the data set. This was completed after the responses from the

questionnaire survey were collected from the participating individuals and then exported into an Excel spreadsheet. The edited data was then exported into the Statistical Package for the Social Sciences (SPSS) for the analysis processes to begin. Using computer software for the analysis was seen as the best way to ensure the validity and reliability of the research findings, and this is due to the standardised procedures SPSS adopts for data processing and analysis (Sarantakos, 2013). Once the data was fed into the computer software, the researcher was "able to explore and analyse them far more quickly and thoroughly than by hand" (Saunders *et al*., 2009, p.15). For quantitatively-oriented studies, there are two tests, which are normally conducted, parametric and non-parametric tests. Their use depends on the type and nature of the data collected. Non-parametric tests make fewer assumptions about the data and are used in situations where the data collected are deemed to be not normally distributed. They are most suitable for a relatively small amount of data, which can be measured on nominal and ordinal scales and are more flexible to apply (Pallant, 2010). Parametric tests, on the other hand, are based on an assumption about the population from which the data is taken (Fellows & Liu, 2008). They depend on interval-scaled data and are based on a normal distribution. Their data analysis processes tend to be considerably more difficult and complex than the non-parametric tests. Therefore, effective analysis can be carried out when the researcher is aware of the analytic procedures and assumptions underlying their choices. Thus, this research was confirmed to adopt parametric testing.

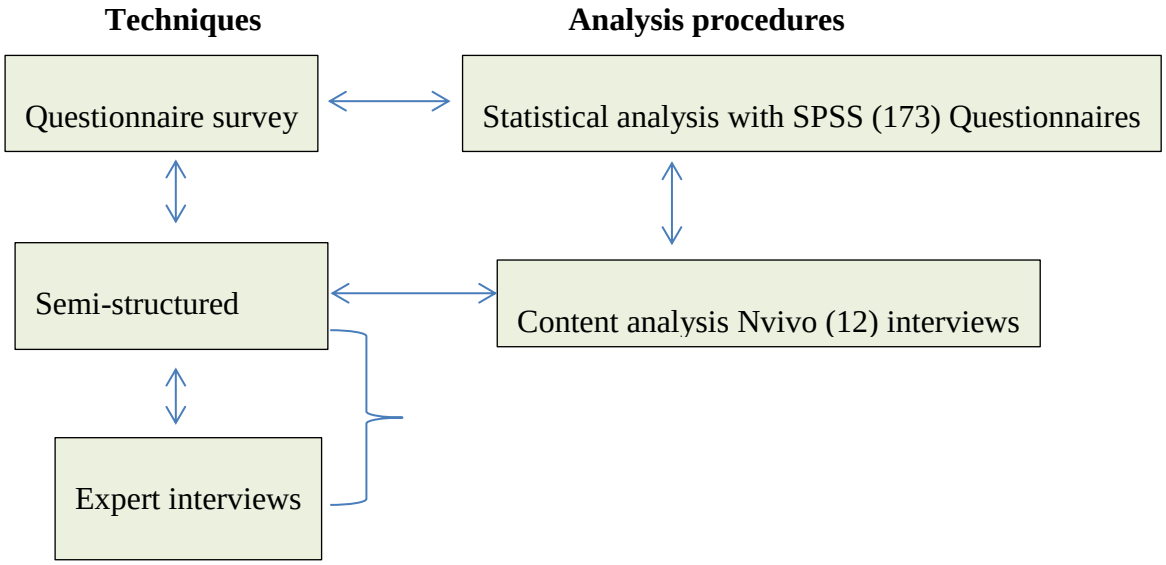


Figure 3-3: Data collection and analysis techniques adopted for the research

The data collection and analysis adopted for this research are illustrated in Figure 3-3. Descriptions of the techniques adopted for the data collection for this research are provided in sections 3.9 and 3.11. The data collected from the questionnaire survey was analysed using statistical analysis, which will be facilitated by Statistical Package for the Social Sciences, (SPSS) software. In comparison, the data collected from the interviews and document review will be analysed using qualitative analysis tools, such as content analysis. According to Bryman (2004), a content analysis is an, "approach to the analysis of documents and texts that seek to quantify the content regarding predetermined categories and a systematic and replicable manner". This technique will be adopted to conduct an in-depth analysis of key issues identified both in the semi-structured interview stage and the document review stage.

Cognitive mapping is a technique used to structure, analyse, and make sense of an account of issues or problems (Ackermann *et al.*, 1992; Ahmad & Ali, 2003). This method offers structured thought through symbolic representation and graphical representation rather than linear layout, managing a large amount of qualitative information that can improve the interview capability (Ahmad & Ali, 2003). This technique will be used by the researcher to gain an in-depth understanding of the perceptions of individuals working in the construction industry in Nigeria, and identifying emerging issues from the interview data. The qualitative data collected will be analysed using the qualitative computer software package, NVivo 10, which facilitates the analyses of data using qualitative analysis procedures. Analysing the research data depend on the types collected, which are either numeric or non-numeric. Therefore, two types of method for data analysis are used, namely qualitative and quantitative.

3.13 Justification for the Choice of Research Techniques

The researcher collected data through interviews and a questionnaire (mixed method) to form the background information and thence develop a conceptual framework. This was then taken into practice based (real) situations to investigate, gather relevant information and understand the perceptions and values of using TQM for construction project performance. As mentioned in previous sections, the research approach of this study was mixed method, which was adopted to achieve the stated aim and objectives of this research. This means both qualitative and quantitative methods were used to collect and analyse data. Furthermore, an expert opinion survey was used to collect qualitative data through interviews with four experts. These experts were the construction industry, and were selected based on their experiences and engagement

in construction projects. This enabled the researcher to investigate the second objective of this research. However, a questionnaire survey will be used to collect the quantitative data.

For the purpose of this research, the target population was employees and professionals who have been involved with and have experience of the Nigerian construction industry. According to Saunders *et al*. (2012) and Denscombe (2010), there are five different methods for analysing qualitative data, which are: content analysis, thematic analysis, grounded analysis, discourse analysis and comparative analysis. A content analysis is a systematic technique for obtaining ideas that have been decided in advance; using transcriptions, the data for the constructs and the sentence coding are compressed into themes. In this research, the approach will be used to analyse the collected qualitative data (via experts and semi-structured interviews) with content analysis software, such as NVivo10 that uses code-based and word-based approach (as illustrated in Table 3-6). The data were transcribed, coded and analysed thematically. This software enables the researcher to quickly auto-code large volumes of transcript, but also to use queries to find a theme for the data.

The quantitative data, which will be collected from a questionnaire survey, will be analysed through the use of statistical analysis software; Microsoft Excel and SPSS. This analysis method will help the researcher to examine the differences and relationships in the collected data, using non-parametric statistical tests, which is valued for its robust application.

Table 3-6: Adopted Research Methodology

Objectives	**Research Method**	**Research Method**	**Analysis**
1.To examine the definition of Total Quality Management and its principles	Literature Review	Literature Review	Content Analysis
2.To explore current Total Quality Management practices in the Nigerian construction industry	Literature Review	Literature Review	Content Analysis

3.To critically evaluate the critical success factors and barriers to the implementation of Total Quality Management in the Nigerian construction industry		Semi-Structured interview	Statistical Analysis
4. To develop and validate a framework for effective Total Quality Management implementation in the Nigerian construction industry.	Primary data	Interviews & Questionnaire Survey (Statistical Analysis)	Statistical Analysis

To summarise, research can be defined as an organised, systematic, critical investigation into specific problem, undertaken with the objectives of finding answers or solutions. However, the task of carrying out an inquiry is made more difficult by the fact that there is no clear consensus about how to conceptualise the process of doing research. Therefore, it is of crucial importance for the researcher to be aware of the philosophical and political issues that underpin their study. For this purpose, several methodologies that have been used by researchers in the field of TQM were considered. The selection of an appropriate methodology depends on the nature of the research and the results of the literature search and desired outcomes. Hence, in this chapter, the researcher provided an overall view of the methodology adopted in this study, starting with a discussion of the methodological underpinnings of this research, indicating that the researcher used a survey as a research strategy, and qualitative and quantitative approaches. The questionnaire development was derived from the literature review findings, and the experience of construction practitioners and design procedures were discussed and explained using the right format and wording and rephrasing the questionnaire several times to suit the target population.

3.14 Qualitative Analysis Techniques

According to Saunders *et al*. (2012) and Denscombe (2010), there are five different methods for analysing qualitative data which are; content analysis, thematic analysis, grounded analysis, discourse analysis and comparative analysis.

1. Content analysis: It is a systematic technique for obtaining ideas that have been decided in advance, and the data for the constructs use transcription and sentence coding that are compressed into the theme.
2. Thematic analysis: Is a highly inductive analytical approach whereby themes emerge from the data collected and are not imposed by the researcher.
3. Grounded analysis: Uses categorisation and the coding of collected data to derive theories and concepts from meaning within the data.
4. Discourse analysis: Is based on the conversation including the way in which individuals talk and what persuades them to talk. The conversation or speech is analysed as performance, rather than the state of mind.
5. Comparative analysis: Refers to a comparison of the data from different individuals until no new issue arises. This type of analysis is connected to thematic analysis.

3.15 Quantitative Techniques

As qualitative data refer to numeric data, they need to be processed, analysed, interpreted and turned into information to be useful and meaningful. Therefore, quantitative analysis techniques enable the researcher to explore, present, describe and examine relationships and trends within the data (Saunders *et al.,* 2012). These techniques vary from a simple table or diagram to complex statistical modelling which presents the statistical relationships between variables. Some techniques that are usually applied for analysing quantitative data are the T-test, Chi-square test and the analysis of variance. However, statistical analysis and advanced data management software packages are required for the implementation of these techniques, such as Minitab, SPSS, SAS and Stat view (Saunders *et al*., 2012).

3.16 Descriptive Analysis Technique

The descriptive analysis phase begins once the data has been cleaned and entered into the computer (SPSS) software. It presents the simplest way to undertake the analysis of the quantitative data in a manner that gives a general overview of the findings (Naoum, 2013). Usually, descriptive analysis is carried out to provide statistical information, such as the mean, median, and standard deviation as well as percentages of the variables (Pallant 2010). Seale (2005) intimated that the determination of the mean, median and the mode values provide a measure of central tendency, while the standard deviation value provides an indication of the dispersion of the data. With the application of descriptive analysis and the determination of central tendency and dispersion, the researcher can "perform validity checks on the samples" (May, 2011, p.122). For example, a descriptive analysis performed on organisational practices will enable the researcher to describe and give a vivid account of an organisation's activities. Doing so also enabled the researcher to describe and compare the results both graphically and numerically. From this, the researcher was able to apply further statistical analysis methods to establish relationships and an interpretation of the results.

3.17 Mixed Method

Recently, the mixed methods approach, has increasingly assumed prominence and acceptance as a feasible and viable alternative research method to the traditional single qualitative-quantitative research approach (Hanson *et al.*, 2005). Some factors, according to Creswell (2009), have accounted for its evolution and acceptance as a research method. The most common cited factors are its complexity and ability to address diverse contemporary research problems. Before its adoption and acceptance as a research method by many other disciplines, it was traditionally utilised in the fields of anthropology and sociology (Johnson *et al.*, 2007). Its emergence in the research arena provided an alternative to mono-methods, which were traditionally not responsive to the increasingly complex and multifaceted problems facing the social world. According to Creswell and Garrett (2008), the recent demand for a mixed method approach arises from concerns about the inability of the individual qualitative and quantitative research paradigms to offer workable solutions to ever more complex and dynamic problems confronting society and the scientific world. Several definitions exist for mixed methods; one such definition is by Johnson *et al.* (2007, p. 123) who defined mixed methods research as,

> *"…the type of research in which a researcher or team of researchers combine elements of qualitative and quantitative research approaches (e.g., viewpoints, data collection, analysis, inference, techniques). For the broad purposes of breadth and depth of understanding and corroboration".*

The complexity and diversity inherent in its design and definition indicate that the mixed method technique has become critical and synonymous to good research practice. According to Greene (2008) the mixed approach, "offers deep and potentially inspirational and catalytic opportunities to meaningfully engage with the differences that matter in today's troubled world". Underlying these definitions is the recognition of its uniqueness and the ability to offer multidimensional research solutions to humanistic and behavioural phenomena in a manner that one form of research method is not able to do. One significant proposition of the mixed method technique is the diversification of ideas it offers as a concept, coupled with its potential to broaden the understanding of human experiences in developing policies and practices (Tashakkori & Teddlie, 2010). Advancing an argument for the potential benefit, Green (2008) cited triangulation and complementarity as some of the major advantages, which are directly associated with the approach.

Also seen as the third force, or methodological paradigm, by authors such as Combs and Onwuegbuzie (2010) and Tashakkori and Teddlie (2010), the approach draws its strength from the traditional qualitative-quantitative research methods and integrates them in a manner that helps to answer unique research questions pertaining to the scientific and social world, which otherwise could not be answered by individual mono-research methods (Klingner & Boardman, 2011). One major advantage of the mixed method is its strong ties with research questions (Creswell & Garrett, 2008). According to Bryman (2006) and Hanson *et al.*, (2005), the decision to adopt a mixed method approach must be based on some reasons, notable among them include the purpose of the study, the research questions, and the type of data required for the study. Underlying these reasons is the rationale behind the mixed method in providing the best platform to answer inductive-based and deductive-based research questions together in a single study. It is believed that an effective utilisation of this principle will yield better outcomes than can be achieved using a single method approach for the study. For example, combining interviews with a questionnaire survey can help to tap more into participants' knowledge, yielding powerful insights for the study (Johnson & Onwuegbuzie, 2004). Equally, the principle behind the mixed method enables the researcher to collect data from multiple sources to investigate the hard and soft issues about human and organisational issues without

compromising the scientific rigour of the findings (Masadeh, 2012). Saunders, et al., (2009) and Onwuegbuzie and Johnson (2006) suggested that, by adopting qualitative and quantitative research methods within the same research framework, practical questions can be addressed simultaneously from different perspectives, leading to greater confidence in the findings and conclusions. Also, adopting a mixed position will enable the researcher to mix and match design elements in a way that provides the best opportunity to answer specific research questions.

However, a fundamental question is how such a research approach can be designed to ensure that weaknesses from one research approach can be well complemented for by the strengths of the other approach. Given this, Onwuegbuzie and Johnson (2006) cautioned researchers adopting a mixed method research approach to carefully examine the extent to which the weaknesses and strengths of both methods can be counterbalanced without compromising the validity of the findings. Given the distinctive characteristics between qualitative and quantitative methods, Newman and Hitchcock (2011) advised researchers to better focus more on the purpose of the research to drive the method in a manner that provides a good report. Philosophically, the mixed method draws from the philosophy of pragmatism (Onwuegbuzie & Johnson, 2006). The advantages of combining their respective approaches, in spite of the differences in their philosophical orientations have been acknowledged in the literature (Grix, 2004). Numerous questions have been raised about the fundamental issues relating to its philosophical orientations. Previous contributors have sought to argue that the philosophical barriers between the two methods, coupled with their contrasting views, made them incompatible to combine. Moreover, the combination of two perspectives, according to Onwuegbuzie and Johnson (2006 p. 59), has also been considered to be tenuous.

> *"… competing dualisms: epistemological (e.g. objectivist vs. subjectivist), ontological (e.g. single reality vs. multiple realities), axiological (e.g. value free vs. value-bound), methodological (e.g. deductive logic vs. inductive logic), and rhetorical (e.g., formal vs. informal writing style) beliefs."*.

Table 3-5: Strengths and Weaknesses of the Mixed Method Approach (Adapted from Johnson & Onwuegbuzie, 2004)

Strength	Weaknesses
Words, images, and description can be used to supplement meaning to figures and the vice versa.	Can be more expensive to conduct.
Stronger evidence can be provided through convergence and corroboration of findings.	Mixing two or more research paradigms can be difficult and problematic.
Can provide broader perspective to a range of research questions and issues.	Can be time consuming
Can offer deeper insights and understanding than the single approach method.	Can be difficult to analyse and draw inferences to interpret findings.
Can offer a more complete knowledge necessary to inform theory and practice.	Can generate a large volume of information/data.

In these cases, investigating such complex interrelations and interactions will amass substantial evidence (Creswell & Garrett, 2008). Similarly, since construction activities are not discrete events but processes different phases involving different types of activities predominating at different times, it therefore stands to reason that some particular research methods may be more useful than others. Apparently, the combination of the relative strengths from multiple perspectives, as described in Table 3-5, has the potential to offer more comprehensive and desirable outcomes (Mingers, 2001). The application of such an approach will allow for both deductive and inductive reasoning, and a better appreciation of a given situation, "rather than a strictly positivistic or interpretive slant to the data" (Harrison & Reilly, 2011 p. 22). Construction management, as a discipline, primarily involves multidisciplinary teams with enormous challenges; thus, combining different data sets and strategies from multiple sources, such as quantitative and qualitative research methods will enhance the reliability and the practical significance of the findings.

3.18 Transcribing, Coding and Analysis of the Qualitative Data

Transcribing the recorded interviews involves the presentation of the spoken word as text. It is an important qualitative data analysis process, which requires a considerable amount of time and care in ensuring that the validity of the transcribed data is not compromised. It is often regarded as an onerous task, especially when large numbers of interviews are involved. However, transcribing interviews offers the researcher the advantage of gaining a better insight and greater familiarity with the interview data (Corden & Sainsbury, 2006). Therefore, in line with the advantages above, the recorded interview data obtained was transcribed. Transcribing the recorded interviews enabled the raw interview data to be extracted and presented in a textual form to enable data readability.

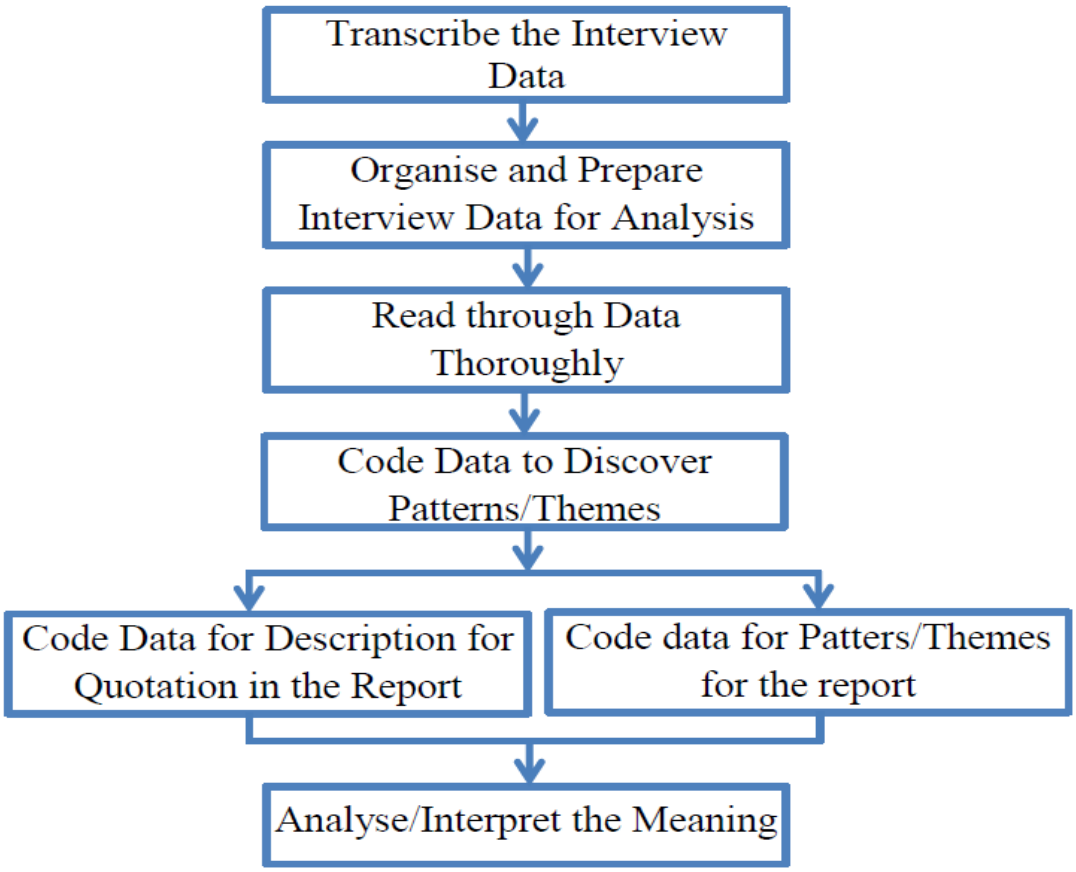


Figure 3-4: Qualitative Data Analysis Process (Adapted from Creswell, 2009)

The open coding approach was undertaken, which enabled the interview transcript to be examined sentence-by-sentence. Specific text segments were identified as key recurring themes were also coded for use as quotations (Basit, 2003); this helped to highlight salient references during the analysis of the interview data. The process enabled the data to be organised to allow for the content analysis and for the interpretation of the qualitative data The qualitative data analysis process undertaken, as illustrated in Figure 3-4, reflects the process outlined by Creswell (2009). To fulfil the mixed method research requirement, the research processes followed for the quantitative phase of the study is also presented in the following sections. Furthermore, it is also important to note that the following words; 'practitioners', 'interviewees' and 'respondents' were used to present the discussion in the quantitative phase of the study and adopted to mean the same thing; hence they were used interchangeably.

3.19 Validity and Reliability

Test to establish the validity and reliability of the data quality is important in order to determine the stability, credibility, and quality of the data obtained (Riege, 2003; Voss *et al*., 2002). Validity depends on adopting a measuring instrument that produces an accurate result; this is closely related to the positivist philosophical orientation (Easterby-Smith *et al.*, 2002; Golafshani, 2003; Patton, 2002). Silverman (2003) posited that validity is another word for truth. However, it has been argued that the validity of qualitative research is affected by the researcher's perception (Creswell & Miller, 2000; Riege, 2003). On the other hand, Silverman (2011) refers to reliability as the degree of consistency with which instances are assigned to the same category by different observers or by the same observer on different occasions.

3.19.1 Construct Validity

As previously noted in Section 3.16, Yin (2014) outlined and discussed four tests to achieve validity and reliability; construct validity, internal validity, external validity, and reliability. However, 12 interviews were found to be appropriate to this research and further interviews would have demonstrated data saturation. Construct validity, according to Yin (2014), relates to the establishment of appropriate or correct operational measure for a particular study. Construct validity was achieved in this research through the literature review, interviews, and the questionnaire survey. Consequently, interview transcripts were transcribed and sent to interviewees for verification to ensure that their views and ideas were captured accurately. These research activities are in line with Yin's (2014) definition of construct validity.

3.19.2 Internal validity

According to Yin (2014), internal validity seeks to establish a causal relationship, where certain conditions are believed to lead to another condition. This test is mainly used for explanatory or causal research, rather than descriptive or exploratory studies (Yin, 2014). The questionnaire survey was administered to answer the questions that the interviews could not address.

3.19.3 External Validity

According to Yin (2014), external validity refers to the extent to which a research finding can be generalised. In this research, the test of external validity is achieved through a review of the key literature. Also, the literature findings were compared at different stages of the questionnaire survey and interview processes.

3.20 Reliability

From a quantitative research perspective, a reliability test provides vital information on and measurement of the internal consistency of responses across items in the questionnaire survey. Some methods are available to measure the reliability of questionnaire survey data; however, the most common method used to measure the inter-item reliability and internal consistency of a questionnaire survey is the Cronbach's Alpha (Pallant, 2010). The level of acceptance on a measure of the internal reliability of the items on the questionnaire survey when using Cronbach's Alpha ranges from 0 to 1.0 (Fellow & Liu, 2008), where '0' means a completely unreliable result and '1.0' means a complete reliability result. Using Cronbach's Alpha coefficient, the crucial level to determine the internal reliability that is considered to be acceptable, is 0.7 (Pallant, 2010). This study used four constructs for TQM in the construction industry, as illustrated in Table 3-6. Cronbach's alpha was tested through SPSS for each of the scales and as can be seen in Table 3-6 all scales achieved good reliability scores. The overall reliability across all items in all scales (34 items) was found to be 88% reflecting a good reliability overall.

Reliability relates to the ability to demonstrate that the operation of research, namely, the data collection research procedures, can be repeated with the same result (Yin, 2014). To determine whether the questionnaire survey instrument used was reliable in measuring what it was intended to measure and to also check the internal reliability (Sarantakos, 2013) of the data,

Cronbach's Alpha was conducted. By applying Cronbach's Alpha test, the researcher was able to determine the "reliability of a summated scale where several items are summed to form a total score", and the inter-items consistency of the questions (Fellow & Liu, 2008, p., 266).

Table 3-6: Cronbach's alpha reliability scores for each of the scales used in the questionnaire

	Items	**Cronbach's Alpha**
Purpose	5	0.72
Benefits	5	0.68
Implementation Barriers	8	0.63
Barriers	7	0.63
Overall	34	0.88

3.21 Ethical approval

In accordance with the University of Salford's Research Ethic Policy, all postgraduate students (PGRs) must obtain ethical approval before starting research with human subjects, animals or human tissue. Accordingly, the researcher applied for ethical approval in line with the application guidelines provided by the University's College of Science and Technology Research Ethics Panel (CST), who granted the application (see Appendix- F for details of the application).

3.22 Summary

This chapter presented the research philosophy, approach methodology and research methods adopted to achieve the aim and objectives set out for the study. It highlighted the advantages and disadvantages, and the strengths and weaknesses of the two (qualitative and quantitative) research methodologies,, and the two data collection techniques; semi-structured interviews and a questionnaire survey. It also justified the reasons for their adoption for the study Furthermore, it outlined the interview process undertaken to collect the qualitative data from 12 key practitioners. The chapter also explained the approach undertaken to collect the quantitative data (using the questionnaire survey) from 173 practitioners, and presented the results obtained. The conceptual framework development was also highlighted. Moreover, the chapter further reported the results of the normal distribution test conducted on the quantitative questionnaire survey data, which forms the basis for a choice of the parametric test for this study. The results of the reliability test conducted on the questionnaire survey were also provided. Finally, the chapter outlined the processes, procedures and the methods of analysis adopted for the qualitative and quantitative phases of the study. The next chapter present the results and data analyses of the semi-structured interviews and questionnaire survey.

4 DATA ANALYSIS AND FINDINGS

4.1 Introduction

This chapter presents the primary data findings of the empirical investigation carried out within the Nigeria construction industry. The findings were gathered from different sources of evidence to achieve the research aim and objectives. The main source of evidence was face-to-face semi-structured interviews and questionnaires. Observations were also made by the researcher. These data have been used to triangulate the findings. This approach provides the opportunity to discuss unique issues arising from the data collection findings that were not predicted in the literature. A critical discussion of the research methodology and the limitations of the research are also presented. The analysis approach and discussion of the findings are organised based broadly on the structure of the questionnaire survey instrument.

Profile of the Interviewees

The fieldwork was carried out in three construction organisations (one government organisation and two private consulting firms) and the interviewees represented the different levels, which include top management, team managers and supervisors, as shown in Table 4-1. The researcher decided to include these levels in order to firstly, gain in-depth information and clear perceptions about the role of organisational leadership in implementing TQM, and secondly, because TQM is an all-inclusive strategy that involves architects, quantity surveyors, urban and regional planners, builders and civil engineers as well as support and management staff (Sakthivel & Rajendran, 2005). However, the majority of the interviewees were managers with sufficient knowledge, ranging from 5 to 15 years of experience. The organisations plan to provide an insight into the whole process.

Table 4.1 lists the codes used against each interviewee's profile to enable their anonymous identification. It also describes their years of experience within the Nigerian constructor industry. For the sake of this research, the researcher selected the following professional range to participate in the interview: Architects, Quantity Surveyor, Civil Engineer, Project Manager, Structural Engineer, Town planner, and Commercial manager.

Table 4-1: Profile of Interviewees

Codes for Interviewees	Participant Type	Number of Years Experience
A1	Architect	12
A2	Quantity Surveyor	10
A3	Civil Engineer	8
A4	Project Manager	15
A5	Structural Engineer	10
A6	Town Planner	6
A7	Architect	9
A8	Quantity Surveyor	5
A9	Project Manager	10
A10	Structural Engineer	7
A11	Town Planner	4
A12	Commercial Manager	5
Total of 12 Interviewees		

4.2 Current TQM practices in the Nigerian construction industry

The aim of this section is to explore the second objective of the research, which is to examine current TQM practices within the Nigerian Construction Industry. The section begins by providing background literature on the impacts and importance of key practitioners' involvement in the construction process. It presents the qualitative and quantitative data and analyses from industry professionals, namely: the 12 semi-structured interviews, and the 173 responses questionnaires (from the 450 issued, which comprised a response rate of 38%). The analysis of each section (issue) is first presented qualitatively and is complemented by the presentation of the quantitative data analysis. Finally, it presents the summary of the findings towards the end of the chapter.

TQM as a management technique that emerged from dissatisfaction with other existing techniques; however it has been implemented in Nigeria with some difficulties. Reward and recognition are therefore considered significant psychological variables that could enhance TQM practice in Nigeria. Practice is defined as a regularly repeated exercise to improve one's skill, or to do something that is common, habitual or as expected (Akpan, 2002). Thus, the employees' readiness for change is essential for a change to TQM to be practicable. Juran and Gruna (1993) opined that, without the human mind, tools alone cannot enable an effective implementation of TQM. In fact, the human factor often makes change difficult and at times, impossible (Esho, 1999). Hence, research into factors that could influence an organisation's move to adopt TQM and its practice is inevitable. In contemporary Nigeria, there have been calls for the adoption of TQM in the management of organisations (Awonaya, 1997). However, some existing problems remain in that some organisations in Nigeria seem to implement TQM without taking their current organisational culture, like leadership and reward systems, into consideration, and whether it will enable the practice of TQM. Most organisations in Nigeria seek to practice TQM without considering the adoption of a broad reward system, which organisations in Western countries have utilised to tap human resourcefulness for TQM practice. Nor have Nigerian organisations researched implementation practices that would enhance and ease its introduction. The majority of the interviewees agreed that the organisation intends to implement TQM and confirmed that this issue was being addressed during regular

meetings with the data collection organisation. However, A2 claimed that TQM had not been addressed before:

> *"... This has never been discussed in People's Committee meetings before, but the Quality Assurance team mentioned the need to implement a quality management system, during the workshop organised by the Nigerian Institute of Architects…"*

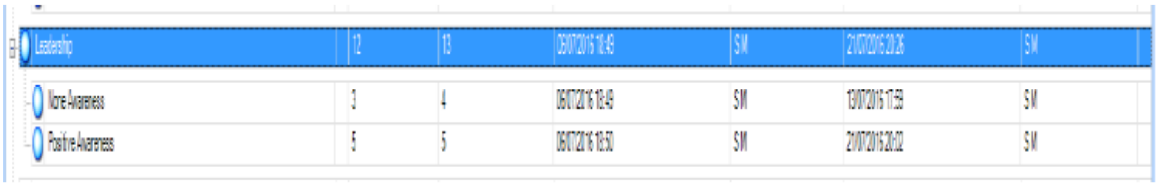
Interviewee A1 emphasised that the company intends to implement TQM because its top management is striving to improve the construction process. He added that an awareness-raising initiative for the top management and junior staff had already started in early January 2008. Therefore, one of the reasons behind the implementation of TQM is to maintain and improve the image of the organisation in the eyes of society. Some senior leaders are aware that TQM represents a competitive advantage. In comparison, A4 contended that nobody addressed the implementation of any quality management system whatsoever, whilst A3 revealed many reasons behind the intention to implement TQM. A3 stated that the organisation of the data is the oldest unit in the FCDA. Moreover, the Nigerian construction market has opened up to global investors, and many private construction industries have been launched over recent years; moreover, it is expected that many international organisations will invest in Nigeria. Therefore, the organisation has realised that TQM is the right strategic tool to compete with the private and international organisations. A4 justified the plan to implement TQM as the need to compete with other engineers, by saying:

> *"... The economy of many countries depends on their engineers and due to globalisation our engineers should compete with the foreigner engineer; I think TQM will make the staff more knowledgeable… "*

A11 revealed that little support had been provided for the implementation of TQM. One interviewee stated that several seminars had been held for awareness purposes. A few interviewees had participated in local workshops, seminars, and a conference from individual interest. However, one senior leader contended that the organisation has other priorities than TQM at this particular time. Furthermore, A6 also highlighted these alternative priorities; the following reflects their view on the efforts so far towards the implementation of TQM within the organisation:

> *"…sometimes these issues are discussed and then suddenly a top management is removed and another person appointed comes in with different ideas. Having a new leader means having a new idea and since it is a government organisation, one individual cannot make a decision as it has to pass through the due process…"*

Table 4-2: Leadership Barriers



Leadership	12	13	13/07/2016 18:49	SM	21/07/2016 20:26	SM
None-Awareness	3	4	18/07/2016 18:49	SM	13/07/2016 17:59	SM
Positive-Awareness	5	5	18/07/2016 18:50	SM	21/07/2016 20:02	SM

Most respondents agreed that there are standards for recruiting construction staff members, as indicated as within the 'none awareness' and 'positive awareness' within Nvivo software, based on the leadership selection (illustrated in Table 4.2). Recruitment, in this respect, begins with the FCDA administrators. However, A7 indicated that these standards are not applied at all times and that, on some occasions, other procedures are adopted. A member of the Human Resources and Training Committee contended that the recruiting standards are applied to most of the applicants, but it was found that some staff members are appointed by the top management without seeking the consent of concerned departmental councils, and that sometimes appointments are made on the basis of grace and favour with people recruited, not on merit but on their connections.

Interviewees were asked a question on customer satisfaction: "How do you determine the needs and expectations of your customers to provide satisfaction?" A7 indicated that new branches were launched within different departments according to technological developments and labour market needs. A7 also pointed out that their organisation was in close communication with potential employers, especially international companies, to establish the skills and knowledge needed from graduates.

For instance, in 2003, the decision was taken by the Federal Government of Nigeria to embark on an absolute computerisation of the cadastral and land registry of the FCT. This led to the establishment of an agency, which is now well known as Abuja Geographic Information Systems - AGIS. Within three years of its establishment, the scheme was able to transform the entire Land Management operations and other land related departments of the FCT. Decisions about land can now be taken from an up to date position with reliable data. AGIS has become a mark of transparency and excellent governance within, not only the Federal Capital Territory but also within the whole of Nigeria. The AGIS task includes the introduction of SDI (Spatial

Data Infrastructure) for F.C.T., the computerisation of spatially related workflows in certain FCDA departments and agencies, and the makeup of the AGIS Resource hub.

AGIS, moreover, is the new FCDA (Federal Capital Development Agency) department for computerised land management. The 'AGIS Resource Centre' is to be a service company for spatially connected data and services for F.C.T. that provides a computerised front and back office (known as a 'one stop shop') for FCDA departments. The AGIS projects' objective is to establish the entity as an independent service source and as the single official source for Geospatial Data on all of FCT, which involves providing a comprehensive, state-of-the-art, infallible, computerised, geospatial data infrastructure for the FCT. This entails computerising the Cadastral and Land Registry for the FCC (Federal Capital City), and the Area Councils and Satellite Towns of the Federal Capital Territory (FCT). Based within the AGIS building, the AGIS Resource Centre functions as an autonomous service provider, a specialised GIS/LIS Resource Centre, and the only official source for Geospatial Data on FCT. It covers all of FCT, with its revenues (additional revenues, not existing ones that have been shifted to AGIS).

A3 explained that their customers are government, both federal and state, corporate bodies like banks, insurance companies, private clients, and embassies, trying to offer services to all. However, A3 states that, "We have other sources that do not depend on federal government budget"; since they work in a development control organisation, they accommodate all those who are willing to build in Abuja. Nevertheless, they first have to seek design approval at which point the inspection team goes to the site to ensure that their customers adhere to the design approval plan with no changes. All interviewees agreed that no measurements whatsoever were taken to ascertain person's satisfaction. In addition, the two interviewees agreed that the lack of certain benefits encourages disloyalty to the organisation. The case of the oil sector was cited by an interviewee who indicated that people working in the oil sector are covered by the health care scheme, but that this does not extend to people working in the organisation, despite the fact that they provide a service to the oil sector in Abuja. However, two interviewees argued that there are some privileges granted to staff members; for example, the provision of furniture at a reasonable price. Nevertheless, the benefits are enjoyed by just the senior workers, including car loans, which not accessible to all staff but rather just for senior workers too.

4.2.1 Employee Empowerment

The next factor discussed with the interviewees was the empowerment of people, in which two questions were posed. The first question was: "Are people empowered enough to take direct action whenever they encounter a problem, without further approval? The majority of interviewees revealed that people are not empowered and all decisions are centralised. However, a few interviewees, especially the senior leaders, claimed that they did empower their people at lower levels to take certain types of decision without requiring approval from top management. These managers recognised, nonetheless, that in their organisation as a whole, there is an over-centralised approach, and that almost all decisions must be approved by top management; all interviewees confirmed that any issues with the financial commitment require top management approval. A4 emphasised that:

> *"...People have no authority; centralisation is predominant in the organisation and everything has to be approved by the Development Authority ..."*

Not surprisingly, different management levels provided different responses to this question. Two interviewees agreed that the management pays attention to the suggestions made by staff members and support staff. However, some interviewees highlighted the fact that the implementation of these suggestions was not usually forthcoming, and that if it did occur, it would be after some delay (caused by bureaucracy). Furthermore, several other interviewees agreed that any suggestions requiring financial commitment would not even be considered. One interviewee emphasised their belief that management does not pay attention to suggestions from lower levels. Indeed, A8 (a top manager) complained that his printer had not been working for three months, but that he had been unable to either get it repaired or replaced by a new one. A member of the support staff argued that management ignores all suggestions. He gave the example of a suggestion he had made, which was a proposal to fight corruption within the organisation, which represents a very serious problem for the business. For this, he needed the support of the management, but his proposal was never discussed. The majority of the respondents agreed that there was a reward and recognition system within the organisation as a whole and their unit in particular, and it was indicated that the reward ceremonies take place on the occasion of national or religious events. Interviewee highlighted some methods available for the reward and recognition of people's contributions to their workplace:

- Covering pilgrimage expenses, this special reward is given to people willing to perform their pilgrimage as Muslims to the Hajj.
- Covering expenses for a Christian pilgrimage to Israel
- Contributions for weddings and burial ceremonies
- Birthday parties

However, according to the majority of the interviewees, the system as such is badly organised; there are no firm criteria for reward, and hence it is perceived as unfair. Consequently, the reward is occasional rather than regular. All support staff interviewees claimed that a reward and recognition system did not exist. One support staff interviewee revealed that memorial ceremonies are only organised for full-time staff, whilst one senior leader also referred to the disparity between rewards, observing that if the system is not fair, people will be less willing to cooperate. Moreover, an interesting point was offered by some interviewees who highlighted that warnings and blame were much more frequent than rewards; "… In the site, we encourage teamwork. They have to work as a team to achieve a goal, access the load and prepare the goal." This suggests that top management encourage team working; for instance, teams are established as members from different disciplines for curriculum development, and technical projects for the industry. However, a team leader highlighted the difficulties encountered when assigning teams to industry-associated matters (e.g. a technical problem, the delivery of training, the provision of consultation, or architectural design). They noted that certain people who do not qualify for such a team allocate themselves to the team and then do not perform well. This was felt to be a serious problem for the Department.

All respondents revealed that the promotion policies within the Federal Capital Development Authority are based on connections; this means that, if an employee is not close to the top manager, their promotion may be difficult to achieve. Another colleague complained that, even simple conferences are lobbied, especially those that are attended abroad. Employees 'hassle' for it, thereby abandoning their duties for those people without Godfather in the office. However, a member of staff revealed that some workers are individualistic and prefer to work outside the collective.

4.3 Key Practitioners' Roles, and Responsibilities in Current Construction Practices in Nigeria

In the context of this research, the roles of practitioners mean their professional background (i.e. architect), while their responsibilities refer to the core duties (i.e. preparing drawings, designing etc.) they perform in the delivery of the projects. Also, practitioners identified as mainly involved in the delivery of construction projects in Nigeria, who participated in the semi-structured interviews and questionnaire survey, are referred to as key practitioners in this Chapter. Below are the key practitioners, and their roles and responsibilities in the delivery of construction projects:

- The architect: is the practitioner tasked with the responsibility of producing the drawings and design solutions for the project in order to meet the client's needs/requirements.
- The client's representative: For the purpose of this research, the client representative is any practitioner representing the client's interests on the project. The greatest responsibility for achieving the client's requirements lies with the client's representative, who is one of the most influential practitioners in the construction project delivery processes.
- The project manager: is the practitioner responsible for managing and coordinating processes, resources (including other practitioners on a daily basis), and facilitating the effective delivery of all project deliverables, to meet all the requirements of the project, and to provide other construction information on progress and variations. This is a key practitioner for the adoption and implementation of decisions etc., for the project.
- The commercial manager: is the practitioner responsible for managing and controlling the cost aspects of the project.

The Nigerian Institute of Architects' (NIA) outline plan of work (2007) forms the basis for the definition of the projects' main delivery stages - early, construction and post construction. At the early stage of the projects' delivery, the main activities that are performed by the key practitioners are planning and preparation. Although planning and preparation are two separate

words, they are employed in this research to refer to all the activities that are required before the commencement of the construction stage of the project. These include: feasibility, goal setting, design, tendering, and so forth. Planning and preparation could be useful to ensure a greater buy-in from all key construction practitioners, to achieve a common objective for the project. Undertaking planning and preparation activities would help to set out performance targets for other activities. At the construction stage of a projects' delivery, the main activities that are to be undertaken include adoption and implementation, and coordination and supervision. Adoption refers to the embracement of activities from the early stage, while implementation is concerned with implementing the adopted activities; in other words, putting the 'adopted' activities into practice. Coordination activities entail the interaction and integration of work and resources, while supervision activities are concerned with overseeing the performance of works and resources.

At the post construction stage of the projects' delivery, the activities that are required to be carried out in the context of this Chapter include monitoring and evaluation. Even though the words 'monitoring' and 'evaluation' are two separate words, they are used in this context to mean the tracking of performance towards the specified targets set out in the early and construction stages of the projects' delivery processes. It is suggested that the early stage of every project's development is crucial because any decision made at this stage has far-reaching implications for the project's overall outcomes. Toor and Ogunlana's (2009 p. 163) study of a construction project's critical success factors has revealed that "most of the highly rated critical success factors are related to the active involvement of clients or their representatives and other key practitioners at the project's" early developmental stages. Smith and Jagger (2007, p. 38) agreed with the aforementioned argument, that decisions which are taken during the early stages of a project's development; for example, at the briefing and feasibility stages, results in "more far-reaching economic consequences than the relatively limited decisions which can be made later in the process". This position is further supported by MacLeamy Curve (illustrated in Figure 4-1) which clearly shows that decisions made early in the project's development have the ability to impact the successful delivery of the project outcomes. This is because, once the projects starts, the opportunity to introduce and maximise the sustainability and potential benefits, for instance, are reduced to a minimum.

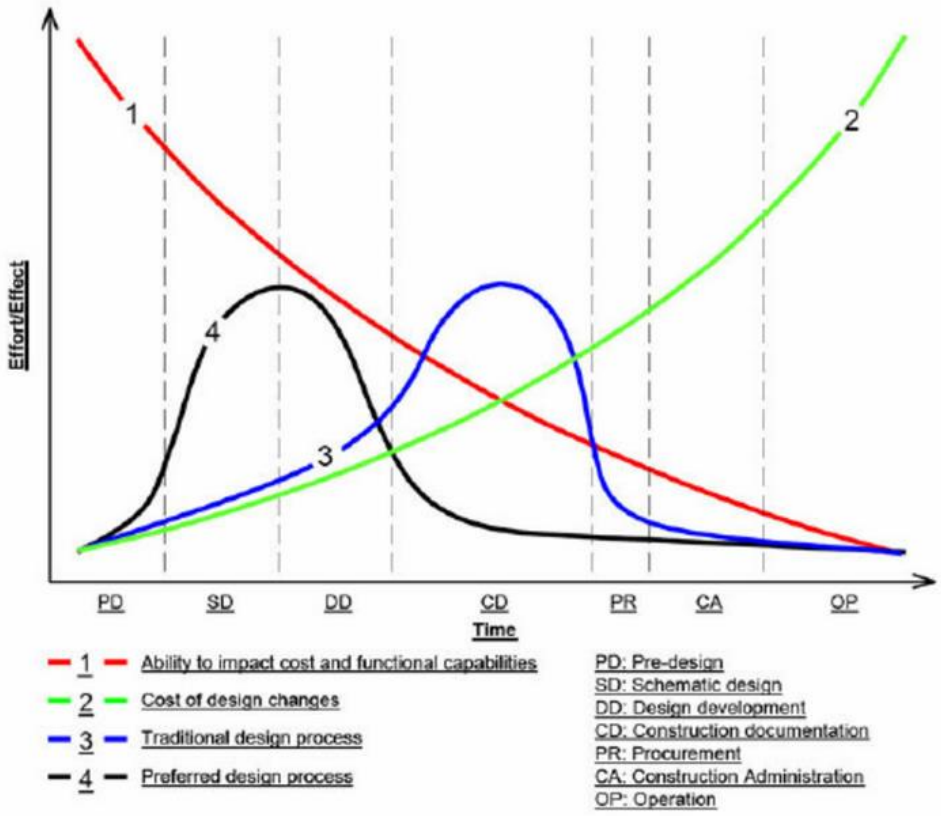


Figure 4-1: MacLeamy Curve (source: American Institute of Architects, 2007)

The level of involvement of client representatives at the early stage, as per the above findings, could also be explained by the suggestion that clients will always want to ensure that their projects are planned and designed to meet the time, cost and quality requirements. However, it is asserted that plans and strategies carried out at this stage of the project development have an impact and implications not only for the cost, time and quality aspects of the projects but also for the performance of a construction project (Pitt, *et al*., 2009). Hence, clients, or their representatives, need to be aware of this, particularly when they are engaging practitioners' services at this stage to deliver their construction projects. Similarly, clients are also particular about the quality of their projects, hence their desire to engage competent architects at the early stages of their project's development to provide design solutions that will meet their needs. One project manager confirmed this, indicating that he needed to get a competent architect involved as soon as possible for them to drive the design process. For most clients and

construction organisations, the early involvement of commercial managers provide the opportunity to seek early advice about the cost implications of adopting and implementing sustainability features on their projects. It can also be observed that early involvement of architects within the Nigerian construction industry, clients' representatives, and commercial managers tends reflect the traditional approaches, to involve key practitioners in the planning and the preparation activities at the early stages of construction projects. Traditionally, the first point of contact when clients want to procure practitioners' services for their proposed projects is the architect and other practitioners who they believe will help them achieve their objectives. Thus, A9 indicated:

> *"I sometimes get involved at the early stages of our projects, but that depends on what the client or the contract want us to deliver…It differs from project to project, and each client has his views on how we should do that…"*

It is argued that construction projects' sustainability "performance outcomes depend upon inputs" from different key contributors (Smyth, 2008, p. 635). Practitioners, such as project managers and others with sustainability responsibilities, are crucial in the sense that their early and frequent level of involvement will enable them to understand clients' needs as well as projects' requirements, and to translate them into practice during the construction stage.

4.4 Barriers to Total Quality Management implementation in the Nigerian construction industry

This section explores the third objective, namely the implementation of Total Quality Management (TQM) in the Nigerian construction industry. As discussed in the Literature Review, this promises several benefits, such as more repeat customers, reduced reworks, improved employee job satisfaction, higher productivity, improved budget performances, improved schedule performances, better chances in bidding processes with pre-qualifications, an increased market share. However, as previously discussed in Chpater 2, there are several barriers to the extensive deployment of TQM in the construction industry. The construction industry is different from other industries in many aspects, including the provision of unique products, a lack of leadership and support from top management, an unqualified workforce, and a lack of effective teams. It is commonly believed that TQM cannot be successfully implemented due to these peculiarities. Moreover, many construction companies consider quality programs an extra cost because they are not completely aware that the cost of non-conformance to quality is much higher than that of operating a quality program.

From the view of construction professionals, training was perceived as one of the impediments to TQM implementation and, based on the question posed, interviewees perceived that training and education occurs via participation in conferences and workshops, both locally and abroad, by tailored training courses, and through annual leave for staff members. They noted out that most of the training programs are conducted as part of a contract when importing new construction equipment. Several interviewees believed there was a training budget, but that no training was provided, while others argued that there was no annual training budget at all. Only a few reported that an annual training plan existed within the organisation, but most emphasised that such a plan was not in existence.

The respondents indicated reasons for the non-activation of the training programs for staff members, which included: a lack of awareness amongst managements of the importance of training activities to improve performance. Other interviewees stated that staff members were overqualified and should thus be trainers rather than trainees. One staff member considered that financial reasons had caused the absence of training programs within the organisation. Many problems were highlighted about training activities, a common complaint amongst staff was that their participation in conferences is limited to just one opportunity per year. The bureaucracy surrounding the required paperwork was observed to cause such long delays that sometimes approval and funding to attend a conference was granted after a conference had taken place.

Not surprisingly, given previous comments about the influence of intercession (waste) in recruitment, this was also identified by many interviewees as a problem concerning nominations for training. When considering communication between different departments and management, all respondents agreed that there was no electronic communication whatsoever and that all communication between departments, and management and staff occurred through the traditional channel. Many interviewees described the communication process as very complicated and suffering from bottlenecks in many places. A1 commented on the bureaucratic ways of communication among departments; for instance, the aforementioned example concerning management approval to participate in a conference. The researcher also questioned the interviewees about their organisation’s performance, and the respondents indicated that measurements are important and provide feedback so that any decisions can be based on facts. Additionally, they argued that the measurement process allows for the identification of opportunities for improvement within the Federal Capital Development Authority.

Figure 4-3 illustrates the tree nodes of the categories in Nvivo, which provide the basis for further analysis by merging concepts derived from the free nodes. The coding system is illustrated in Figure 4-3. Figure 4-3 simplifies the process of identifying key issues through the discussion and analysis of the factors under the parent themes.

There is a general agreement among interviewees, including top managers, staff, and support staff, that no performance measurements take place within their organisations, other than a calculation of the workloads of staff members and their salaries. The interviewees added that the administrative regulations require an annual efficiency report regarding all employees, which needs to be approved by their managers before any promotion to higher ranks. Some interviewees mentioned that each department had its own form of measurement. For instance, some departments have a regular meeting to discuss issues within the organisation and to try to overcome the problems encountered.

> "*…Yes, we have time, cost, and quality in a project execution. The manager makes such decision and treats the challenges encountered whenever there is a need for it…*"

Table 4-3: Tree nodes of the Categories in Nvivo (version 10)

Name	Sources	References	Created On	Created By	Modified On
Awareness of TQM	12	13	08/06/2016 11:34	S M	21/07/2016 20:12
None Awareness	2	2	08/06/2016 12:17	S M	21/07/2016 18:42
Positive Awareness	9	9	08/06/2016 12:17	S M	21/07/2016 20:12
Employee Empowerment	11	16	06/07/2016 18:39	S M	21/07/2016 20:27
None Awareness	5	5	06/07/2016 18:39	S M	21/07/2016 18:53
Positive Awareness	3	5	06/07/2016 18:40	S M	13/07/2016 18:52
Infrastructure factors	11	19	06/07/2016 18:41	S M	21/07/2016 20:27
None Awareness	4	5	06/07/2016 18:41	S M	21/07/2016 20:01
Positive Awareness	3	3	06/07/2016 18:41	S M	21/07/2016 20:01
Leadership	12	13	06/07/2016 18:49	S M	21/07/2016 20:26
None Awareness	3	4	06/07/2016 18:49	S M	13/07/2016 17:59
Positive Awareness	5	5	06/07/2016 18:50	S M	21/07/2016 20:02
Organisational culture	12	12	06/07/2016 18:46	S M	21/07/2016 20:17
None Awareness	2	2	06/07/2016 18:46	S M	21/07/2016 20:00
Positive Awareness	5	5	06/07/2016 18:47	S M	21/07/2016 18:49
Reward and Recognition	12	13	06/07/2016 18:47	S M	21/07/2016 20:24
None Awareness	1	1	06/07/2016 18:48	S M	21/07/2016 18:50
Positive Awareness	10	10	06/07/2016 18:48	S M	21/07/2016 20:24
Top Management commitment	12	13	08/06/2016 12:16	S M	21/07/2016 20:17
None Awareness	4	4	21/06/2016 12:01	S M	21/07/2016 20:22
Positive Awareness	7	7	21/06/2016 12:01	S M	21/07/2016 19:55
Training and Education	12	14	06/07/2016 18:58	S M	21/07/2016 20:22
None Awareness	3	3	06/07/2016 18:59	S M	21/07/2016 18:52
Positive Awareness	6	8	06/07/2016 18:59	S M	21/07/2016 20:23

The interviews revealed that all respondents were aware of the importance of continuous improvement (CI) within the construction industry, believing it to be a wide-ranging activity, as stated by A10.

> *"…Continuous improvement is an everyday improvement in achieving the same goal with less input, less wastage for the clients to benefit more. Every business wants to improve, for example, if you buy construction equipment the time will be improved and more work will be done…"*

Meanwhile, support staff believed that CI processes are exhibited in the improvement of services to staff members, such as the enhancement of transport services and the establishment of a network accessible to all staff.

It was unanimously agreed that TQM initiatives would precipitate improvements to the Nigerian construction industry, and, likewise, it was also believed that, as yet, there were no such assessment activities within the construction industry. One senior manager predicted that resistance to these initiatives would emerge from individuals who were not performing well in their jobs. Another interviewee, A12, expressed the opinion that with freedom there should also be a follow-up and assessment program. The issue of professionalism, as another aspect of the organisation culture, was also explored, for which the researcher asked the following question: 'How do you see TQM initiatives with relation to your professionalism?' All interviewees agreed that there was no contradiction between TQM and professionalism. However, a manager commented that some individuals within their organisation were 'short-sighted' and that the organisational culture needed to change to become more accepting to new ideas. Furthermore, A4 argued that: "The resistance to change and to try anything new is a human tendency and human nature, evidence for that is many staff members are not interested in using the computers".

From the interview findings, the researcher was able to discover the following factors had an impact on TQM implementation within organisations: communication, and leadership. These key points discovered in the findings will be further explored in the discussion and revised in the framework. These findings will be discussed thoroughly in the next chapter in the light of the aim and objectives of the study.

4.5 Questionnaire Result

This section reports the results generated from the questionnaire regarding the implementation of TQM in the Nigerian construction industry. This method was designed to collect information about the knowledge and understanding of Total Quality Management (TQM) as well as assess opinions about any barriers that may exist that could affect the implementation

of TQM systems within the construction industry. This section will firstly present demographic/background details about participants then will introduce participants' views across five-point Likert scales, examining: the purpose of TQM, benefits of TQM, implementation barriers, and barriers. Initially, the results will be reported descriptively, using statistics that describe the distribution of the results in each of the scales (the number of cases and percentages, mean/average, standard deviation as well as the rank). Descriptive statistics will then be followed by an examination of the scales' reliabilities and their distribution before introducing inferential statistics (to make an inference from the sample to the bigger population). Such inferential statistics will indicate whether the demographic details have a significant impact on the five different scales. Statistics were analysed using Field's (2012) statistical books, which provide guidance on how to report and analyse data.

4.6 Background Information

A total of 450 questionnaires were issued, and 173 participants completed the questionnaire; they were initially asked to provide background information regarding their job title, experience and highest qualification level. Figure 4.2 shows the percentage of participants across the three job titles: 91 were supervisors (38%), 63 were in upper management (35.6%), and 23 occupied middle management roles (13%). This response rate was considered appropriate considering the difficulty in obtaining questionnaire responses from the construction industries (Black *et al.*, 2000; Hoxley, 2008).

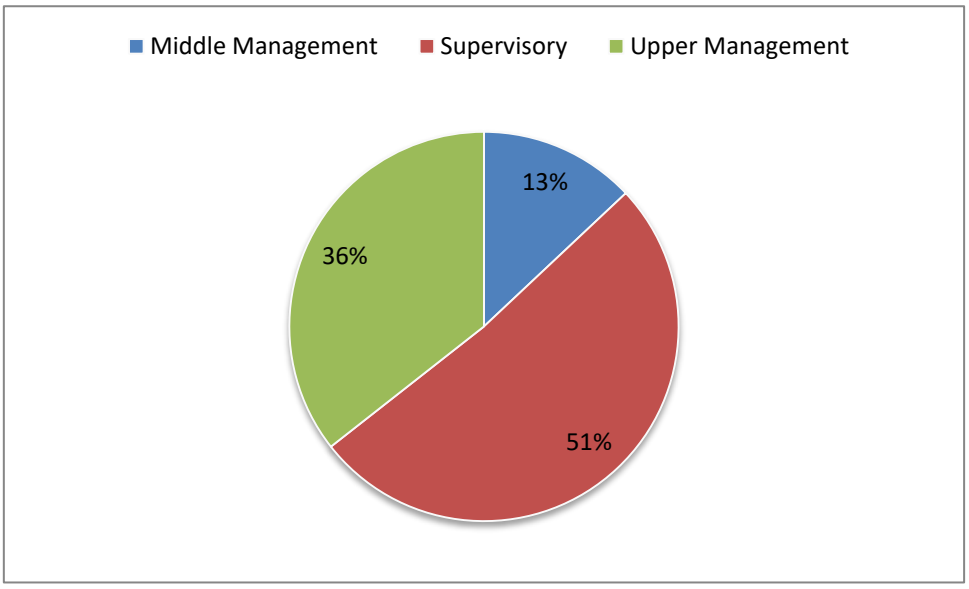


Figure 4-2: Participants' Job Level within the Company

Regarding the years of experience in their current roles, 74 had more than ten years' experience (42%), while 72 had 5 to 10 years (41%), experience and 31 stated that they had less than five years working experience in their current role.

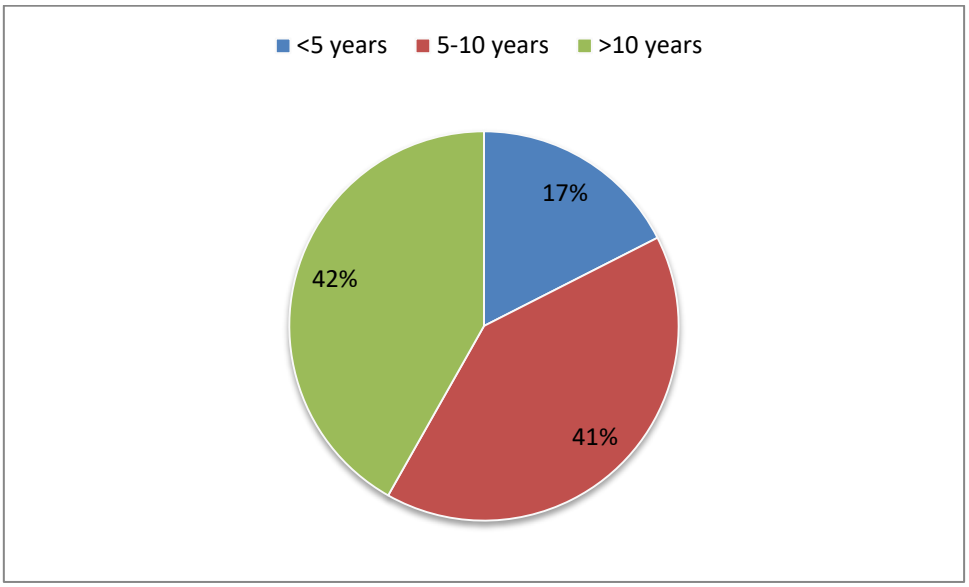


Figure 4-3: Participants' years of experience in the company

In terms of their educational level, 70 participants held a qualification equivalent to a Master's degree or higher (39.5%), 55 stated that the had a Bachelor's degree (31.1%), while 36 held Diplomas (20.3%). Finally, 16 participants held a high school level qualification a lower (9%).

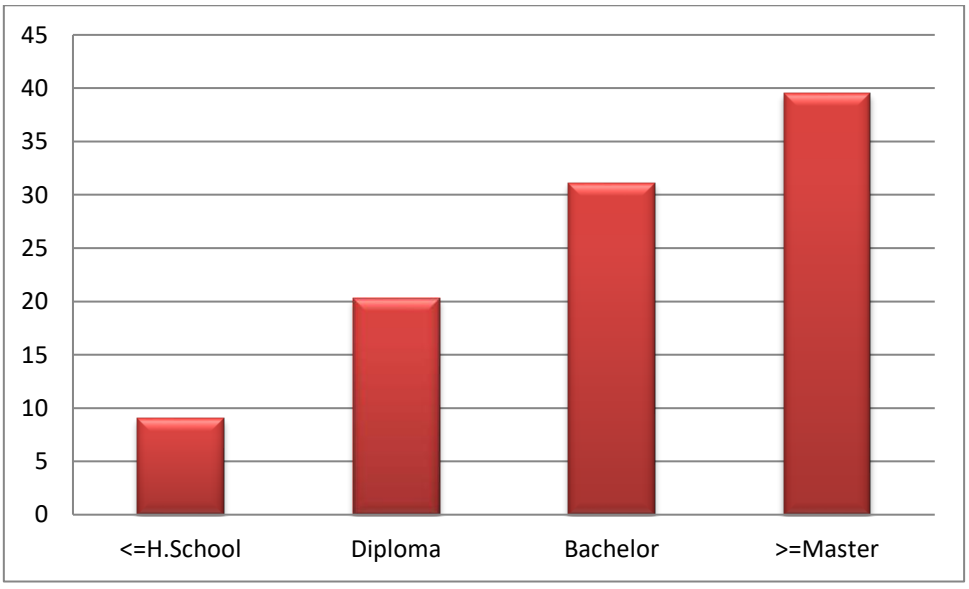


Figure 4-4: Participants' Level of Qualification Achieved

4.7 Participants' Understanding of TQM Related Issues

TQM is set to be examined using five scales, answering for the purpose of TQM, benefits, implementation barriers, and barriers. Each of the scales will be presented separately and items within each will be ranked based on their mean score.

4.8 Purpose of TQM

Participants' understandings as to purpose of TQM were assessed using a 5-point Likert scale. This section was mainly concerned with how the purpose of TQM is perceived and understood by participants in the construction industry. Participants were asked to look at each item and rate their answers from (1=strongly disagree to 5= strongly agree) as to how they understand TQM. Table 4-4 provides descriptive statistics from the responses, including the number of participants (n) and the percentage (%) under each of the five points of the scale. The mean score (average), the Standard Deviation (SD), as well as the rank order of each item within the scale, was included. Such descriptive statistics allow the researcher to understand the common answers among participants in each of the items. By observing the results in Table 4-4 it can be seen that there is agreement (agree + strongly agree) across all items in comparison to the disagreements. This indicates that participants generally agree with the current purposes of the TQM.

However, it should be acknowledged that some items received more agreement than others. As an indicator of which item (purpose) was ranked highest, the researcher analysed the mean score. It can be said that most agreement was generated for the item stating that 'TQM can provide a disciplined means of producing goods/services for customers' (M=3.68). Almost 69% of the participants either agreed or strongly agree that the TQM provides disciplined means for providing good services and goods to customers. Secondly, there was a high agreement that, 'TQM can reduce resource wastage' (M=3.67), where 67% of the participants either agreed or strongly agreed with this statement highlighting the important role of TQM in reducing resource wastage. In the third rank, participants showed agreement (61%) that 'TQM can be used to demonstrate that this is a total quality organisation'. On the other hand, the least agreement was generated for items stating that 'TQM help to strengthen the control over operations' (M=3.51), although the item stills show more agreement (61%) than disagreement.

It should therefore be noted that most items generated similar agreement scores, although the mean scores and ranks are different. This highlights that participants generally agreed with all TQM purposes. It can generally be assumed here that all items are considered of importance as they all showed more agreement than disagreement.

Table 4-4: Descriptive Statistics Showing the Distribution of Results within the TQM Purpose Scale

		S. Disagree	Disagree	Neutral	Agree	S. Agree	Mean	SD	Rank
1. TQM can reduce resource wastage	No of responses	7	29	24	72	45	3.67	1.14	2
	Percentage	4.0%	16.4%	13.6%	40.7%	25.4%			
2. TQM aid the improvement for customer satisfaction	No of responses	13	27	22	66	49	3.62	1.24	4
	percentage	7.3%	15.3%	12.4%	37.3%	27.7%			
3.TQM can provide a disciplined means of producing	No of responses	9	23	22	83	40	3.68	1.11	1
	Percentage	5.1%	13.0%	12.4%	46.9%	22.6%			

goods/services for customers									
4. TQM help to strengthen the control over operations	No of response	11	31	28	69	38	3.51	1.19	5
	percentage	6.2%	17.5%	15.8%	39.0%	21%			
5. TQM can be used to demonstrate that this is a total quality organisation	No of responses	13	18	37	61	48	3.63	1.25	3
		7.3%	10.2%	20.9%	34.5%	27.1%		1.19%	

4.9 The Benefits of TQM Implementation

As illustrated in the literature review, there are many benefits associated with TQM implementation. In this section of the results, the researcher will present the findings regarding the five main benefits of the TQM. Participants were asked to indicate their agreement (on the five-point scale) on how they rate their agreement/disagreement with each benefit. In doing so, the descriptive statistics, overall, indicated that there is more agreement (agree, strongly agree) compared to disagreement in each of the items, indicating that there is consensus on the five benefits. However, by comparing benefits based on score, it is shown that participants agree more with some compared to others. The greatest agreement was achieved for the item stating that 'TQM can improve customer satisfaction' (M=3.45), which showed that about 58% of the participants agreed or strongly agreed with this statement. This indicated that customer satisfaction is the highest ranked benefit for TQM implementation. This was followed by almost 50% who agreed or strongly agreed that 'TQM helps to meet government demands, requirements or pressures' (M=3.36). The lowest agreement was generated for the item stating that 'TQM is a part of a wider quality improvement process' (M=3.20). Although the items vary in terms of mean scores and are ranked differently, it should be acknowledged that none of the items generated more disagreement than agreement. This indicates that all items represent positive opinions about the different benefits of TQM.

Table 4-5: Descriptive Statistics Showing the Distribution of Results within the Benefits of TQM Implementation Scale.

		S. Disagree	Disagree	Neutral	Agree	S.Agree	Mean	SD	Rank
1. TQM can improve customer satisfaction	No of responses	17	35	22	56	47	3.45	1.32	1
	Percentage	9.6%	19.8%	12.4%	31.6%	26.6%			
2. TQM is a part of a wider quality improvement process	No of responses	12	51	36	44	34	3.20	1.24	5
	Percentage	6.8%	28.8%	20.3%	24.9%	19.2%			
3. TQM increase the competitive advantage of a company	No of responses	21	40	34	43	39	3.22	1.33	4
	Percentage	11.9%	22.6%	19.2%	24.3%	22.0%			

4. TQM improve the quality of the products and services offered	No of responses	18	45	20	60	34	3.26	1.30	3
	Percentage	10.2%	25.4%	11.3%	33.9%	19.2%			
5.TQM helps to meet government demands, requirements, or pressures	No of responses	13	40	35	47	42	3.36	1.26	2
	Percentage	7.3%	22.6%	19.8%	26.6%	23.7%			

4.10 Barriers to the Implementation of TQM

This section is concerned with barriers to the implementation of TQM; previous research has indicated some challenges and barriers and this section is mainly concerned with eight barriers of interest. Participants were asked to state how much they agree that each statement represents a barrier to the implementation of TQM. The descriptive results indicated the outcomes suggesting that all statements represent barriers, i.e. there is more agreement than disagreement across all statements. In an attempt to rank the items regarding how much agreement was achieved, it was evident that there was a lack of commitment in response to the statement 'There is a lack of top management commitment to TQM generally within the industry' where 62% of the participants agreed (M=3.56). This was closely followed by 56% who agreed that, "There are no outside pressures to make the organisation implement improvements in its quality management systems' (M=3.48). Thirdly, and also closely ranked, were 56% who agreed that, 'Communication between departments is ineffective' (3.47). At the other end of the scale, the lowest ranked statement was found to be 'There is no awareness of TQM through employees in the industry' (M=3.40), and 'There is a lack of understanding the benefits of TQM in the industry' (M=3.30). The two items showed 56% and 55% agreement respectively. All items showed more agreement than disagreement, which highlights the overall agreement with the benefits of the TQM implementation. It is also important to stress the mean scores were close; hence it is difficult to distinguish which item is the most important. See Table 4-6 for the statistical breakdown.

4.11 Barriers:

For the final scale in the questionnaire, participants were asked to rate their agreement/disagreement with the barriers. In doing so, seven barriers were included, which the participants indicated their response on a five-point scale. By observing the results in Table 4.6, it can be seen that there is more agreement with barriers in five of the statements compared to the disagreement. However, when ranking statements individually, it was evident that most agreements arose in response to the statement that 'Training targets in the organisation are not achieved' (M=3.69), to which almost 67% of the participants. Secondly, a greater agreement was generated for the statement, 'TQM is an additional workload to the established quality

Management' (M=3.65), where 65% showed their agreement. At the other end of the scale, the two statements to have generated more disagreement than agreement, and these were, 'Top management provides financial support to the employees to apply and improve quality programs' (M=3.43) and 'Quality objectives are clearly identified to employees' (M=3.06). The agreement was 56% and 45%, respectively. Only the lowest ranked item showed more disagreement than agreement (below the neutral point); this could indicate that the quality objectives might be identified to a certain degree.

Table 4-6: Descriptive Statistics Showing the Distribution of Results within the Scale For the 'Benefits of TQM Implementation'.

		S. Disagree	Disagree	Neutral	Agree	S. Agree	Mean	SD	Rank
1.There is a lack of understanding of the purposes of TQM in the industry	No of responses	21	33	14	70	39	3.41	1.33	6
	Percentage	11.9%	18.6%	7.9%	39.5%	22.0%			
2.There is a lack of understanding the benefits of TQM in the industry	No of responses	17	45	18	61	36	3.30	1.31	8
	Percentage	9.6%	25.4%	10.2%	34.5%	20.3%			
3.There is no awareness of TQM through employees in the industry	No of responses	24	33	20	47	53	3.40	1.43	7
	percentage	13.6%	18.6%	11.3%	26.6%	29.9%			

		S. Disagree	Disagree	Neutral	Agree	S. Agree	Mean	SD	Rank
4.There is a lack of top management commitment to TQM generally within the industry	No of responses	12	25	30	71	39	3.56	1.17	1
	percentage	6.8%	14.1%	16.9%	40.1%	22.0%			
5.There is no government financial support to help the organisation to implement a TQM system	No of responses	13	31	38	56	39	3.43	1.22	5
	Percentage	7.3%	17.5%	21.5%	31.6%	22.0%			
6.There are no outside pressures to make the organisation implement improvements in its quality management systems	No of responses	18	30	26	55	48	3.48	1.32	2
	Percentage	10.2%	16.9%	14.7%	31.1%	27.1%			

		S. Disagree	Disagree	Neutral	Agree	S. Agree	Mean	SD	Rank
7.Communication between departments is ineffective	No of responses	15	39	24	46	53	3.47	1.34	3
	Percentage	8.5%	22.0%	13.6%	26.0%	29.9%			
8.There is a general sense of low morale in the organisation	No of responses	14	33	38	42	50	3.46	1.29	4
	Percentage	7.9%	18.6%	21.5%	23.7%	28.2%			

Table 4-7: Descriptive Statistics Showing the Distribution of Results within the Barriers

		S. Disagree	Disagree	Neutral	Agree	S. Agree	Mean	SD	Rank
1.There is no cross functional cooperation between departments	No of responses	13	45	21	44	54	3.46	1.35	5
	Percentage	7.3%	25.4%	11.9%	24.9%	30.5%			
2. There is no employee involvement in management decisions	No of responses	20	26	26	56	49	3.49	1.33	4
	Percentage	11.3%	14.7%	14.7%	31.6%	27.7%			
3. Quality objectives are NOT clearly identified to employees.	No of responses	50	31	17	32	47	3.06	1.50	7
	Percentage	28.2%	17.5%	9.6%	18.1%	26.6%			

4.There is a lack of cooperation from customers	No of responses	21	28	24	50	54	3.49	1.38	3
	Percentage	11.9%	15.8%	13.6%	28.2%	30.5%			
5. TQM is an additional workload to the established quality Management.	Number of responses	12	27	23	63	52	3.65	1.24	2
	Percentage	6.8%	15.3%	13.0%	35.6%	29.4%			
6.Top management Do NOT provide financial support to the employees to apply and improve quality programs	No of responses	19	31	28	52	47	3.43	1.33	6
	Percentage	10.7%	17.5%	15.8%	29.4%	26. %6			
7.Training targets in the organization are generally not achieved	No of responses	18	23	18	55	63	3.69	1.34	1
	Percentage	10.2%	13.0%	10.2%	31.1%	35.6%			

4.12 Reliability of scales:

This study used five constructs for Total Quality Management in the construction industry. Before proceeding with further analysis, it is essential to check that the scales used are reliable, namely that the items within the scale measure for the same idea they are set to examine. This is referred to as internal reliability or consistency and is often tested through Cronbach's alpha, which measures the consistency between items. The reliability score ranges between 0% and 100% (0-1). A general understanding is that a reliability score of more than 62% is deemed acceptable to consider scales reliable. Cronbach's alpha was tested through SPSS for each of the scales and, as can be seen in Table 4.8, all scales achieved good reliability scores. The overall reliability across all items in all scales (34 items) was found to be 88% reflecting good reliability overall.

Table 4-8: Cronbach's Alpha Reliability Scores for each of the Scales used in the Questionnaire

	Items	Cronbach's Alpha
Purpose	**5**	**0.72**
Benefits	**5**	**0.68**
Implementation Barriers	**8**	**0.63**
Barriers	**7**	**0.63**
Overall	**34**	**0.88**

4.13 Distribution of the Main Results

This section examines the distribution of the results across the five scales. Firstly, it should be highlighted that, since all scales are considered reliable, the researcher created an average score for each. This will allow for the use of advanced statistical tests (inferential statistics). Such tests are often based on what is to be tested and the distribution of the results, i.e. whether the data is considered parametric. After creating an average for each scale, the researcher produced a descriptive statistics table (Table 4.9). This table included general descriptive statistics, and Skewness and Kurtosis scores, all of which illustrate the distribution of the data within each of the scales. As can be observed, all scales (the overall average of each) are considered normally distributed (all scores cluster around the mean); this is confirmed through the skewness (how the data is skewed/spread from the mean) and kurtosis (how narrow the data is) scores within the range +/-2. This is also confirmed by eyeballing the histograms (Figure 4-4), which also reflects a normal distribution. Since the data is considered normally distributed, the researcher will use parametric inferential statistics to conduct further examinations of the data.

Table 4-9: Descriptive Statistics of the Four Scales after averaging them

	N	**Minimum**	**Maximum**	**Mean**	**Std-deviation**	**Skewness**		**Kurtosis**	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Purpose	177	1.00	5.00	3.6294	.80681	-.703	.183	1.124	.363
Benefits	177	1.00	5.00	3.3040	.86210	.220	.183	-.574	.363
Imp. Barriers	177	1.00	5.00	3.4414	.71956	.427	.183	.091	.363
Barriers	177	1.00	5.00	3.4705	.75445	.121	.183	-.399	.363

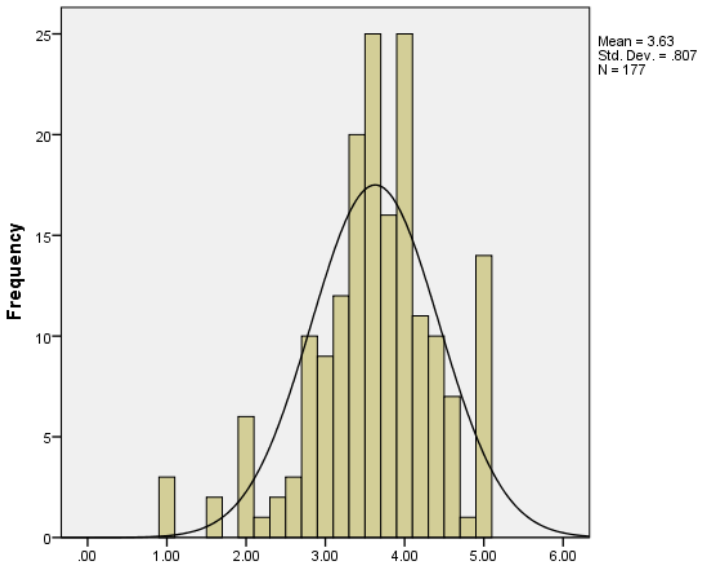


Figure 4-5: Distribution of Purpose

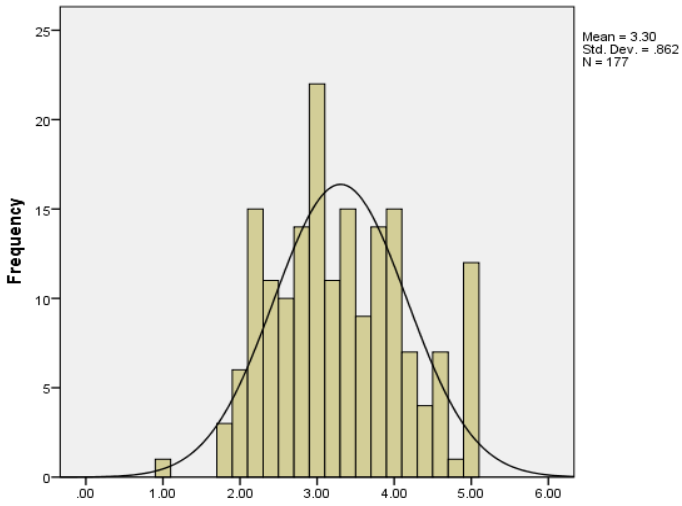


Figure 4-6: Distribution of Benefits

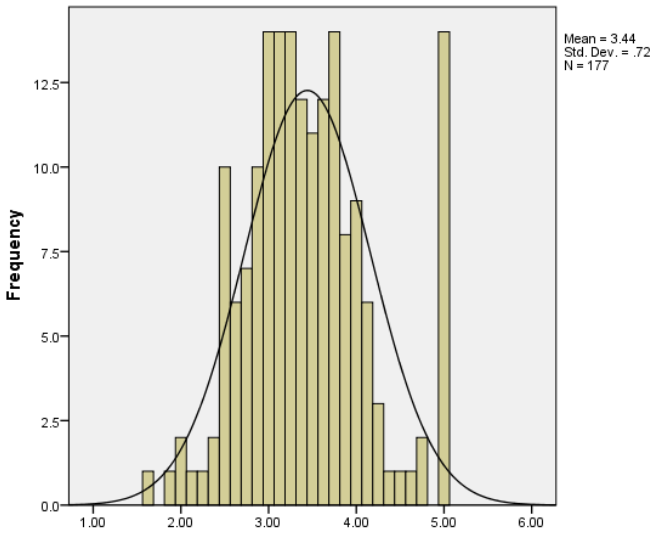


Figure 4-7: Distribution of Implementation Barriers

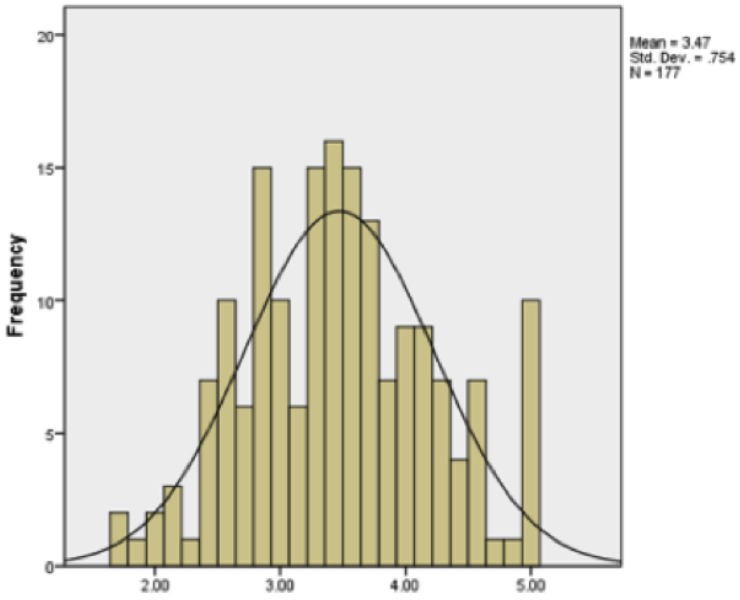


Figure 4-8: Distribution of Barriers

4.14 Inferential statistics:

This section will present inferential statistics measuring the relationship between the five different scales, followed by the impact of the job type, experience level, and educational level. Inferential statistics are unique and different from descriptive statistics in that they allow the researcher to generalise the outcome to the bigger population. Inferential Parametric tests will be used as the data was judged to be normally distributed.

4.15 Correlations:

Pearson's Correlation coefficient is an inferential statistical test used to measure whether a linear correlation/relationship exists between two variables. The correlation coefficient ranged between -1 and +1 (-100% and +100%); a positive coefficient reflects a positive correlation where an increase in one variable is associated with an increase in the other variable. In comparison, a negative correlation reflects that when one variable increases the other decreases in terms of the score. Scores close to the zero mark reflect no correlation. Indeed, no conclusion can be made about the coefficient unless it is significant ($p<0.05$); the significance level reflects the likelihood of the results being down to chance, namely that the researcher is willing to take a chance of up to 5% that the outcome is accidental. In this study, an alpha level (p) of 5% ($p=0.05$) will be used as a threshold to determine the significance of the outcomes in all inferential tests.

Pearson's correlation was measured between the five scales (Table 4.10), and it was evident that there is a positive and significant ($p<0.05$) correlation between all. Therefore, the Purpose of TQM was shown to have a significant positive correlation with Benefits: $R(177)=0.390$, $p=0.000$, Implementation barriers: $R(177)=0.297$, $p=0.000$ and Barriers: $R(177)=0.230$, $p=0.002$. Meanwhile, the benefits of TQM showed a significant positive correlation with Implementation Barriers: $R(177)=0.375$, $p=0.000$, and Barriers: $R(177)=0.343$, $p=0.000$. Barriers: $R(177)=0.634$, $p=0.000$, Barriers: $R(177)=0.3408$, $p=0.000$. Finally the Implementation barriers had a significant positive correlation with Barriers: $R(177)=0.440$, $p=0.000$

Table 4-10: Pearson's Correlation Coefficient between the Four Scales Along With the Significance Score and the Number of Participants

		Purpose	Benefits	Imp. Barriers	Barriers
Purpose	Pearson Correlation	1	.390	.297	.230
	Sig. (2-tailed)		.000	.000	.002
	N	177	177	177	177
Benefits	Pearson Correlation		1	.375	.343
	Sig. (2-tailed)			.000	.000
	N		177	177	177
Imp. Barriers	Pearson Correlation			1	.440
	Sig. (2-tailed)				.000
	N			177	177
Barriers	Pearson Correlation				1
	Sig. (2-tailed)				
	N				

The strength of relationship between 0.90 and 0.25 which shows that one value increases made a clear notification about the negative correlation between the two numbers.

4.16 Job Type Effect:

The effect of the job type of participants views across the fives scales was tested using One Way Analysis Of Variance (ANOVA) for the independent groups (Middle Management, Supervisory, Upper Management). The ANOVA tests allow the researcher to determine whether there is a significant difference between the three groups ($p<0.05$). Furthermore, a Post Hoc test (Bonferroni) also allows the researcher to compound groups individually to identify where the differences come from.

The ANOVA test confirmed that the Top Management job type has a significant effect on the Purpose of TQM, $F(2.174)=3.53$, $p=0.031$, as illustrated in Table 4.11 .The highest score was achieved for Supervisors (3.74) followed by Upper Management (3.59) and finally, Middle Management (3.29). The post hoc test showed that the difference came from the Supervisor's group and Middle Management types ($p=0.029$). A significant effect was also found between the job type and the Benefits of TQM, $F(2.174)=3.71$, $p=0.026$. Upper Management showed the highest mean score (3.40) followed by Supervisors (3.34) and finally, Middle Management (2.86). The Bonferroni post hoc tests showed significant differences between Upper Management and Middle Management ($P=0.026$) and between Middle Management and Supervisors ($p=0.048$). No significant effect was found between the job type and Implementation Barriers, $F(2.174)=1.04$, $p=0.354$ and Barriers, $F(2.174)=3.04$, $p=0.05$.

Table 4-11: Descriptive Statistics for the Four Scales across the Job Types

		N	Mean	Std. Deviation	Std. Error	Minimum	Maximum	p
Purpose	Middle Management	23	3.2	.76	.15926	1.60	4.60	0.029

	Supervisory	91	3.7	.91	.09551	1.00	5.00	
	Upper Management	63	3.5	.60	.07599	1.00	4.60	
	Total	177	3.6	.80	.06064	1.00	5.00	
Benefits	Middle Management	23	2.8	.79	.16511	2.00	4.60	0.026
	Supervisory	91	3.3	.98	.10306	1.00	5.00	
	Upper Management	63	3.4	.63	.07948	2.00	4.60	
	Total	177	3.3	.86	.06480	1.00	5.00	
	Supervisory	91	3.1	1.01	.10621	1.00	5.00	
	Upper Management	63	2.9	.61	.07708	1.78	4.56	
	Total	177	3.0	.83	.06294	1.00	5.00	

Imp. Barriers	Middle Management	23	3.4	.74	.15455	2.25	4.75	1.04
	Supervisory	91	3.5	.81	.08549	1.63	5.00	
	Top Management	63	3.3	.54	.06809	1.88	4.50	
	Total	177	3.4	.71	.05409	1.63	5.00	
Barriers	Middle Management	23	3.2	.67	.14156	2.14	5.00	0.05
	Supervisory	91	3.5	.85	.08936	1.71	5.00	
	Top Management	63	3.3	.58	.07377	1.71	4.57	
	Total	177	3.4	.75	.05671	1.71	5.00	

Table-4-12: The ANOVA Table Presenting the Overall Difference and Significance between the Job Types in Each of the Scales

		Sum of Squares	df	Mean Square	F	Sig.
Purpose	Between Groups	4.468	2	2.2	3.531	.031
	Within Groups	110.099	174	.6		
	Total	114.567	176			
Benefits	Between Groups	5.355	2	2.6	3.714	.026
	Within Groups	125.452	174	.7		
	Total	130.807	176			
Imp. Barriers	Between Groups	1.083	2	.5	1.046	.354
	Within Groups	90.044	174	.5		
	Total	91.126	176			
Barriers	Between Groups	3.387	2	1.6	3.045	.050

	Within Groups	96.791	174	.5		
	Total	100.178	176			

Experience was discovered to have a significant effect on the purpose of TQM within the construction sector therefore, groups are created to acknowledge the various years of experience of participants within the sector. The groups are the less than five years groups, between five to ten years groups also those with over ten years' experience. In terms of respondents', the research also recorded educational level, 70 participants held a qualification equivalent to a Master's degree or higher (39.5%), whilst 55 stated that the have a Bachelor's degree (31.1%), 36 had Diplomas (20.3%) and 16 participants recorded a high school level qualification or below (9%).

4.17 Experience:

An ANOVA test was also used to determine the effect of experience on participants' views across the five scales. The experience was categorised into three categories (<5 years, 5-10 years and >10 years). Experience was found to have a significant effect on the purpose of TQM, $F(2,174)=5.20, p=0.006$ where those with more than ten years' experience (3.84) showed the highest agreement, followed by those with 5-10 years (3.52) and finally, participants with less than five years of experience (3.35). The post hoc tests showed a significant difference between >10 and <5 years ($p=0.013$). Furthermore, a significant effect was also found on the Implementation Barriers: $F(2,174)=6.87$, $p=0.001$. The highest score was found for the >10 years group, followed by the <5 years group (3.53), and finally, the 5-10 years group (3.21). A significant difference was only found between the 5-10 years and the >10 years groups ($p=0.001$). Meanwhile, a significant effect was found on the Barriers: $F(2,174)=3.20$, $p=0.043$, where the >10 years group had the highest mean (3.62) followed by the <5 years group (3.48) and finally the 5-10 years (3.30). The post hoc test showed significant differences between the >10 years group and the 5-10 years group ($p=0.037$). In comparison, no significant difference was found for experience and Benefits, $F(2,174)=0.52, p=0.591$, for the <5 years

group (3.43), the 5-10 years group (3.30) or finally those with >10 years (3.24). Thus, all three groups had similar scores or views regarding the benefits of TQM.

Table 4-13: Descriptive Statistics for the Four Scales across Levels of Experience

		N	Mean	Std. Deviation	Minimum	Maximum
Purpose	<5 years	31	3.3	.89994	1.00	5.00
	5-10 years	72	3.5	.76051	1.00	5.00
	>10 years	74	3.8	.76518	1.60	5.00
	Total	177	3.6	.80681	1.00	5.00
Benefits	<5 years	31	3.4	.77875	2.00	5.00
	5-10 years	72	3.3	.79505	1.80	5.00
	>10 years	74	3.2	.95763	1.00	5.00
	Total	177	3.3	.86210	1.00	5.00
Imp. Barriers	<5 years	31	3.5	.57662	2.38	5.00
	5-10 years	72	3.2	.61981	1.88	5.00

	>10 years	74	3.6	.80412	1.63	5.00
	Total	177	3.4	.71956	1.63	5.00
Barriers	<5 years	31	3.4	.72906	1.86	5.00
	5-10 years	72	3.3	.70190	1.71	5.00
	>10 years	74	3.6	.79114	2.14	5.00
	Total	177	3.4	.75445	1.71	5.00

Table 4-14: The ANOVA Table Presenting the Overall Difference and Significance between the Three Experience Categories in Each of the Scales

			Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
Purpose	Between Groups	percentage	6.4	2	3.232	5.202	.006
	Within Groups	No of response	108.1	174	.621		
	Total		114.5	176			

Benefits	Between Groups	Percentage	.789	2	.395	.528	.591
	Within Groups	No of response	130.0	174	.747		
	Total		130.8	176			
Imp. Barriers	Between Groups	Percentage	6.6	2	3.336	6.874	.001
	Within Groups	No of response	84.4	174	.485		
	Total		91.1	176			
Barriers	Between Groups	Percentage	3.5	2	1.781	3.207	.043
	Within Groups	No of response	96.6	174	.555		
	Total		100.1	176			

Groups was created in table 4:14 to identify the participants level of education which varies bachelor's degree and higher, master's degree and above and followed by diploma and high school qualification.

4.17.1 Job type effect:

The ANOVA test was used to measure the effect of education level on participants' views across the five scales, where a Bachelor's degree or higher showed the highest score (3.70), whilst a similar score was found for those with a Master's degree or above (3.69); this was followed by Diploma (3.56) and high school qualification (3.26). The post hoc test showed no significant difference between any two of the groups. However, education also showed a significant effect on the Implementation Barriers, F (3,173) =3.84,p=0.011. The post hoc showed a significant difference between the Master's and Bachelor's (p=0.000), and the Master's and Diploma (p=0.029). No significant effect of education was found on the Purpose, F (3,173) = 1.48, p=0.220 or Benefits, F (3,173) =1.07, p=0.360.

Table 4-15: Descriptive Statistics for the Five Scales across Levels' Of Qualification

		No of responses	Mean	Std. Deviation	Minimum	Maximum
Purpose	High school or less	16	3.3	1.08497	1.00	4.40
	Diploma	36	3.5	.64820	1.60	4.80
	Bachelor's	55	3.7	.56943	2.00	5.00
	Master's and higher	70	3.6	.94650	1.00	5.00
	Total	177	3.6	.80681	1.00	5.00

Benefits	High school or less	16	3.1	.66821	2.20	4.20
	Diploma	36	3.1	.73210	1.80	4.40
	Bachelor’s	55	3.2	.71385	1.80	5.00
	Master's and higher	70	3.4	1.04557	1.00	5.00
	Total	177	3.3	.86210	1.00	5.00
	Master's and higher	70	3.2	1.01830	1.00	5.00
	Total	177	3.0	.83737	1.00	5.00
Imp. Barriers	High school or less	16	3.4	.52540	2.50	4.13
	Diploma	36	3.2	.49094	2.38	4.50
	Bachelor’s	55	3.3	.58026	2.13	5.00
	Master's and higher	70	3.6	.89019	1.63	5.00
	Total	177	3.4	.71956	1.63	5.00
Barriers	High school or less	16	3.4	.48717	2.57	4.29
	Diploma	36	3.3	.61483	1.71	4.57
	Bachelor’s	55	3.1	.72654	1.86	5.00

	Master's and higher	70	3.7	.80060	1.71	5.00
	Total	177	3.4	.75445	1.71	5.00

Those with a Master's degree or above showed the highest score (3.65) followed by high school qualification (3.40), Bachelor's (3.30) and Diploma (3.24). The post hoc test showed a significant difference between Master's level and Diploma (p=0.027) and between Master's level and Bachelor (p=0.038). The final significant effect of education was found for the barriers' scale, F (3,173) = 6.86, p=0.000. Again the highest score was generated for those with a Master's level (3.75) followed by a high school qualification (3.45), Diploma (3.33) and lastly Bachelor's degree (3.19) as seen on table 4-15

Table 4-16: The ANOVA Table Presenting the Overall Difference and Significance between the three education levels in each of the Scales

			Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
Purpose	Between Groups	percentage	2.8	3	.960	1.487	.220
	Within Groups	No of response	111.6	173	.646		
	Total		114.5	176			
Benefits	Between Groups	percentage	2.4	3	.801	1.079	.360

	Within Groups	No of response	128.4	173	.742		
	Total		130.8	176			
Imp.Barriers	Between Groups	percentage	5.6	3	1.897	3.841	.011
	Within Groups	No of response	85.4	173	.494		
	Total		91.1	176			
Barriers	Between Groups	percentage	10.6	3	3.552	6.865	.000
	Within Groups	No of response	89.5	173	.517		
	Total		100.1	176			

Table 4.16 represents the Anova table presentation of the overall difference and significance between the various levels of Education within the academic group. It shows that percentage has 2.8%, Benefits =2.4%, Imp. Barriers =5.6%, Barriers=10.6 %. Educational levels are considered relevant as it helps with the understanding of the TQM implementation.

4.18 Summary

This chapter has presented the findings that emerged from the data collected from Nigerian construction organisations using interviews and a questionnaire. Multiple sources of evidence, including face-to-face interviews and questionnaire, documentary review, archival records, and direct observations were used during the data gathering exercise in order to enhance the internal validity of this research. Questionnaire respondents were experts from Nigerian construction companies and found to have a low level of understanding of the purpose of TQM. This was

also the situation amongst practitioners identified as mainly involved in the delivery of construction projects in Nigeria, who participated in the semi-structured interviews and questionnaire survey. The researcher also observed that there was no uniformity in response as many interviewees believed there was a training budget, but that no training was provided, while many others argued that there was no annual training budget at all. Only a few respondents reported that an annual training plan existed within the organisation, although the vast majority emphasising that such a plan was not in existence.

The analysis and findings of the data on the quality management elements that are believed to affect the implementation of TQM within Nigerian construction companies revealed that top managers are visibly and explicitly committed, and convinced of the need for TQM. These findings will be discussed thoroughly in the next chapter in light of the aim and objectives of the study. However, the research also showed that the fostering of a quality management culture was found to be relatively low among manufacturing companies in Nigeria. The study indicated that respondents do not appreciate the rewards and incentives provided by their companies because they felt it favoured some employees but not all. In addition, it showed that Nigerian construction companies were not providing appropriate training and education to their employees. Based on the analysis, no conclusion can be made about the inferential test unless it is significant ($p<0.05$); the significance level reflects the likelihood of the results being down to chance. In this study, an alpha level (p) of 5% ($p=0.05$) was used as a threshold to determine the significance of the outcomes in all inferential tests.

5. DISCUSSIONS OF THE FINDINGS

5.1 Introduction

In this chapter, a detailed discussion of the research findings is provided and links with the literature review are made. Also, the implications of these findings are presented. The discussion will be based on the aim, objectives and research questions mentioned in chapters one and four, and focused on the framework developed in section 2:21 of Chapter 2. This has enabled the researcher to assess the impediments that affect the effective implementation of TQM within the Nigerian Construction Industry. The discussion of the research findings is presented by adopting an interview approach in which the similarities and contradictions between each element in the list of factors and the corresponding interview findings are examined. This approach provides the opportunity to discuss unique issues arising from the interview findings that were not predicted in the literature.

This chapter will contribute to the achievement of the second and third objectives of the study, which are, "To explore the current Total Quality Management practices in the Nigerian construction industry' and 'To explore the drivers and barriers of Total Quality Management implementation in the Nigerian construction industry' by identifying the motives (reasons) for seeking the benefits of TQM implementation. To make it easier for the reader to connect the previous chapter, which presented the findings of the study, and this chapter, the researcher follows the same sub-headings for both chapter. Therefore, in this chapter, the general characteristics of the respondents are discussed, which is followed by an examination of the level of general TQM knowledge, and the awareness and understanding of the purpose of TQM.

Furthermore, the research findings (Chapter 4) that are concerned with the general attitude towards quality management among the respondents are discussed and the effects of the following factors on the effective implementation of TQM in the Nigerian Construction Industry: commitment and support from top management, the organisational culture/climate, recognition and rewards, training and education, employee empowerment, and involvement and the infrastructure. The chapter also discusses the relationship between the barriers as independent factors, whilst the revised framework, a critical discussion of the research methodology, and the limitations of the study are presented.

5.2 General Characteristics of the Respondents

In terms of respondents' educational level, 70 participants held a qualification equivalent to a Master's degree or higher (39.5%), whilst 55 stated that the have a Bachelor's degree (31.1%), 36 had Diplomas (20.3%) and 16 participants recorded a high school level qualification or below (9%). The reasons for the greater response rate amongst those with higher qualifications could be due to the influx of university or college graduate students each year seeking jobs where the supply is a lot higher than the demand. This suggests that availability of qualified staff at a certain level is not a major problem. The indication from this research is that the respondents are well-educated and the construction companies in Nigeria have considerable interest in recruiting people who hold at least a university degree.

Another finding was that many of the respondents came from public companies, followed by the private sector. However, it is worth mentioning that a relatively low percentage of the respondents came from private companies, which is not unusual since the government is still encouraging privatisation in Nigeria. However, the implication of the low percentage of respondents from the private organisations suggests that organisations in Nigeria do not have strong links with owned companies, or with internationally based organisations in the construction sector.

5.3 Understanding the Purpose of TQM and its Principles

Due to the current focus on TQM, there is a danger that management could become familiar to a certain degree with the standard and then assume that they understand it fully, where, in fact, they only have a limited view (Taylor & Adair, 1993). Therefore, it was important to assess management understanding, in particular amongst top and middle managers, and supervisors in terms of whether their awareness of the terminology had been converted into an understanding of its meaning and intent. In each company there is usually a group of reasons behind certification and the researcher believes, based on the literature (Brown *et al.,* 1998; Taylor & Meegan, 1997), that these reasons also affect a company's decision to make sustained progress towards TQM once certification is obtained. This belief led the researcher to suggest that the companies that chose to gain certification for internal reasons were more likely to progress towards TQM than those motivated by external reasons. Moreover, the researcher has detected the existence of significant factors on the influences the effective implementation of TQM. In this sense, it could be argued that companies that are planning, or have decided to

continue, their TQM journey towards the effective implementation are those that give greater importance to 'internal improvement' when deciding to pursue certification rather than the 'international marketing' and 'external pressure'. It can be said that the most agreement was generated for the item ‘TQM can provide a disciplined means of producing goods/services for customers’ (M=3.68). Almost 69% of the participants either agreed or strongly agreed that TQM provides a disciplined means for providing good services and goods to customers. Secondly, there was a strong agreement that ‘TQM can reduce resource wastage’ (M=3.67); 67% of the participants either agreed or strongly agreed with this statement highlighting the important role of TQM in reducing resource wastage. In the third rank, participants showed agreement (61%) that ‘TQM can be used to demonstrate that this is a total quality organisation’. In comparison, the least agreement was generated for the statement, ‘TQM help to strengthen the control over operations’ (M=3.51), although the item still illustrates more agreement (61%) than disagreement.

This result is supported by Escanciano *et al.* (2001) who conducted their study in Spain and found that companies who registered and were willing to make internal improvement were more likely to progress towards TQM. However, Escanciano *et al.*,(2001) used a different measurement instrument and utilised non-parametric tests. Therefore, it could be argued that companies seeking certification mainly for advertising purposes or as a result of external pressure tend to be less ‘quality management aware’ (Erdal & Ghosh, 1997), and thus concentrate more on certification than on real quality management improvements (Santos & Escanciano, 2002). Sun and Cheng (2002) noted that companies that consider certification only as a tool to compete in the domestic and international markets might miss the opportunity to profit from the potential for systemic organisational and performance improvements.

However, the study identified a low level of awareness of TQM amongst participants. The participants who were familiar with TQM were asked to select a statement (or provide their own) to best describe the purpose of TQM, as awareness is not necessarily mirrored in the levels of understanding of the concepts. The result showed that the respondents highly agreed that the major purpose of TQM is to provide a means of guaranteeing high-grade products and services and to establish a method of consistent documentation in the construction sector. Other respondents considered TQM as a new name for a ‘not-so-new’ management practice. This result reflects a poor understanding of the purpose of TQM (Al-Khalifa & Aspinwall, 2000; Meegan & Taloy, 1997). However, the awareness and understanding of TQM are only the

beginning of a process in quality management, as highlighted by researchers (Hill *et al.*, 2001; Najmi & Kehoe, 2001; Oakland, 2003). However, the findings of this study revealed that the real purpose of TQM might be misunderstood by Nigerian construction companies as being limited to quality conformance. This result is in line with the findings of Al-Zamany *et al.* (2002) who found that the level of awareness of TQM issues in Nigerian organisations is very low and there is a poor understanding of its purposes. They explain that this is a result of a lack of information, and training and education programmes on quality issues in Nigeria. Such limited knowledge was highlighted in the literature as a major impediment to further quality development (Curry & Kadasah, 2002; Magd & Curry, 2003; Meegan & Taylor; 1997; Zairi, 1996), and is expanded within the findings of this thesis. Moreover, the results indicated that the understanding the purpose of TQM increases with the length of work for a company, which illustrates the degree of variation among respondents regarding the level of understanding.

5.4 Quality Management to TQM

Researchers, such as Escanciano *et al.* (2001), point out that the situation in which a company finds itself after certification relates to the date on which such certification was obtained. Thus, if this is true, companies that have been certified for longer should be those moving towards TQM since they should have had the opportunity to objectively evaluate the positive effects of certification for every aspect of the construction company. In other words, it is logical to assume that firms that are more concerned with quality try to implement TQM policy and practice regardless of certification; consequently, their quality management journey does not necessarily relate to the year in which certification is obtained. This result contradicts the experience of Jones *et al.* (1997) and Casadesus *et al.* (2000) who share the same opinion; they state that companies mature as they age and thus increasingly appreciate the advantages derived from certification, which probably will lead them (or would have led them) to the practice of TQM. Therefore, they assumed that companies with earlier certification would have applied TQM beforehand because quality improvement is important to them. In this sense, it was assumed that companies certified for a longer period are those more likely to progress towards total quality.

5.5 Concern for Quality Management

The study investigated the extent to which the concern for quality management was considered an essential factor for the success of any quality initiative. The results from this research

revealed that most of the respondents considered quality management a strategic issue. This high percentage suggests that respondents are aware of the importance of quality management to their organisation. Also, the result suggested that organisations take quality management seriously, as the majority of respondents have ranked it among their top three strategic issues. Overall, it could be argued that the respondents were aware of the importance of quality management to their organisation. A similar result was achieved in the study by Curry and Kadasah (2002), which was conducted in Saudi Arabia. This result is also consistent with Oakland's (2003) claim, which emphasised the importance of quality management as a strategic issue and stated that it could lead to improvments in the organisation's performance.

5.6 Responsibility for Quality

In spite of the high levels of awareness regarding the strategic importance of total quality management, it was interesting to note the limited number of companies that distribute responsibility for quality management amongst all employees. This potentially reflects the assumption that the quality control department is ultimately responsible for quality management. The reason for such an assumption could be the emphasis placed by companies on obtaining TQM certification, which has been the primary responsibility of the quality department (Curry & Kadasah, 2002). This could also reinforce the misunderstanding amongst employees as to the purpose of TQM. This result suggests that construction organisations do not have a good grasp of TQM, since it seems apparent that they continue to practice classical quality control rather than shift to TQM. TQM theory states that quality management is the responsibility of all employees (Dale, 1999; Oakland, 2003), although the study found little evidence of this. Thus, it could also be argued that these organisations are not able to distinguish between quality management and quality control. Mathews *et al.* (2001) and Bayazit (2003) stated that quality is not the job of just the quality department, and instead that quality management philosophy proposes the management of human resources as a paramount consideration. Thus, a fundamental consideration is the empowerment of employees to accept responsibility for quality (Osuagwu, 2002; Thiagrajan & Zairi, 1997)

5.7 To Critically Evaluate The Critical Success Factors And Barriers To TQM Implementation In The Nigerian Construction Industry.

This discussion was based on the third objective and addressed the following factors.

5.7.1 Top Management Commitment and Support

The commitment of top management has been identified as one of the major determinants of successful quality management programmes. Such studies have advocated a high level of commitment (Ahire *et al.,* 1996; Antony *et al.,* 2002; Aspinwall, 1999; Bayazit, 2003; Conca *et al.,* 2004; Oakland, 2003; Saraph *et al.,* 1989; Tamimi, 1998; Yousef, Tsang & Antony, 2001). These researchers maintained that the commitment of management must be constant and embrace all departments, as well as customers, suppliers, and sub-contractors. Hradesky (1995) advocated the integration of major activities under the TQM umbrella, and the need for the participation and performance from top management, with an appropriate dedication of both time and resources. In comparison, the result showed moderately outcomes for top managers in: identifying quality goals and objectives; devoting time for quality; allocating adequate resources to improve quality; giving priority to quality; supporting any change required in style and structure in order to promote the new culture, and frequently discussing the importance of quality within company meetings. Also, the findings showed that the respondents were not sure of whether their top managers actively listen to their employees and check their progress. Moreover, they were certain whether their top managers were slow in showing active involvement in quality-related activities. Therefore, in the context of this study, top management is viewed as being reasonably important when it comes to TQM implementation, and it could be argued that the commitment of top management does not appear to be a limiting factor in effectively implementing TQM in the Nigerian construction industry.

However, it should be noted that such results might not represent a true picture of the commitment of top managers to quality management. It is therefore possible that some respondents are members of top management teams and evaluated their colleagues more highly than is actually the case. Another potential reason relates to the culture and nature of Nigerian citizens, who usually do not like to directly criticise superiors. The literature claims that

commitment to quality amongst top managers is fundamental to the success of quality initiatives. This is apparent in both empirical studies and the publications by quality gurus. According to Juran (1974) and Deming (1986), most of the problems associated with quality are attributed to management. Furthermore, the commitment of top management is also highlighted as a critical factor by several empirical studies.

Ebrahimpour (2001) noted that the commitment of top management was cited as one of the obstacles to the implementation of quality management by eight of the eleven firms they interviewed. Moreover, Steven and Stanton (YEAR, cited by Thiagarajan & Zaire, 1997, p.270) state that, "Everything starts with a committed and passionate leader of the business organisation, a leader who is really committed to making fundamental change". Thus, this requires managers and employees who understand the mutual benefits of employee involvement, and government leaders who recognise the benefits of TQM implementation for economic development, and managers and workers who realise the benefits of accepting positive change. Moreover, the impact of top management commitment on the success of any quality initiative within the construction sector has repeatedly been documented (for example, Antony *et al.*, 2002; Sebastianelli & Tamimi, 2003). In terms of this study, a significant effect was also found on the Implementation Barriers: $F(2,174) = 6.87$, $p = 0.001$, whilst the highest score was found within the >10 years group, followed by the <5 years group (3.53) and finally the 5-10 years group (3.21), and a significant difference was found only between the 5-10 years and the >10 years groups ($p = 0.001$). Furthermore, a final significant effect was similarly found on the Barriers: $F(2,174) = 3.20$, $p = 0.043$. Thus, the >10 years group had the highest mean (3.62) followed by the <5 years group (3.48) and finally the 5-10 years (3.30). The post hoc test showed significant differences between the >10 years group and the 5-10 years group ($p = 0.037$).

Therefore, the results of this study are consistent with the research of Curry and Kadasah (2002) and Baidoun (2004), whose studies were conducted in Saudi Arabia and Palestine, respectively. They, like this study, identified commitment and support from top management towards quality management efforts. However, the result of this study differed from that of Al-Khalifa and Aspinwall (2001) in Qatar, who found that there, was a lack of top management commitment and support to quality management and considered this a contributing factor that leads to an ineffective TQM implementation.

5.7.2 Organisational Culture/Climate Dimensions

Organisational culture is considered an important context for this study; one of the reasons for including this within the study is that it clarifies an important part of an organisation's internal environment, including a set of assumptions, beliefs, and values that members share and use to guide their attitudes and behaviours (Al-Khalifa & Aspinwall, 2000). Consequently, it is expected that these assumptions and values would guide and impact on the type of relationship between managers and employees, and particularly on the decision-making style and degree of trust, empowerment, and cooperation among employees at all levels of the organisation (Hind, 1996). Therefore, understanding the work environment and the characteristics of the organisational culture in Nigeria is necessary to help plan the climate and cultural transformation for effective TQM implementation. Developing a culture and climate to support TQM is far more difficult than implementing TQM in an already receptive environment (Hanson & Klafsjo, 2003). Also, research conducted by Tsang and Antony (2001) found that one of the most critical success factors for the successful implementation of TQM in the UK service sector was a cultural change. Thus, participating companies were assessed for several critical cultural features, which could influence the climate and cultural changes needed to effectively implement the TQM philosophy.

However, indicating employee resistance to change, one of the interviewees said:

> *"Employees are used to the current system and they do not desire change. Standing up to the challenges and changing the current situation is a difficult job because it requires a change in the national culture".*

Furthermore, an appropriate 'management style' is considered essential if TQM is to have any chance of success, and the results from this study suggested that the management style was more likely to be authoritative than participative. Thus, it could be argued that the top managers are using an autocratic leadership style in their organisations. According to Al-Dahhan (1998, p.55),

> *"Managerial behaviour, which remains strictly within the framework of the authoritative and TQM structure of the organisation, seeks to prepare subordinates to accept decisions already made by managers and to improve the individual managers' images in the society".*

Another important requirement for TQM is the need to have 'flat' organisations instead of a traditional hierarchical structure. Organisations that have successfully implemented TQM have

been shown to dismantle their vertical structure (Osuagwu, 2002). However, the results indicated that there are excessive layers of management, which employees need to navigate when they need help. This reflects the degree of centralisation in the decision-making process amongst participating companies. Consequently, it could be understood that companies in the survey suffer from excessive bureaucracy, excessive rules, and administrative requirements, which could make it difficult for new and innovative ideas to be properly considered (Rawabdeh, 2002). Also, this may discourage employee creativity in problem-solving (Awamleh, 2002). This finding is hardly surprising considering that one of the manifestations of Nigerian culture is a preoccupation with status and prestige (Al-Dahhan, 1988). Thus, this current study similarly reflects concentrations of power, paternalism, and personalism, which could represent a bottleneck and a hindrance to new and innovative ideas.

Moreover, the philosophy of teamwork over individualism is an essential principle for TQM, and this was given low importance by the respondents. However, teamwork has to have an appropriate environment to succeed. As Deming (1986) noted in one of his now famous fourteen points for management, 'Drive out fear so that everyone may work effectively for the company', this directly conflict with the concentration of power which limits the contribution of teamwork. The low averages for the adoption of teamwork and cross-functional teams may affect the operation of organisations and impede any TQM adoption (Bayazit, 2003). Nevertheless, both culture and lifestyle, which reinforces extended family structures, is also an important factor, as well as the religious belief in sharing; these attributes could mitigate individualism and support teamwork. Even though these characteristics of culture could support the formation of teams (Darwish, 2000), the findings showed that their running and operation was hampered by other cultural attributes as well as the moderately low perceptions of other cultural elements. The adoption of teamwork to identify and solve problems is employed to some extent; however, this is not supported by the adoption of cross-functional teams. In this respect, one of the interviewees stated that:

> *"Culture and interdepartmental relations are ascertained to be impediments to TQM. The company work culture and company mission and objectives are not synergistic. Additionally, lack of coordination between departments is also seen to be detrimental to successful TQM implementation, also middle managers are resistant to change".*

This study mirrors the findings of Adebanjo and Kehoe (1998), who studied TQM implementation in UK construction organisations, and found that not only were team-building

techniques not employed, but that TQM was considered a quality management problem. The literature (Dale, 1999; Deming, 1986; Oakland, 2003) stated that quality organisations prioritise high-quality communication, stressing the importance of a constant two-way dialogue (between management and employees) and that communication has to be open so that autonomous teams can conduct internal communication and teams can talk to other teams to good effect. Nevertheless, some restrictions on communication channels exist among Nigerian construction organisations, which employees are expected to navigate. This suggests that the level of warmth and fellowship amongst employees is low in the companies. One of the interviewees stated that, "The relationship between managers and their employees is really bad. In fact, there is no affection prevailing between them". Thus, the prevailing organisational culture/climate appears not to be conducive to new management change initiatives, and is hindering TQM adoption.

5.7.3 Reward and Recognition

Reward and recognition systems play a major role in the effective implementation of TQM (Meegan & Taylor, 1997). An important feature of any quality improvement programme is to show due recognition for improved performance by any individual, section, department or division within a company, including the construction sector (Dale & Plunkett, 1990, cited in Zhang *et al.*, 2000). Crosby (1996) considers recognition to be one of the most important steps of the quality improvement process. The findings of this study revealed that respondents do not appreciate the rewards and incentives provided by their companies, as the limited budget for rewards, the absence of appropriate opportunities for promotion, and the low recognition of employees' individual and team achievements in quality improvement scored highly. Respondents also believe, to an extent, that there is a lack of appropriate reward and recognition for outstanding performance, that compensation is not linked to the achievement of quality goals, that employees feel unsuitably rewarded for their contribution in general, and that there is a lack of formal system to encourage and reward employees. Moreover, it could be seen from the responses that management, in general, are not encouraging, rewarding or even evaluating the employees' suggestions in quality matters. A statement from one of the interviewees supports this result: “To be honest, there is a lack of incentives to perform quality work and innovation is not rewarded at all. That is because of the lack of resources". Another interviewee stated that: "There is no formal system for reward and recognition in the organisation, therefore,

all the reward and recognition that the employees might receive is mainly based upon the personal relationships".

This mirrors the findings of Adebanjo and Kehoe (1998), who found that worker evaluation, lacks a systematic approach and hence salary adjustments are not commensurate with job functions, and appreciation for worker contributions is not apparent. Favouritism rather than merit was seen as an important criterion on which to promote employees. Adebanjo and Kehoe add that such an approach gives little attention to self-development and management development. This view is supported by Ali (1997), who stresses that family ties and ideological affiliations have an impact on Nigerian people outside and inside organisations, and this affects organisations' practices and relationships between people inside organisations. For example, social connections and 'who you know' sometimes play a major role in recruitment, promotion, or the award of better opportunities at work. Such subjective measures might, however, affect wider relationships and the level of trust between managers, employees and even customers. London and Higgot (1997) consider a transaction in corporate culture as one of continuous improvement and a fundamental requirement in establishing TQM processes. In this sense, they consider that an effective reward and recognition process provides a clear and visible statement to all employees of the organisational values and the commitment to employee involvement. Zhang (2000), states that recognition and reward activities should effectively stimulate employee commitment to improve quality, whilst other authors highlight the importance of rewards and recognition in the TQM process generally (Binney, 1992; Rao *et al.,* 1999). After reviewing the best practice of quality leaders in Europe, Japan and the USA, Johnston *et al.* (2001) concluded that rewards and recognition are one of the enablers that maximise employee involvement. They added that rewards and recognition are one of the main contributors to the company's quality journey, which appears not to be the case in this research.

5.7.4 Training and Education

Training and education represent a cornerstone for individual and collective development (Sharrna & Gadenne, 2002). Continuing education and training is one of the most vital issues in the successful adoption of comprehensive quality management strategies such as TQM (Ahmed & Hassan, 2003). Haupt and Whieman (2004) found that there is a relationship between the training of employees and TQM implementation. Also, training and education are important for the preparation of an organisation for change, for the accomplishment of the

change itself, and for its institutionalisation as a permanent part of the organisation. The study found that respondents have a negative attitude towards the training and educational processes in their organisations. The results revealed that employees were not trained in either problem identification or problem-solving techniques, or group discussion and communication techniques. In addition, the study revealed that quality awareness-building among employees was not ongoing in the companies; moreover, seminars and workshops in quality issues were not arranged on an ongoing basis, and training and education does not cover all the workforce as part of an ongoing process, Meanwhile, resources are not available for employee training in the company, and quality management-related training was not given to all employees throughout the company. Thus, training is not regarded as one of the most important factors to improve quality, as companies are not giving sufficient time to train all employees, and employees are not trained in teamwork. Moreover, the study revealed that some companies do not provide training for their employees, as they believe it is a waste of time and money. Therefore, the respondents do not perceive that their organisation places any importance on the education and training of employees. This can be seen as an indication of the lack of commitment and seriousness of the companies to the development of a quality culture. As one of the interviewees stated:

> *"We are reluctant to train our employees simply because when the employees become qualified they leave to other companies which might offer them more salaries and other opportunities that we could not offer. So we do not want to spend our money for the benefit of others'".*

Moreover, it is clear from the responses that managers have a lack of time to attend any training programmes, as one of the interviewees commented:

> "*Middle managers are occupied in doing so given that one of the primary objectives of every quality management system is to improve continuously, this study has identified the lack of quality management continuous training and education that could be considered as an important barrier to the successful transition towards TQM many tasks that it becomes hard for them to participate in the training courses".*

It follows that, if the current training and education regime does not adequately equip employees to competently perform their roles, this may contribute to an investigation into the issue of training and education. The respondents were asked if they had received any quality-related training in their organisation. The results show that more than two-thirds had not received any such training. However, for the rest, the most frequently attended training courses among respondents contributed to the failure of many quality management programmes and

systems. When asked about the reasons for not attending any training courses, the respondents stated their company did not require them. Lack of time also was cited as one of the main constraints, indicating that training is often superseded by other more pressing priorities. Other respondents believe that they knew everything and had nothing left to learn. This result is contradicts the findings from the research conducted by Hill (1997), which highlighted that organisational learning (i.e. exposing organisational members to new ideas, expanding their knowledge, altering their behaviour, and internalising new insights) is one of the main driving forces for the introduction of TQM, and that quality circles are a useful vehicle at the early stages of the learning journey. Hill (1997) indicated that organisations wishing to implement TQM must address the issue of organisational learning, whereby change and learning must go hand-in-hand.

This result also supported the findings of Tamimi and Sebastianelli's (1998) study; they found several factors working against TQM implementation. The major barrier cited was the lack of training in areas, such as group discussions, communication techniques, quality improvement skills, problem identification, and problem-solving techniques. Masters (1996) found that one of the contributing factors leading to ineffective TQM implementation is the absence of continuous training and education. Likewise, Adebanjo and Kehoe (1998) identified a lack of training programmes to enhance workers' skills and involvement in quality improvement activities as one of the quality management problems. The results of these studies conducted by Antony *et al.* (2002) and Bayazit (2003) show that a lack of training and education was the most important factor for unsuccessful TQM implementations in Hong Kong and Turkish industries, respectively, which accords with the results of this study. Moreover, Amar and Mohd Zain (2002) observed that poor education and training present a major obstacle to the development and implementation of a quality programme, while a lack of understanding and proper training are considered to be significant contributors to employee resistance.

5.7.5 Employee Empowerment and Involvement

A key component for the achievement of an organisational transformation is to allow employees to become comfortable with change (Bayazit, 2003; Carlsson & Carlsson, 1996). However, for quality management to be effective, it necessitates the full participation of all employees. A study conducted by Lawler (1996) in the USA concerning the Fortune 1000 found that there was a strong correlation between the integration of employee involvement and

TQM. Meanwhile, Zhang *et al.* (2000) found that employee participation is a critical construct for successful implementation of TQM; similar findings reported by Rao *et al.*, (1999). The issue of employee empowerment and involvement is a critical quality factor for a successful TQM implementation and has been addressed by various writers (Baidon, 2004; Lau & Idris, 2001; Sohal & Terziovski, 2000; Stewart & Waddell, 2003; Tari, 2005).

The results showed that there was a lack of employee empowerment and involvement among the construction companies in Nigeria as the respondents negatively evaluated the empowerment and involvement of employees in their organisation. It was found that employees' suggestions were not implemented, quality circles were not in use, and employees were not given the necessary resources to solve any quality problems that arise. Moreover, it was understood that a continuous learning process was not employed in the company, employees were not empowered to accept responsibility for quality, and were not kept informed of anything that concerns their company and their work. Furthermore, the results indicated that employees were not encouraged to offer suggestions, were not involved in decision-making or day-to-day activities, not encouraged to inspect the quality of their products or fix any quality problems, and not empowered to implement quality improvement efforts.

Indeed, managers sometimes felt threatened by the idea of delegating authority and empowering employees in view of the lack of employee-management trust. Another possible reason that leads to the failure of employee involvement is the negative and passive attitude of employees towards management in the Nigerian culture. This means that the prevailing reality will deny the participation and the ideas of employees at lower levels of management, which will adversely affect the acceptance and implementation of TQM in subsequent phases (Al-Khalifa & Aspinwall, 2000; Aly, 1995). Moreover, the results of this study contradict those of Antony *et al.* (2002) who found that employee involvement is not critical for TQM success in Hong Kong organisations. However, the findings of this study support the result of Salegna and Fazel (2000) who surveyed the obstacles faced by TQM and non-TQM organisations and found that a lack of real employee empowerment was one of three major obstacles facing TQM organisations in the USA. However, it is evident from the literature that the greater the extent of employee empowerment and involvement, the greater the positive impact on operations. Ahire *et al.* (1996) found, in their empirical study, that human resource management is a key influence on the successful implementation of quality management as it shapes the quality

management environment through empowering employees to make decisions related to quality.

5.7.6 Infrastructure Factors

It could be seen that the difficulties associated with quantifying the benefits of quality management systems play a major role in the effective implementation of TQM within the Nigerian construction industry. This is supported by Al-Khalifa and Aspinwall (2000), who found that the intangibility of the benefits associated with TQM implementation were among the obstacles to its adoption. Moreover, in the USA, Salegna and Fazel (2000) found that the lack of benefits was considered one of the major obstacles to the adoption of TQM. The lack of required resources and the traditional belief that ‘quality costs money’ were found to be among the most important factors. It seems that the respondents simply did not believe 'quality is free' which is contradicts the claim of Crosby (1979). This suggests that they do not understand TQM and what it required to successfully implement TQM. One of the interviewees supported this result by stating that,

> *"It is too soon to think about initiating or launching TQM in our organisations. The implementation of TQM needs an investment of a lot of money, which the company could not afford. Moreover, I believe that the benefits that might be obtained from TQM will be less than the cost of acquiring it. On the other hand, the implementation of TQM would require an evolution in both national and organisational culture, which needs more time and resources".*

This finding is consistent with the study conducted by Salaheldin (2003) who found that some manufacturing firms highlighted resource limitations as one of the forces that hinder the introduction of TQM into Egyptian construction firms. This may stem from the reduction of funds and grants that the Egyptian government provided firms as a result of the implementation of its privatisation policy. This result also supports Mersha's (1997) finding concerning the main factors that complicate quality improvement efforts in SSA companies, whilst Masters (1996) and Tamimi and Sebastianelli (1998) found that insufficient resources were one of the contributing factors leading to an ineffective TQM implementation.

Among the second important group of infrastructure factors that represent an obstacle to the adoption of TQM, was a lack of expertise. In addition, the holistic nature of TQM was regarded as a force that inhibited its adoption. However, respondents were not sure of the readiness of their organisations to launch TQM; therefore, it could be argued that the construction

organisations in Nigeria are not yet ready to implement this process. Moreover, it is clear that Nigerian construction companies are convinced of the necessity of TQM adoption, and that this starts a quality assurance project with an intention for continuous improvement. This result reflects the findings of Escanciano *et al.* (2001), who found that nearly 80% of firms stated that they were planning, or had already begun the installation, of TQM, taking as a base their certified quality system. To summarise, the results showed that respondents perceived insufficient infrastructure, the lack of intangible benefits, a lack of resources, cost, a lack of expertise and the holistic nature of TQM as barriers to inhibit the adoption of TQM.

5.8 Discussion of the Revised Theoretical Framework

The conceptual framework developed from the literature has many key elements. However, the analysis of the empirical fieldwork revealed that some quality management factors are perceived as impediments, which are generally considered essential for the successful implementation of TQM. Therefore, from the literature review and the findings of this study, the researcher believes that the emphasis should be placed on overcoming the following factors in order to enable the successful implementation of TQM:

- A lack of TQM knowledge
- A lack of Top Management commitment and support
- Inappropriate organisational culture/climate
- A lack of rewards and recognition
- A lack of employee empowerment and involvement
- A lack of training and education

The following section provides a brief justification for inclusion of these elements in the framework.

5.8.1 A Lack of TQM Knowledge

The discussion in section 2.15.1 considered employee awareness of the purposes of TQM a crucial element for its successful implementation. They embraced this approach without understanding its impact on the long-term management practices of their organisations and thus failed to achieve lasting improvements. Therefore, a lack of TQM awareness should be viewed

as a step towards TQM and not the 'end of the journey'; thus, this element has been included in the framework.

5.8.2 A Lack of Top Management Commitment and Support

The need for commitment and support from top management for quality management was established in section 2.13.1. In spite of the results from this study, top management commitment and support has been kept within the framework. The rationale for this decision is that the literature repeatedly states the importance of this factor, and the result from the (primary) data analysis reinforces this, through the challenges discussed. Consequently, it has been considered one of the most significant factors and is thus included in the framework.

5.8.3 Inappropriate Organisational Culture/Climate

As discussed in the literature review, a supportive organisational culture is considered one of the factors that affect the successful implementation of TQM. Despite that, the results of this empirical study have shown that the prevailing organisational culture/climate appears not to be conducive and therefore, a potential hindrance to the implementation of TQM. For this reason, it has been included within the framework.

5.8.4 A Lack of Rewards and Recognition

The importance of employee reward and recognition regarding TQM implementation and improvement, and quality management programmes was discussed in sections 2.13.4. The study found that there is a lack of appropriate reward and recognition systems among Nigerian Construction companies, which potentially influences employee engagement in the process; therefore, it could be argued that this element should be included in the framework.

5.8.5 A Lack of Training and Education

The discussions in sections 2.13.5 and 6.1.4 identified that training and education are important factors for the effective implementation of TQM. However, this study has identified the lack of continuous training and education regarding quality management as an impediment to the successful transition to TQM within the Nigerian Construction companies, as discussed in section 2.11.7; consequently, it is included in the framework.

5.8.6 Lack of Employee Empowerment and Involvement

The importance of employee empowerment and involvement was established earlier in sections 2.13.6 and 6.1.5. The findings of the current study show that employee empowerment and involvement were found to be very low among the construction industries in Nigeria. Therefore, it was considered an impediment to the successful implementation of TQM and included in the framework.

5.8.7 A Lack of Infrastructure Factors

The result of this study has identified some infrastructure factors that impact on the effective implementation of TQM, as discussed in section 2.15.7. Hence, infrastructure factors were considered being important factors for inclusion in the framework. Accordingly, the theoretical framework was revised in light of the findings from the empirical research.

5.8.8 Links between the Elements of the Framework

The information from the literature review and the primary data ascertained that there are some links between the elements of the framework. The arrows have identified the mutual effect of the elements of the framework. It is observed from previous literature that the lack of understanding of the purpose of TQM impacts on an effective TQM implementation within business, and particularly the Nigerian construction sector. As previously mentioned, the misunderstanding of the purpose of TQM has led managers within the construction companies to perceive TQM as a panacea for all organisational problems. As a result of these assumptions, their expectations were confounded regarding the benefits of TQM. This negatively affected the commitment and support of top management.

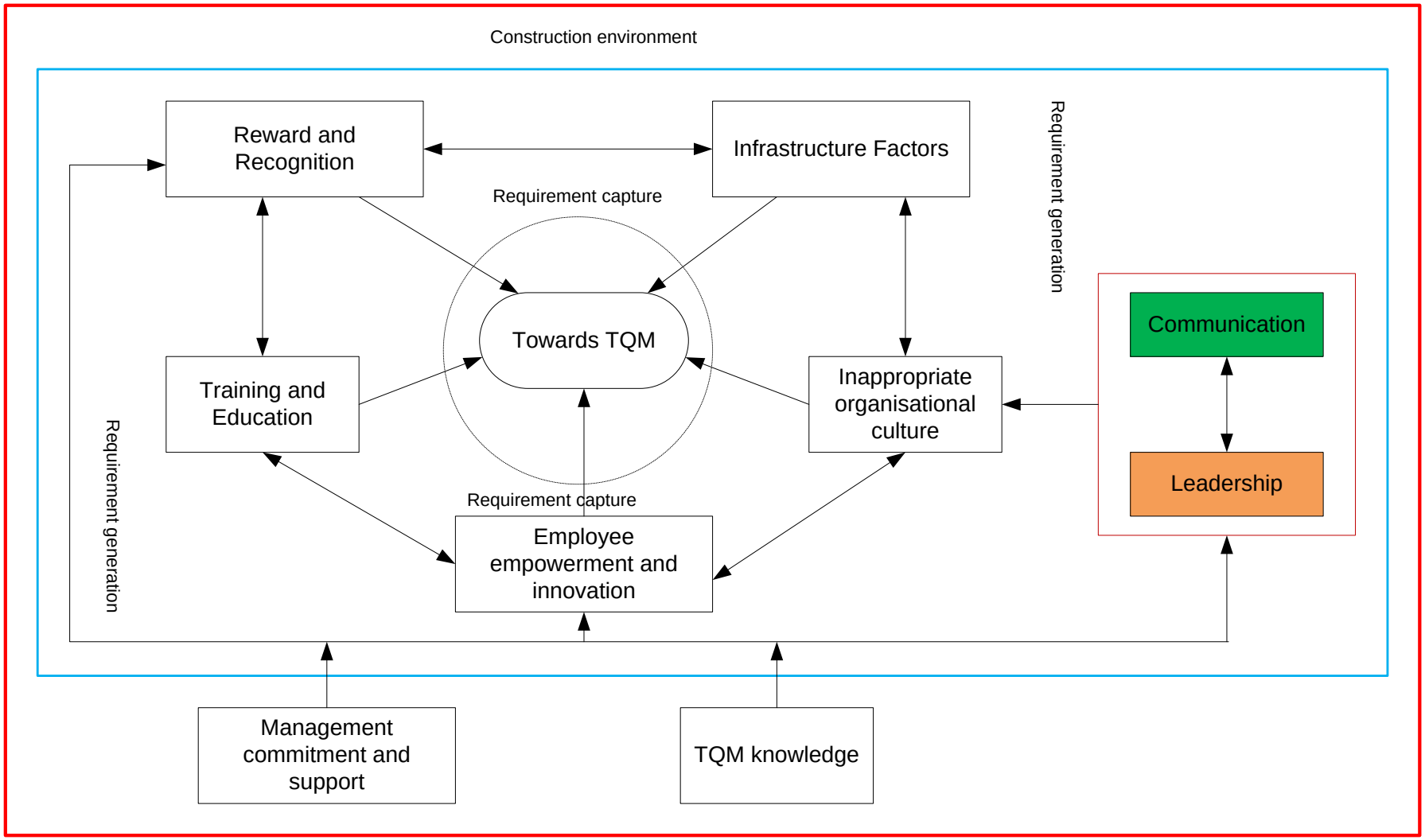


Figure 5-1: The Revised Framework

The findings of this study illustrated in figure 5.1 reasonable commitment and support from top management to quality, they also revealed that this is not reflected in their actual behaviour in companies. Evidence for this was identified within the organisational culture/climate, training and education, reward and recognition, and employee empowerment and involvement. However, it was found from the literature that top management commitment and support affects the influence of other factors, including organisational culture, training and education, employee empowerment and involvement, and reward and recognition, which in turn affect the successful implementation of TQM. Moreover, the literature emphasises the existence of a relationship between training and education and employee empowerment and involvement. Thus, it is understood that a successful TQM implementation within Nigerian construction organisations should be gradual with the progression and selection of appropriate management actions. Therefore, as the knowledge of TQM in Nigeria is still limited, a logical and simple framework is provided.

5.9 Communication

Communication is defined as an, "exchange of information and understanding between two or more persons or groups" (Omachonu & Ross, 2004, p. 28). Goetsch and Davis (1997, p. 307 give a more general definition of communication by describing it as: "the transfer of a message (information, idea, emotion, intent, feeling, or something else) that is both received and understood".

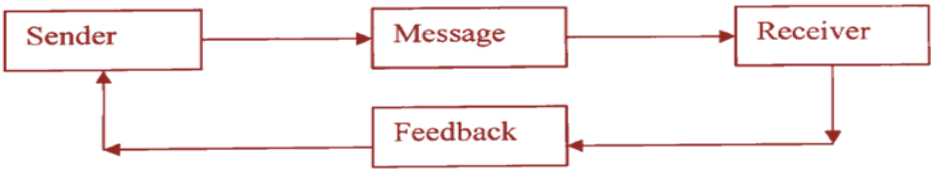


Figure 5-2: Simple Communication Model. Omachonu *et al.*, (2004)

Omachonu and Ross (2004) listed the many ways in which employees obtain information, with these being: monthly meetings between top management and staff, monthly departmental meetings, emails, organisational newsletters, memos, verbal and written feedback from a manager or supervisor. Despite the variety of forms of communication available, the construction sector predominantly uses a written form of communication (Barnett, 1992), despite evidence that using a variety of media can enhance communication within and across departments as illustrated in Figure 5-2. This does not only involve high-tech methods, such as email, but also the use of low-tech media, such as posters and graphs posted on the wall (Evans & Dean, 2000).

The future organisational vision needs to be communicated and understood, and all employees encouraged to contribute to TQM efforts (Weeks *et al.*, 1995). The plan and vision for quality by top management can lose both clarity and momentum when it is not communicated to all employees and clients (Omachonu & Ross, 2004). Therefore, it is recommended that management should gather all employees to communicate and discuss the mission. Communication of the mission should be conducted by face-to-face meeting rather than through other means of communication, and within this context, discussion and feedback should be encouraged (Thiagarajan *et al.*, 2001), since without well functioning feedback

channels, employees do not receive appropriate information in order to make suitable modifications to their performance (Weeks *et al*., 1995).

A lack of appropriate communication among management and staff has a significant negative impact on the overall educational excellence (Sakthivel, 2007). TQM requires the adaptation of communication systems to the needs of the work, and not to the needs of the hierarchy. Effective communication and effective planning for change by an organisation can overcome any apprehension felt by staff (Weeks *et al.,* 1995). In fact, communication has become an important issue in the debate on improving quality within the construction industry. Communication can be inhibited by cultural or political issues, which prevent the expression of viewpoints (Beckford, 2002). Each disciplinary community has its characteristic forms of communication, and Omachonu and Ross (2004) listed the communication difficulties that may arise when:

- Construction workers find the need to communicate to staff in other departments; or when
- Organisation staff wish to communicate to the wider society;

Weeks *et al.* (1995) argued that supportive communication is a competitive advantage, in that it strengthens satisfaction, innovation, teamwork and a common organisational vision. Management needs, therefore, to improve cross-functional communications by, for example, setting up new modes of communication, improving the management of meetings, and using information technology (Thiagarajan *et al*., 2001). It is known that vertical hierarchical communication combined with a competitive culture forms a serious barrier to collaborative efforts (Sarvan & Anafarta, 2005). Undoubtedly, communication has a positive impact on service quality, since, when an organisation disseminates the correct information throughout all its departments, it ensures that every employee understands its processes (Samat *et al.,* 2006). In TQM, employees and clients are supposed to communicate more openly and frequently with each other, precisely with the intention of guaranteeing that there is complete and common understanding about issues that impact upon service quality. Hence, a well-developed communication system that delivers accurate information that can be easily understood by all employee levels is an essential ingredient of the TQM approach. These findings supported earlier contentions (Martinez-Lorente *et al*., 1998) that effective communication is part of the cement that binds the bricks of the total quality process. Poor communication, on the other hand, can cause many problems for a quality management system

in any organisation (Wosik, 2009). Top management must, therefore, place great effort into developing a commitment to TQM through an effective dialogue with the workforce explaining why TQM should be adopted as a solution to the institution's quality and management problems (Huq, 2005). Such open communication is needed for all members of an organisation in order to exchange ideas freely and attain the common goals without restraint by status or authority (Baba *et al*., 2001).

Therefore, it can be seen that various forms of communications are available within and across departments. However, the organisational vision and mission must first be effectively communicated and understood by, all employees to ensure the successful implementation of TQM. Ineffective communication can cause many problems for TQM in any organisation and pose a serious barrier to effective implementation.

5.10 Leadership

A leader in Total Quality Management is a person who inspires, by appropriate means, sufficient competence to influence a group of individuals to become willing followers in the achievement of organisational goals. However, it is important to identify these means, and understand how these can encourage the transformation of negative feelings into positive. The study focused on leaders directing new trends in quality management; these were people creating new ideas, new policies, and new procedures. They have a reputation for bringing change to the basic quality foundations of their organisations, and are viewed as 'creative change agents', not simply masters of basic routines. Although all of these individuals were successful within their situational setting, they shared, to a large degree, four characteristic leadership strategies (Bennis & Nanus, 1985; Cornesky *et al.*, 1990). These four strategies are: attention through vision, meaning through communication, and trust through positioning, and confidence through respect.

Leadership commitment is held as one of the key determinants of a successful TQM implementation. Ideally, the initiative for implementing a TQM approach should come from top management and be implemented top-down; however, Forbes (1994) argued that, in some cases, 'shop floor' employees initiate quality improvement efforts and management subsequently support these actions by providing their commitment. In this study, the latter scenario does not hold true, since lower management levels are not in control of resources so the commitment and support from top management are thus required to initiate the process

(Sakthivel & Rajendran, 2005; Siddiqui & Rahman, 2006; Weeks *et al.*, 1995). Furthermore, within the Nigerian context, any idea needs formal approval by the top management before action is taken. Therefore, unless top management is committed to an initiative, it is difficult for any lower levels to make any progress. Weeks *et al*. (1995) emphasised that, if top management does not provide support or provides only weak support, TQM efforts are likely to fail. Thus, senior management instability is also regarded as a barrier to the successful implementation of TQM (Mosadegh Rad, 2005). This observation from the literature has some application in the case of the Nigerian construction industry.

Interviewees in organisations believed that, where TQM is in the interests of the top manager, it is likely that resources, efforts and funds are likely to be dedicated to that project, but that as soon as a new top leader (with no interest in its implementing) is appointed, the project is at risk of being dismantled, such as occurs with changes to Government politicians in Nigeria. The findings revealed that senior leaders have a very limited understanding knowledge of TQM, and it was necessary for the researcher to spend time explaining the TQM terminology and concepts. Indeed, the findings of this study identified that the knowledge and understanding amongst employees would need improvement in order to successfully implement a TQM implementation process; this particular point is made by Zaire (1994), who outlined that top management should devote time to learning about the concepts and principles of TQM such that they acquire a deep appreciation of the approach. Quality-based scholars have stated that ineffective leadership can inhibit efforts to implement TQM. Within Nigerian construction, top management, therefore, should provide the necessary support, leadership and resources, and should be trained and educated for effective leadership in the TQM effort. Moreover, instability amongst senior managers (just as in top management as referred to already) can be a serious threat to TQM initiatives. To guard against this occurrence, the construction industry needs to establish a long-term strategic vision, and all leaders should be united in their open commitment to achieving this, and their commitment should be sustained to facilitate long-term cultural change.

5.11 Validation of the Conceptual Framework

Validation represents a process where the researcher provides an account of research findings to a sample population (usually involving people on whom the research has been conducted) to request feedback on the findings (Bryman, 2004). In this research, the conceptual framework

for the effective implementation of TQM within the Nigerian construction industry was validated using construction experts in the construction industry in Nigeria. The membership of the validation team was drawn from contractors, consultants and government agencies. To validate the conceptual framework for its suitability and applicability within the construction sector in Nigeria, a five-point Likert scale varying from 'Strongly agree to Strongly disagree' was designed with a weighting allocated to each point, where 'Strongly agree' = 5, 'Agree' = 4, 'Not sure' = 3, 'Disagree' = 2 and 'Strongly disagree' = 1. The five-point Likert scale validation questionnaire was sent out to 17 selected members of the Nigerian construction sector. The selection of experts for this validation process was based on a purposive sampling technique, which involved the selecting of individuals based on a specific purpose, rather than randomly chosen (Teddlie & Yu, 2007). The purpose was to invite experts with experience of working in the Nigerian construction industry with a specific role in working with both Government and private firms to check the development of the framework in relation to the implementation of TQM within the Nigerian construction industry. Thus, the purposive technique was used deliberately to choose experts based on the qualities and expertise they possessed (Tongco, 2007). In the validation questionnaire, experts were asked to rank the conceptual framework regarding its simplicity, clarity, applicability, usefulness and comprehensiveness. They were also asked to provide comments, which, in their view, could improve the conceptual framework and its implementation within the construction industry in Nigeria (see Appendix - G for the validation questionnaire template). A questionnaire survey method was adopted for a quicker data collection from the selected experts.

5.12 The Validation Process

The validation questionnaire sought to solicit expert opinions on the modified conceptual framework regarding its simplicity, clarity, applicability, usefulness and comprehensiveness. To support the aim of this research, which was to develop a framework for the effective implementation of TQM within the Nigerian Construction Industry, the validation questions were designed in line with the philosophical stance of this research (outlined in section 3.3.4) and the data collection techniques adopted for this research (outlined in section 3.7.1). In this context, the questions consisted of both close-ended and open-ended formats. The close-ended questions sought to gauge the degree to which participants agreed with the statements provided in the questionnaire, while the open-ended questions offered the opportunity to freely provide additional information that could be relevant but not found in the questions. The 17

questionnaires were distributed via email to the selected experts, and 15 (representing 88% response rate) were accurately completed and returned, and hence used for the validation analysis.

5.13 Validation data analysis and results

In this instance, descriptive statistics were used to analyse the details of the data collected. According to Pallant (2010), descriptive statistics "describes the basic characteristics of the data in a study". It provides a summary about the sample in addition to some easily understandable graphs. The data collected from the validation questionnaire was analysed using the SPSS software package, and describes what the study has found (Najimu, 2011). Descriptive statistics were therefore adopted to provide a clear understanding of the opinions of the selected experts regarding the conceptual framework.

The experts were asked to express the degree to which they agreed or disagreed with the conceptual framework in terms of its comprehensiveness, usefulness, applicability, clarity and simplicity. As shown in Figure 5-3, 9 out of 15 experts representing 60% strongly agreed while 27% agreed that the modified conceptual framework (shown in section 5:12) is comprehensive; thus, it contains all the elements required for the successful implementation of TQM. However, 2 out of 15 experts (representing 13%) disagreed with the comprehensiveness of the conceptual framework. In relation to the usefulness of the framework, 8 out of 15 experts representing 53% strongly agreed while 20% agreed that the framework would be useful for the Nigerian construction industry. In contrast, one expert (constituting 7%) was not sure while another (7%) disagreed about its usefulness. As illustrated in Figure 5-2, two experts strongly disagreed with the usefulness of the conceptual framework.

When expert opinions were sought regarding the applicability of the framework within the Nigerian construction industry, 7 out of 15 and 6 out of 15 representing 47% and 40%, respectively, strongly agreed or agreed that the framework applied to the Nigerian construction industry, whilst two (representing 13%) were not sure. The result indicated that 11 out of 15 experts (73%) strongly agreed that the framework was clear and the content could be understood. In contrast, 27% of the experts agreed that the framework was clear. Finally, the experts were asked to indicate their degree of agreement regarding the simplicity of the framework. The result showed a positive response from the experts where 7 out of 15 experts (47%) strongly agreed while 33% agreed that the framework was simple to understand within

the construction industry and also by policy makers. Nevertheless, three experts (20%) disagreed and were of the view that the conceptual framework was not simple enough to understand. Also, one expert made the following suggestion:

> *"... May I suggest the provision of some sort of a roadmap as a guide to help local firms within the Nigerian construction industry in order to develop basic knowledge or orientation on TQM to enable e-mail communications amongst local firms within the industry..."*

The above suggestion represents a fundamental requirement, and important to guide local firms to progress beyond mere access to the fundamental requirements of a TQM implementation.

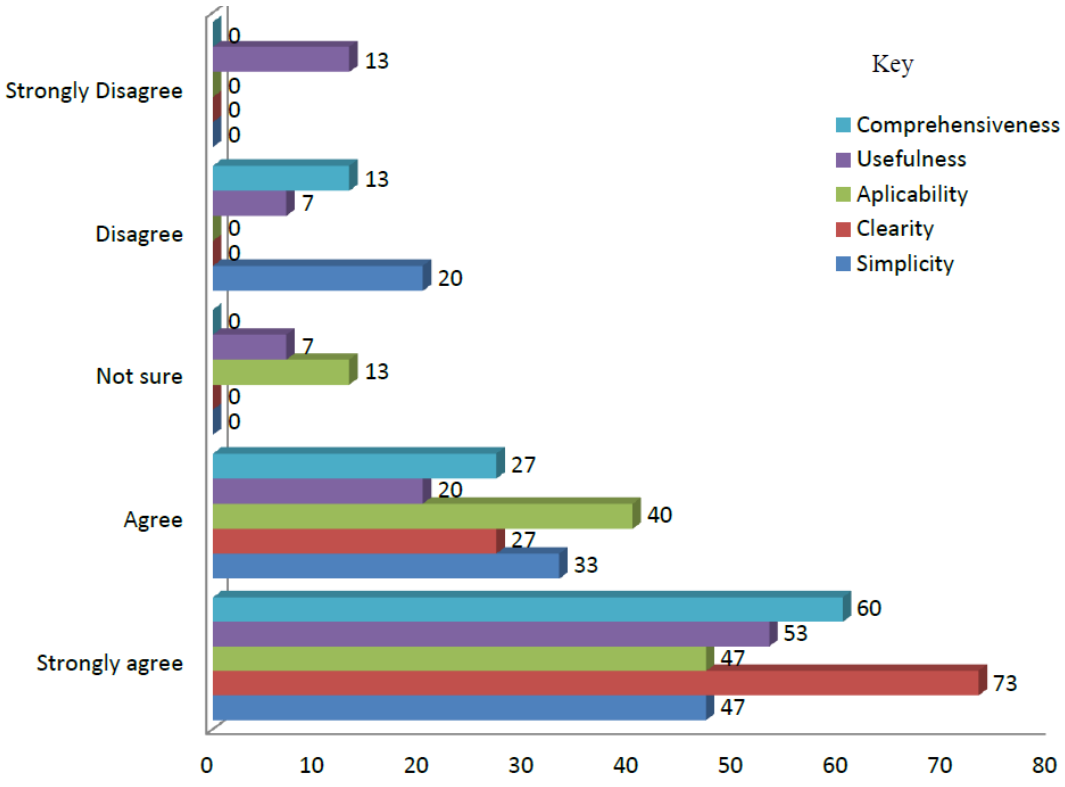


Figure 5-3: Results from the validation questionnaire (In Percentages)

5.14 Summary

This chapter discussed the findings that were generated from analysing the primary data in Chapter Five. The research methodology was also briefly reviewed to confirm its applicability for the study and the fact that it enabled the researcher to achieve its stated aim and objectives.

Moreover, some limitations were highlighted in recognition of the parameters placed on the study. The study revealed that companies that are planning, or have decided to continue, their quality management journey towards TQM are those who give greater importance to their decisions on continuous 'internal improvements' rather than 'international marketing' and 'external pressures'. However, it could be argued that this result does not reflect the findings of the study with respect to the reasonable commitment and support from top management to quality management. Therefore, it could be argued that it is not enough for management to manifest their commitment verbally; it must be transparent throughout the whole company through adequate support, monitoring, coherence, and the priority given to quality. In general, without appropriate leadership, TQM may not succeed and only dynamic leadership can create the commitment to drive a TQM strategy. These impediments provide the main elements of the framework of this research.

After the regression of the quality management elements, strong positive relationships with quality management progress were identified that suggested that these elements need to be addressed on an integrative basis if TQM is to be achieved. The theoretical framework was revised in light of the findings from the empirical research, and as a result, some amendments were made to the framework. The researcher critiqued the research methodology and the limitation of this study were presented, whilst the conceptual framework was updated and populated with key findings identified through the synthesis of data from the questionnaire survey and interviews. Furthermore, the validation results obtained from 15 selected experts through both the close-ended and open-ended questionnaire was presented and discussed. The results indicated that the framework, on the whole, was comprehensive, useful, applicable, clear and simple for implementation within the construction industry in Nigeria.

6. CONCLUSIONS, CONTRIBUTIONS AND RECOMMENDATIONS

6.1 Introduction

In this final chapter of the thesis, the conclusions will be drawn, which start with the attainment of the research aim, objectives, and questions. The contributions to knowledge, operational recommendations and the researcher's suggestions and directions for further research are also presented.

6.2 Conclusion Based On the Individual Research Objectives

In this section, the way in which the aim and objectives of the study have been achieved is demonstrated, and the answers to the research questions are provided.

6.3 Achieving the Aim and Objectives of the Study

The aim of this research is to examine 'The effective implementation of TQM within the Nigerian Construction Industry'. The aim was achieved by addressing the research objectives as follows:

- **Objective 1:** To examine the definition of Total Quality Management and its principles

This objective was achieved by the conduct of a literature review from which an understanding of TQM implementations and principles were established. This understanding evolved from three main sources, which were: experts' experiences and theories about the subject, TQM universal models (such as EFQM, MBNQA), and related empirical studies. The literature review also examined TQM-related topics within the construction sector with a special focus on the construction industry context (the main focus of this study). This first objective also attempted to answer the first research question '*What is Total Quality Management and what are its principles?*' Most of the literature related to TQM originated in, or referred to, Western countries, and only a few studies were reported from the developing economies, with even fewer conducted within Nigeria (the research context).

- **Objective 2:** To explore the current Total Quality Management practices in the Nigerian construction industry.

Based on the current literature on Nigeria, the interviewees noted that the most common issues are those where projects are not completed or are abandoned by contractors. Some of the issues were found to be the result of the Government's use of construction projects as a means of payback to individuals who contributed to their political campaign. Secondly, continuity was not considered; this was as a result of the unwillingness of a new Government to continue from the projects of a previous Government. Instead, they tended to award new contracts and abandoning existing ones. Finally, corruption is a significant issue that contributes to uncompleted projects, where contractors pay so many bribes to secure a project and once the contract is awarded, the money spent on bribes is not replaced which leads to the abandonment of projects.

Osuagwu (2012) noted the failed attempts at implementing a TQM strategy in Nigerian organisations. Osuagwu argued that the main variables implicated in such failures are early organisational efforts that are simplistically grasped, such as the perception that quality circles are the only panacea to solve all corporate problems. Thus, these and the following findings answer the research question, '*What are the current practises of TQM in the Nigerian construction organisation?'* Significant influences include: an over-reliance on statistical methods; an under-reliance on statistical methods; the bureaucratisation of TQM efforts; a failure to recognise the relationship between TQM objectives; lack of employee involvement and participation; and a failure to integrate major organisational functions into TQM activities.

- **Objective 3:** To critically evaluate the Critical Success factors and barriers to the implementation of Total Quality Management in the Nigerian construction industry.

This was achieved through the literature review, interviews and questionnaire survey. There was a general awareness of the importance of implementing TQM throughout the organisation, from the senior managers to lowest ranking employees. Moreover, given that all participants had experienced many problems within the construction sector, they were hopeful about the outcome of a TQM approach, believing this would resolve such problems. It was found that the more aware individuals were of TQM, the more they were likely to perceive the potential benefits. Consequently, interviewees advised an extensive awareness programme aimed at all employees within the construction industry (including top managers). The achievement of this objective helped to answer the third research question, which was *'What are the critical success faactors / barriers affecting the TQM implementation in the Nigerian construction industry?'*

For this question, it was imiortant to determine whether there was any relationship between the commitment and support of top management, the organisational culture, reward and recognition, training and education, employee empowerment and involvement, a customer focus and the infrastructure factors. The lack of communications networks was an issue identified within the organisation. The need to address resource issues at the very beginning of any implementation strategy is crucial since inadequate resources undoubtedly prevents the achievement of high quality products, and will potentially lead to the failure of a quality initiative. Moreover, it was found that performance measurement and assessment are needed within TQM implementations within the Nigerian construction industry. However, there was no evidence in the findings of this research that the organisation adopted any performance measurement and assessment, other than what was conducted by individuals on their initiative, which was very little. Communication channels were found to be ineffective within the organisation, and the literature reveals that many such problems lie at the root of failed attempts to implement TQM since the approach heavily depends upon good communication and the efficient information flow throughout the organisation. Good communication channels within the organisation can enhance the success rate of TQM implementation, and it is recommended that effective communication systems that deliver accurate information on a regular basis, which can be easily accessed by all levels of employee is established. Management must thus improve cross-departmental communication.

- **Objective 4:** To develop and validate a framework for effective Total Quality Management implementation in the Nigerian construction industry.

The methods of data collection chosen as appropriate were semi-structured interviews and the use of questionnaire surveys, followed by appropriately prepared interview protocols and a set of structured questionnaire questions were triangulated with the documentation, archival records and direct observations, which enhanced the validity of this research. It is important to mention that meeting this objective was highly dependent upon the accomplishment of the first objective. This objective was realised by analysing the data obtained from the middle managers and supervisors via the interview and questionnaire, and utilising both descriptive and inferential statistical tests, which have been used to identify the relationship of a group of independent variables, (top management commitment and support, organisational culture, reward and recognition, training and education, employee empowerment and involvement and infrastructure factors) and the dependent variable (the effective implementation of TQM).

Finally, by achieving the research objectives, the aim of this study has been successfully achieved.

6.4 Operational Recommendations

This study is important to managers and construction organisations in Nigeria in terms of their ability to understand the requirements of a TQM implementation within their organisations. Based upon the findings, a set of practical recommendations is provided, which would be important in promoting the effective implementation of TQM within Nigeria construction companies. The following are the main recommendations:

- The TQM strategy, and general orientation, where the former could be a prerequisite for the latter, should be considered as an integral initial step on implementing TQM. Companies in Nigeria should understand the short and long-term implications of embracing TQM initiatives.
- Managers at all levels and all staff must have a positive attitude towards quality improvement to ensure that there is an organisation-wide commitment to the TQM philosophy and the tools or techniques of quality improvement. This implies that responsibility is not assigned just to a specialised quality department or person, but rather that everyone in the organisation must integrate and take ownership of the TQM philosophy within their day-to-day activities and decision-making.
- Managers of construction companies need to be fully committed and supportive of quality management efforts. Managers should not just talk about it but rather ensure that they are implementing and undertaking these practices themselves. Without this, it is difficult to envisage that managers can provide the vision and leadership necessary to change the culture of the organisation.

Nigerian construction companies should place more emphasis on training and education in quality management and this should be provided to all employees, regardless of level. This will enable the effective leadership of teams that continuously aim to improve processes. Moreover, the following additional recommendations are raised:

- Those enhancing the implementation and improvements on the quality management programmes should be recognised and rewarded.

- Managers in Nigerian construction industries should be more concerned with the human aspect of their organisations in that they should concentrate on the empowerment and involvement of employees, which would help to motivate and encourage their staff in carrying out their duties.
- Managers in Nigerian construction companies should provide a suitable infrastructure for the effective implementation of TQM. Therefore, they should realise that implementing TQM takes time, effort and change throughout the entire organisation; thus, managers need to convince staff that real individual and organisational benefits can be obtained through the implementation of TQM as part of the business strategy
- Finally, the points outlined above should be undertaken on a continuous basis. A systematic application of Deming's 'Plan-Do-Check-Act' is a useful technique to monitor and problem-solve for continuous improvement.

6.5 Contributions to the Body of Knowledge

This study has offered significant contributions to existing knowledge and practise. The following outline the contributions, divided into theory and practical considerations:

6.5.1 Theoretical Contributions

- This research offers contributions to the body of knowledge; as far as the researcher is aware, as the first piece of research to examine the effective implementation of TQM within the Nigerian Construction industry and therefore, represents originality within this field
- From this research, it can be envisaged that the impediments to the implementation of TQM within the Nigerian Construction industry are similar amongst organisations from different parts of the world. Nevertheless, previous studies have not investigated some of the impediments in the same detail as this study. Moreover, the impact of some notable indicators, such as undesirable organisational behaviour regarding communication and leadership factors, have never been identified as impediments to the adoption of TQM in previous studies, which mean these are unique to this study
- A further contribution is the analysis and synthesis of the literature on the issues that hinder the effective implementation of TQM within the Nigerian Construction Industry
- The outcome of this research will also be used in the future for academic publications

6.5.2 Practical Contributions

- Professionally, managers need to also explore the practical implications of such efforts, and to consider the implications of the findings for this research in their organisations.
- From an application perspective, the framework increases the degree of awareness concerning the requirements for an effective implementation of TQM in the construction sector in general.
- The importance of TQM in practice is established, and the need to develop knowledge of the benefits to organisations in the developing countries especially in Nigeria
- The development of a framework based on the literature review and the result of the empirical findings help to identify critical impediments to the effective implementation of TQM within the Nigerian construction industry. This is the main contribution of this thesis.

6.6 Limitations of the Research

Every study has its limitations and it is important to consider these as these have the potential to impact on the conclusions that can be drawn. Indeed, limitations may have an impact on the precise conclusions that can be drawn. Although the researcher has made every effort to overcome the limitations within this study, the following represented the major issues to consider. The limitations on time and financial resources represent constraints for all research and this study was no exception. Moreover, there were some difficulties with the distribution of the questionnaire and an identical method could not be used for all companies. Some departments, for example, refused to accept the questionnaire, whilst others accepted and volunteered to distribute it to the targeted employees, while other department allowed the researcher to deliver the questionnaire personally and distribute it to the targeted individuals. Although this may have caused inconsistency in the data collection process, the impact of distribution differences were not thought to have had a major impact on the reliability and validity of this research.

6.7 Suggestions for Future Research

This research presented the fundamental aspects of TQM, the meaning of quality and the essence and mechanisms of quality control. However, the research does not discuss in detail how that may influence the organisational structure and neither does it determine the organisation's structural requirements that would effectively accommodate the consequences and the quality management system. In particular, the present research has found that:

- Quality control starts with identifying customer needs and only ends when the customer is fully satisfied
- Quality control is concerned with all activities throughout the organisation
- Quality control is the responsibility of everyone within the organisation
- The question of how all these influence the organisational structure is one which requires more detailed research and may form the agenda of further studies. These studies could:
- Develop a deeper understanding of the impediment factors that affect the effective implementation of TQM in practice; this remains a task that requires further attention from researchers. Moreover, a longitudinal study that examines the impact of such factors over time would enable a better understanding of the factors impacting on implementation.
- This study was not specific to any particular elements of the construction industry, hence, further studies could examine particular sectors; for example, future research could be conducted within individual industrial service sectors to examine differences and similarities between industries in terms of TQM implementation. Thus, the limitations of this study may constitute a basis for prospective research and further investigation.
- It would be useful to conduct an exhaustive study on the total quality system's state of development in Nigeria and identify the results experienced by organisations that have adopted the process, to compare them against those that have not gone beyond the quality certification itself
- A study of the detailed impact of each element of the model on quality management progress, especially regarding top management commitment, organisational culture, training and education and employee empowerment and involvement would be of value to understand more precisely how these affect a TQM adoption process.

Consequently, from the above suggestions, it could be suggested that this study has endeavoured to open a door for further investigation into Total Quality Management and its potential and impact on the construction sector generally, and the Nigerian construction sector specifically.

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APPENDICES

Appendix A - Questionnaire

This questionnaire survey is designed to collect information about your knowledge and understanding of Total Quality Management (TQM) and to assess your opinion on any barriers that you feel may exist which would affect the implementation TQM within the construction organisation. The TQM concept is an approach to enhancing the efficiency and overall flexibility of business as a whole, fulfilling customer requirements, both external and internal to the organisation, which can lead to a reduction in resource wastage, the strengthening of a brand's image, reductions in defects and costs, and cost benefits (which can be obtained through control of financial performance). It is fundamentally a way of organising and connecting the whole organisation, within each and every unit, and involving every employee at every level. I would be very grateful if you could answer all questions as completely and accurately as possible.

Demographic information

From the list below, please select one title that best describes your position in your organisation:

Al. Name of the company: (Optional).....

A2. Your job title in the company:

Middle Management □ Supervisory □

Top management □ Senior Managers □

A3. Your number of years in the company:

<5years □ 5 to 10 years □ >10years □

A4. Educational background:

High school or lower □ Bachelor's degree □

Diploma □ Master's degree or higher □

A5. Type of ownership of your company:

Public □ Private □

Other please specify.....

ORGANISATION INFORMATION

This set of questions asks about your opinion on a range of issues related to the understanding of TQM within your organisation and practices related to TQM. The survey is presented in the form of a list of statements with which you may strongly agree, agree, disagree, or strongly disagree. Please tick the box that you consider best reflects your opinion in relation the statements made.

SECTION B: Understanding of TQM related issues.

Part 1: purpose of TQM

This part is concerned with how the purpose of TQM is perceived and understood. Using the scale below, please indicate to what extent you agree or disagree with the following statements, which reflects your understanding of TQM. (Please tick one box for each statement).

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1. TQM can reduce resource wastage.	□	□	□	□	□
2. TQM can help to improve customer satisfaction.	□	□	□	□	□
3. TQM can provide a disciplined means of producing goods/services for customers.	□	□	□	□	□
4. TQM helps to strengthen the control over operations	□	□	□	□	□

5. TQM can be used to demonstrate that this is a total quality organisation	□	□	□	□	□

PART 2: The Benefits of TQM Implementation

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1.TQM can improve customer satisfaction	□	□	□	□	□
2. TQM is part of a wider quality improvement process	□	□	□	□	□
3. TQM can increase the competitive advantage of a company?	□	□	□	□	□
4. TQM can improve the quality of the products and services offered	□	□	□	□	□
5. TQM can help to meet government demands, requirements, or pressures	□	□	□	□	□

PART 3: Barriers To TQM Implementation

The rate of failure of TQM programmes can be as high as 90% (Soltani *et al.,* 2004). Hence, assessing overall change readiness before any attempt to implement change starts is a good investment. It can either identify practical considerations to enable success or warn of problems that may derail attempts to achieve change.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree

1. There is a lack of understanding of the purposes of TQM in the industry	□	□	□	□	□
2. There is a lack of understanding of the benefits of TQM in the industry	□	□	□	□	□
3. There is no awareness of TQM amongst employees in the industry	□	□	□	□	□
4. There is a lack of commitment from top management to TQM generally within the industry	□	□	□	□	□
5. There is no government financial support to help the organisation to implement a TQM system	□	□	□	□	□
6. There are no outside pressures to make the organisation implement improvements in its quality management systems	□	□	□	□	□
7. Communication between departments in the organisation is ineffective	□	□	□	□	□
8. There is a general sense of low morale in the organisation	□	□	□	□	□

PART 4 – Barriers

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1. There is no cross functional cooperation between departments	□	□	□	□	□

2. There is no employee involvement in management decisions	□	□	□	□	□
3. Quality objectives are clearly identified to employees.	□	□	□	□	□
4. There is a lack of cooperation from customers	□	□	□	□	□
5. TOM is an additional workload to established quality management practices**.**	□	□	□	□	□
6. Top management provides financial support to the employees to apply and improve quality programs	□	□	□	□	□
7. Training targets in the organisation are generally not achieved	□	□	□	□	□

Appendix B - Interview Guide

Semi-structured interviews questions (Protocol)

I. **Introduction:** The researcher opens the interview by clarifying the following

• The background of the research topic

• Why this topic is being researched

• Why the organisation has been chosen

• The people who will be interviewed and why

• The expected time for the interview

• The confidentiality of information gathered

• Any health and safety or security issues

II. Demographic information

• Organisation———————————————————

• Name ———————————— ———— Gender: ————————-

• Position ———————————— Qualifications: ————————

• Years of service ———————————— Years in this position: ————

(1) Does your organisation intend to/has your organisation implemented TQM?

(2) Why does/did your company intend to implement TQM?

(3) What do you understand by Organisational Leadership?

(4) What efforts and support have your organisation's leadership given so far towards the implementation of TQM?

(5) Does your organisation's leaders have standards for recruiting the staff? Do you think these are important?

(6) Who are the customers of your organisation? Why do you view them as customers?

(7) How do you determine the needs and expectations of your customers in order to provide satisfaction?

(8) Do you measure your customers' satisfaction? If so, how? What specifically is measured?

(9) Are people empowered enough to take direct action whenever they encounter a problem without the need for further approval? (Please explain in more detail)

(10) Does your organisation's leaders pay attention to suggestions from employees?

(11) Do you have any reward and recognition systems in your organisation?
If yes, what are your views on this system?

(12) How do employees in your organisation work in teams?
And does management encourage employees to work in teams?

(13) To what extent are promotions based on individual achievements?

(14) Do you have a training plan in your organisation? If not, why?
If yes, how does this work?

(15) How do senior leaders in your organisation communicate key decisions?

(16) What are your key organisational performance measures?
And how do you use this information to support organisational decision-making?

(17) What is your understanding of continuous improvement?

(18) How continuous improvement exhibited in your organisation?

(19) How do you see TQM initiatives with relation to your professionalism?

(20) Do you wish to add any further comments?

Appendix C - Participant Information Sheet

PARTICIPANT'S INFORMATION SHEET

Research Title: Effective implementation of TQM in the Nigerian Construction Industry.

Research Information

What is the purpose of this study?

The aim of this research is to develop a framework for the effective implementation of Total Quality Management in the Nigerian construction industry. This research has the following objectives:

- To examine the definition of Total Quality Management and its principles
- To explore current Total Quality Management practices in the Nigerian construction industry
- To critically evaluate the critical success factors and barriers to the implementation of Total Quality Management in the Nigerian construction industry
- To develop and validate a framework for the effective implementation of Total Quality Management in the Nigerian construction industry.

Your firm's participation in this research contributes to the development of a framework for the implementation of TQM in the Nigerian construction industry to help improve performance and waste reduction in the construction process; this is considered to be beneficial to the entire construction industry in Nigeria. This research poses no physical, social or mental risks to participants as it does not require the use of hazardous substances or radiation, and processes to ensure anonymity and the protection of data (in terms of security) are implemented and assured as follows.

Do I have to take part in the study?

Participation in this study is completely voluntary and you may withdraw at any time. Even after agreeing to participate in the study, you are still free to withdraw at any time and without any reason.

What will happen to me if I take part?

The entire interview process is expected to last one hour. Interviewees shall be allowed to withdraw their participation from this research at any time they wish to do so. Any information provided before withdrawal from the interview process shall immediately be destroyed. Information provided by the participants shall be for this research and shall be kept securely for the duration of this research. All data collected will be kept and solely accessed by the researcher and the supervisor of this research and will never be made for other parties, third party usage or be made available to the public.

What do I need to do?

If you have decided that you would take part in the study, please contact the researcher: xxx by email: xxx and they will arrange a convenient appointment with you to participate. You can also forward any questions to the researcher and they will be glad to respond. If you consent to the information on this sheet, you will be required to sign a consent form. Please be assured that you can withdraw at any time even after signing the consent form.

What are the potential benefits from taking part?

There are no monetary benefits regarding for individuals participating in this research. It is hoped that this work will help provide first-hand evidence of the current situation. The study will also give the researcher an opportunity to deepen our knowledge in the role of leadership in the effective implementation of TQM in the Nigeria construction.

Will I be paid for taking part?

No payment will be made for participating in this research, but you may wish to request a short report on the research findings when the thesis is completed.

What if there is a problem?

If you have any concerns you about any aspect of the study, you can to speak the researcher who will answer your questions. If you are not satisfied with their response, you may wish to forward a complaint directly by contacting their main supervisor, who is xxx

What will happen to the results of the study?

The findings will be published in the form of a report, which will be included in a thesis that forms part of a post-graduate Doctoral degree. Furthermore, it is also likely that the researcher will write academic papers based on the findings of this study, and that these papers will be published in professional journals or presented at conferences.

Who is organising and funding the study?

This is post-graduate research that fulfils the requirements of a PhD at the University of Salford, concerning the role of leadership in the effective implementation of TQM in the Nigeria construction industry. The research is organised by the School of the Built Environment at the University of Salford and it is self-funded. The research is being led by xxx (a PhD candidate University of Salford) and supervised by xxx at the University of Salford.

Who has reviewed the study?

The researcher's supervisors and the University of Salford's Ethics Committee have reviewed all aspects of this study.

Contact for further information

Researcher's Contact

xxx

School of the Built Environment

The University of Salford

Manchester M5 4WT,

The United Kingdom.

Appendix D - Participant Consent Form

PARTICIPANT'S CONSENT FORM

Title of Project: **The Effective Implementation of TQM in the Nigerian Construction Industry**.

Name of Researcher: **XXXX**

Contact of Researcher: **XXXX**

School of the Built Environment

The University of Salford

Manchester

M5 4WT

Statements	Please tick where appropriate		
I have read and understood the participant information sheet for the above research and my participation in the research	No	Yes	N/A
I have been given the opportunity to ask relevant questions about the research			
I agree to take part in the research interview			
I understand that taking part in the research interview include tape recording which I agree to			
I understand that information provided by me during the interview will only be kept for the period of this research			
I understand that information provided by me during the interview will be confidential and will not be disclosed to people outside this research			

I understand that my participation in this research is voluntary, I can withdraw from this research at any time and I do not have to give any reason(s), for why I no longer want to take part in this research and any information I have provided shall accordingly be destroyed immediately			
I hereby agree to take part in this research			

Name of Participant:……Date……Signature:……

Name of Researcher:……Date……Signature:…….

Research Supervisor

xxx

School of the Built Environment

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School of the Built Environment

The University of Salford

Manchester

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Cell Phone:

Email:

February 2015

Appendix E – List of Publications

Published Papers

- Ahaotou, S., & Chaminda, P. (YEAR) The Importance Of Leadership In Effective Implementation Of TQM In The Nigeria Construction Industry.
- Ahaotou, S. (YEAR) Exploring The Role Of Leadership In Total Quality Management
- Ahaotou, S.& Chaminda, P. (YEAR) Barriers To The Effective Implementation Total Quality Management In The Nigeria Construction Industry
- Ahaotou, S.& Chaminda, P. (YEAR) TQM In The Nigerian Construction Industry (Abstract)

Appendix F- Ethical Approval:

Academic Audit and Governance Committee

College of Science and Technology Research Ethics Panel (CST)

To **Sylvia AHAOTOU (and Dr. Chaminda Pathirage)**

cc: **Professor Hisham Elkadi, Head of School of SOBE**

From **Nathalie Audren Howarth**, **College Research Support Officer**

Date 27/07/2015

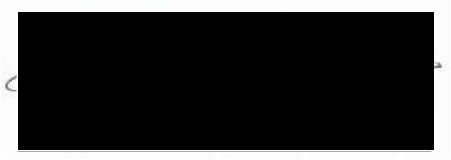
Subject: **Approval of your Project by CST**

Project Title: **Effective implementation of total quality management in the Nigerian construction industry.**

REP Reference: **CST 15/10**

Following your responses to the Panel's queries, based on the information you provided, I can confirm that they have no objections on ethical grounds to your project. If there are any changes to the project and/or its methodology, please inform the Panel as soon as possible.

Regards,



Nathalie Audren Howarth

College Research Support Officer

Appendix G - Validation Questions

Validation Questions

Instructions to Respondents

This questionnaire is based on the framework provided, so please study the framework carefully and answer or tick as appropriate. As provided in the table below, please tick one answer that best describes your opinion of the proposed framework.

	Strongly agree	Agree	Strongly disagree	Disagree	Not sure
1. The framework is simple to understand					
2. The contents are clear enough					
3. The framework is applicable to Nigerian Construction					
4. The framework is useful					
5. The framework is comprehensive					

Please provide comments or suggestions that, in your opinion, can be used to improve the framework.

…….

…….

…….

Appendix H - Invitation To Participate

School of the Built Environment

The University of Salford

Manchester

M5 4WT

December 19, 2016

Dear sir/madam,

An invitation to participate in the validation of a proposed TQM implementation framework

My name is Sylvia Ahaotu, a PhD candidate at the School of the Built Environment, at the University of Salford, Greater Manchester, UK. I am currently undertaking research into the effective implementation of TQM within the Nigerian Construction Industry. The aim of this research is to propose a framework for the effective implementation of TQM within the Nigerian Construction Industry. TQM is a managerial approach aimed at achieving quality through engaging all (internal and external) customers (employees). Today's environment indicates that Total Quality Management (TQM) would represent an effective managerial approach to achieve customer satisfaction and global competitiveness; this research is focused on the Nigerian Construction industry.

In this regard, the attached proposed framework was developed through a rigorous research process. It was information by a literature review, and a mixed research method was adopted, consisting of questionnaire surveys, and semi-structured interviews. The validation process is considered an important process in achieving the aim for which the framework was developed. Therefore, your participation and feedback on the suitability, or otherwise, is most important

in the development of the final version of the framework. To achieve this, I have formulated a set of questions to solicit your expert opinion on the framework.

I would like to inform you that I have taken all the necessary steps to protect the identities of those who reply to this questionnaire; thus, your data will be kept confidential and only used for the purposes of this research. May I inform you that you can withdraw your participation at any time you wish to do so.

For further clarification or information about this research, please do not hesitate to contact me or contact Dr. Chaminda Pathirage at the School of the Built Environment (University of Salford, Greater Manchester, M5 4WT) who is supervising this research.

Yours sincerely,

Sylvia M. Ahaotu (PhD Candidate)

Email: XXX @edu.salford.ac.uk

Dr Chaminda Pathirage (Supervisor)

Email: XXX @salford.ac.uk