FACTORS INFLUENCING TOTAL QUALITY MANAGEMENT PERFORMANCE IN THE CONSTRUCTION INDUSTRY: A CASE STUDY OF TANZANIA NATIONAL ROADS AGENCY, DAR ES SALAAM.

KENNETH GEORGE NINDIE

A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS OF PROJECT MANAGEMENT (MPM)

DEPARTMENT OF MARKETING MANAGEMENT AND ENTREPRENEURSHIP

OF THE OPEN UNIVERSITY OF TANZANIA

2023

CERTIFICATION

I, the undersigned certify that, I have read and hereby recommends for acceptance of the dissertation titled; **Factors Influencing Total Quality Management Performance in the Construction Industry: A Case Study of Tanzania National Roads Agency, Dar es Salaam,** in partial fulfilment of the requirements for the degree of Master of Project Management of the Open University of Tanzania.

…….……..

Dr. France Shayo

(Supervisor)

.....

Date

COPYRIGHT

DECLARATION

I, **Kenneth George Nindie,** declare that, the work presented in this dissertation is original. It has never been presented to any other University or Institution. Where other people's works have been used, references have been provided. It is in this regard that I declare this work as originally mine. It is hereby presented in partial fulfilment of the requirement for the Degree of Master of Project Management of the Open University of Tanzania.

……..…….

Signature

……

Date

DEDICATION

This dissertation is dedicated to my dear wife Catherine and our lovely children George, Celline, Grace and Leonard; your love, understanding and patience during my prolonged absence while I was undertaking my studies were a constant source of inspiration.

ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to the almighty God for His blessings and giving me the strength to accomplish this study. I owe profound thanks to the many people and institutions who made valuable contributions in different ways to the fulfilment of this study. Firstly, my special appreciation to my supervisor Dr. F. Shayo, who offered guidance, advice, assistance and support right from the proposal stage to the final document.

I wish to express my gratitude to the Ministry of Finance and Planning for availing financial resources and time which enabled me to undertake my postgraduate studies.

My sincere gratitude to all officials, leaders and the respondents interviewed in the process of accomplishing this study.

I would like to thank my family for patiently enduring my long absence at the time of my studies.

Also, my gratitude to my fellow staff members for their support and encouragement.

Lastly, I would like to thank all those not mentioned here for their valuable contribution towards this work.

God bless you abundantly.

ABSTRACT

The study examined the factors influencing TQM performance in the construction industry in Dar es Salaam. Specifically, the study examined the organisational factors for TQM performance, identified the supplier-related factors for TQM performance; and examined the employee training factors for TQM performance at TANROADS, Dar es Salaam. Descriptive research design with mixed approaches was used with a sample size of 74 respondents. Data were collected through structured questionnaires and interview. Quantitative data were descriptively analysed along with regression analysis. Qualitative data were analysed using content analysis. The findings revealed that various organisational factors such as customer focus, innovational performance, integration process, quality of participation, management assurance and involvement and employees management influenced TQM performance at TANROADS Dar es Salaam where quality services were managed for public use. Likewise, supplier-related factors for TQM performance included delays of works, cost overruns, re-works, variations and claims and dispute resolutions. These had immense impacts that led to 10% of project cost that rose during the projects' life span. Moreover, employee training factors that influenced TQM performance in the study area were employees' empowerment and enrichment prioritized quality, flexibility and service provision towards profitability. It is recommended that training

and management of employees are relevant to enable employees to capture new ideas, knowledge and technology relevant for use in their day-to-day operations.

Key words: *Total Quality Management Performance; Construction Industry, Tanzania National Roads Agency.*

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS AND ACRONYMS

ISO	International Organization for Standardization
RII	Relative Importance Index
SASO	Saudi Arabian Standards Organization
SPSS	Statistical Package for the Social Sciences
TANROADS	Tanzania National Roads Agency
TOC	Theory of Constraints
TQM	Total Quality Management

CHAPTER ONE

BACKGROUND

1.1 Chapter Overview

The chapter covers the background of the study. It presents the background to the problem, statement of the problem, research objectives, research questions, significance, limitations and delimitations; and finally organization of the study.

1.2 Background to the Study

The world's society and economy have suffered human and financial losses as a result of poor quality management in the construction industry; therefore, the need for quality products and services is vital (Suganthi et al., 2017). Shehu et al. (2014) reported that throughout the world, the construction area of civil engineering is one of the most hazardous industries where poor design and maintenance is the major factor that affects construction. The primary purpose of total quality management (TQM) is to provide excellence in customer satisfaction through continuous improvement of products and processes by the total involvement and dedication of each individual who is in any way a part of that product/process (Ramezani and Gharleghi, 2013). As quality in a construction company is the key focus for competitiveness and the success of construction projects, the level of success of construction projects greatly depends on the quality of performance (Mazher et al., 2015).

A study conducted by Suganthi et al., (2017) in India regarding the factors affecting total quality management in construction projects using the Relative Importance

Index (RII) as a regression-based index that summarizes the magnitude of respondents' status found that supplier related factors, employee involvement and organizational factors were considered as important factors in implementing TQM in construction projects. As for Besterfield (2008) employee training plays an important role in the construction industry to improve employee skills and their work flow, as well as accelerating organizational performance that provides quality and customer satisfaction. Thus, quality management at all levels should require adequate education and training that is able to contribute to ongoing quality improvement process and development of products in the construction industry. Ramezani and Gharleghi (2013) in their study reported that employees and management have to work as a team in all departments, integrated together to achieve the required outcome of the quality management in order to provide value for the organization and high quality outputs.

A research by Mazher et al., (2015) found that TQM focuses on the quality of management system, not the management of quality and continuous improvement of processes in order to improve every feature of an organization. On the other hand, Suganthi et al, (2017) reported that quality is the degree of excellence in a competitive sense that includes reliability, serviceability, maintainability or even individual characteristics. Yet, quality inspection in the construction industry contributes to quality improvement by experienced employees where measurement and examination can be handled more efficiently by experienced employees.

Frank and Ronald (2013) asserted that factors influencing TQM on quality assurance require systematic preventive activities to ensure final products or services due to

designing of the business process of production in order to meet customer expectations. Moreover, Mfugale (2019) reported that construction firms in Tanzania have adopted TQM keeping in mind the current or future challenges in order to bring a positive impact on industrial performance to achieve long term profitability, sustainability and competitiveness.

However, a few studies reviewed have focused on factors influencing TQM in various business undertakings without specifically looking into the construction industry as TQM in the construction sector brings a lot of benefits including improved business quality, increased customer satisfaction and reduced construction costs. Such benefits are missing in the Tanzania National Roads Agency (TANROADS) as TQM as a strategy seems to be practised at a lower speed in the Tanzania construction industry. The absence of TQM strategy has resulted into delays, cost overruns, reworks, variations, claims, and disputes as common problems in the construction industry generally, TANROADS in particular. Yet, the study was guided by the Deming's theory that asserts that each organisation is composed of a system of interrelated processes and people who make up systems and Shewhart cycle model that focuses on what works and what does not work for improvement of organisational performance. It is from this background that this study examined the factors influencing TQM performance in the construction industry with reference to Tanzania National Roads Agency (TANROADS) in Dar es Salaam.

1.3 Statement of the Problem

Total Quality Management (TQM) is a management approach that focuses on quality

value creation that has become a source of sustainable competitiveness in various sectors. However, the construction sector faces major challenges in implementing such good quality for customer needs which has become the primary focus in modern business success.

According to Mazher et al. (2015), TQM is a concept that strives to continually improve an organization's ability to deliver intended output to clients at the desired quality. Hooknakker et al. (2010) reported that customer satisfaction is a key factor in the success of any business, and TQM can help organizations achieve this goal. Peter et al. (2010) also reported that TQM can help organizations achieve their goals by improving their processes and systems.

A series of major roads projects are being planned and executed in Tanzania, which will help to improve transport in the country. However, much criticism has been directed at the construction industry for generally poor workmanship, cost overruns and delays in project completion. Therefore, it has become of great importance and concern that in order to deliver projects that satisfy customer needs, the processes, the people and materials should be improved through TQM. Proper implementation of TQM may result into increased performance and profitability, continued internal communication, improved efficiency, minimization of errors, cost reduction, and customer satisfaction.

A number of studies that have been done on TQM have identified critical factors for implementation of TQM. While many studies have looked at these factors, it is important to note that most of these studies have been done in the manufacturing and service industry. Moreover, little or no studies have been conducted in the

construction sector in Tanzania and specifically TANROADS. This study is intended to bridge the gap by looking at the factors that influence Total Quality Management performance in the construction industry using Tanzania National Roads Agency, Dar es Salaam as a case study.

1.4 Research Objectives

1.4.1 General Objective

To examine the factors influencing Total Quality Management (TQM) performance in the construction industry with reference to TANROADS, Dar es Salaam.

1.4.2 Specific Objectives

i. To examine the organisational factors for TQM performance at TANROADS, Dar es Salaam.
ii. To determine the supplier related factors for TQM performance at TANROADS, Dar es Salaam.
iii. To examine the employee training factors for TQM performance at TANROADS, Dar es Salaam.

1.5 Specific Questions

i. What are the organisational factors for TQM performance at TANROADS, Dar es Salaam?
ii. What are supplier related factors for TQM performance at TANROADS, Dar es Salaam?
iii. What are the employee training factors for TQM performance at

TANROADS, Dar es Salaam?

1.6 Significance of the Study

The study aimed at identifying and documenting the current status of the quality practices followed in the construction industry in Tanzania with reference to TANROADS, Dar es Salaam. The study helps construction industry practitioners towards knowledge provision regarding TQM for the successful performance in the industry. Also, the study is a source of knowledge in improving institutional performance towards eliminating delays in works while concentrating on quality provision. Finally, the study is for partial fulfillment of the requirements for the award of the Master's degree in Project Management of the Open University of Tanzania.

1.7 Limitations of the Study

This study was conducted at the TANROADS office in Dar es Salaam, therefore results may not be generalised. Also there were difficulties in accessing information related to this study as some respondents were hesitant to give accurate information for fear that the information may be sensitive or confidential.

1.8 Organization of the Study

This study is organized into five chapters. Chapter One presents the background information. Chapter Two presents and reviews relevant works of literature related to the study. Chapter Three presents the research methodology used in the study. Chapter Four presents the results and discusses the findings while Chapter Five presents the conclusion and recommendations arising from the study findings.

CHAPTER TWO

LITERATURE REVIEW

2.1 Chapter Overview

This chapter reviews and presents literatures from different authors to build a foundation for this study. It presents the conceptual definitions, theoretical review, empirical review, research gap and conceptual framework.

2.2 Conceptual Definitions

2.2.1 Total Quality Management (TQM)

TQM refers to total features and characteristics of the product or service needed to meet the expectations and satisfaction of customers in order to fulfil the requirements. The definition is based on different perspectives and expectations where valid requirement is defined as conditions that meet the particular needs of customers. In the construction industry, quality must be a set of characteristics comprising marketing, engineering, manufacturing and maintenance through the product or service so as to meet the demand of consumers (Hooknakker et al., 2010). In this study TQM is considered as a modern system in the field of quality, after quality assurance, quality control and ISO.

2.2.2 Performance

This is a task or operation seen in terms of how successfully it is performed (Mazher et al., 2015). According to Albert (2012) performance in the construction industry refers to the carrying out of works according to requirements set out in a contract

where the requirements might include; progressing the works in line with the programme; completing the works by the completion date; satisfying quality, health and safety, and environmental and other standards. Moreover, successful performance discharges the party bound to perform the act from contractual liability while non-performance is the failure to do something required by a contract.

2.2.3 Construction Industry

This is a group of economic establishments dealing with new construction, alteration, repair and demolition of which are primarily engaged in the same kind of activity or in producing the same kind of product or service (Albert, 2012). In the construction industry projects are considered a success when they are completed on time and on budget, and when performance goals are achieved. Kober et al., (2012) report that performance goals are directly related to productivity, time management, and decision making. In order to achieve these goals, and for construction engineering to be executed in the most effective and structured manner, companies need to build and maintain strong teams, track and measure success, and ensure the project runs smoothly.

2.2.4 Tanzania National Roads Agency

The Tanzania National Roads Agency (TANROADS) is an autonomous agency established on 1st July, 2000 by an order published in the Government Gazette Notice No. 293 of 2000 under Section 3(1) of the Executive Agencies Act No. 30 of 1997, with the expectation of witnessing a significant improvement in road maintenance and development with respect to quality, efficiency and cost-

effectiveness. The Agency is responsible for the management of roads made up of trunk roads and of regional roads according to the Roads Act No. 13 of 2007 and subsequent reclassification.

2.3 Theoretical Review

This study was guided by two theories namely; Deming's theory and Shewhart Cycle as hereunder.

2.3.1 Deming's Theory

Deming's theory of profound knowledge is a management philosophy grounded in systems theory. It is based on the principle that each organization is composed of a system of interrelated processes and people which make up the system's components. The success of all workers within the system is dependent on management's capability or organisational capability/factors to orchestrate the delicate balance of each component for optimization of the entire system (Bowen, 2010). The system of profound knowledge is based on system appreciation to understand the company's processes and systems, variation knowledge of employees to understand the occurrence of variation and their causes, knowledge theory to understand quality programs and psychology knowledge to understand human nature. In his fourteen points, Bowen (2010) proposed that among the factors for performance include organisational factors such as customer focus, quality participation and innovational performance; supplier factors such as delays of works, cost overruns and variations; employee factors such as employee empowerment, enrichment and regular training and management. Moreover, other factors include

management commitment, positive corporate culture, training and proper communication system in implementation of TQM.

2.3.2 Shewhart Cycle

The Shewhart Cycle is the theory which deals with learning what works and what does not on an ongoing improvement in a schematic way. According to the Kenya Institute of Management (2009), a company focuses on costs and when the costs rise; quality deteriorates. This is consistent with the theory of constraints discussed by Frank and Ronald (2013). Theory of Constraints (TOC) is a set of concepts, principles and tools that can be used to improve management of systems and maximize performance by identifying the most restrictive limiting factor that constraints the system's performance and managing it. It focuses on improving performance rather than reducing costs. In order to improve the performance of the organisation in the construction industry, organisational factors such as quality participation, customer focus, innovational performance etc need to be considered. Similarly, supplier related factors such as delays of works, cost overruns and variations are essential. Additionally, employee factors such as employee empowerment and enrichment, facilitation of regular training and management are important for the organisational performance.

This study is anchored on these two theories in that it takes all the organizations' systems to have a successful implementation of TQM and the organization performance as highly dependent on its ability to continuously improve on management of its systems.

2.4 Empirical Literature Review

In this section, the researcher reviews the work done by other researchers that in one way or another relate to the topic as discussed hereunder.

2.4.1 Organisational Factors for TQM performance in construction industry

Mohamed et al. (2014) carried a study in the Saudi Arabia construction sector that developed different areas starting by adopting formal quality approaches by implementing business processes, employee training, observation and performance measurement, and improving their operation system by providing high standards. The findings revealed that the adoption of the TQM approach in the Saudi construction industry increased productivity, profitability and company reputation in order to meet the quality demands and requirements set by the Saudi Arabian Standards Organization (SASO).

Ebrahimi and Sadeghi (2013) in their studies showed numerous impacts of quality management and firm performance. It was found that, among the possible metrics discussed in the literature operational performance, quality performance, financial and market performance, innovation performance, and customer satisfaction were the most cited, or in other words, gained more interest from the researchers. However, studies examining the effect on project performance in the construction trade were scarce. It was concluded that TQM practices and performance relationships need a far more extensive investigation especially in the construction industry.

A study by Rumane (2010) found that successful TQM implementation can bring

many benefits to an organization, greater customer satisfaction, improved product quality, and a higher market share achieved by meeting the quality requirements of TQM

implementation in the construction industry. Although a majority of the articles claimed the benefits of adopting TQM management philosophy in various types of organizations, others argued that TQM does not work (Harari, 1993; Sila and Ebrahimpour 2002). Some studies found that TQM firms do not outperform non-TQM firms (Ebrahimi and Sadeghi 2013) or have either no effect or negative effects on the firm performance (Kober et al., 2012).

A study conducted by Coelho et al. (2021) explored the relationship between organisational culture and total quality management (TQM) implementation in Australia, with the purpose of identifying the particular culture that dominates the Australian construction industry, and distinguished which cultures determine the successful implementation of TQM. Although the application of the competing values framework (CVF) for evaluating organisational culture (OC) in the construction industry were studied by some scholars, research into OC and its impact on TQM procedures in connection to the CVF in project-based industries such as construction received less attention. The findings revealed that Australian construction organisations are dominated by the market and external focused cultures according to the CVF of organisational classification. Furthermore, the findings acknowledge that organisations that are dominated by hierarchical cultural characteristics could provide an unfavourable environment for the successful implementation of TQM; whilst an organisation that obtains a mix of cultures,

specifically with the adhocracy and market cultures dominating could provide a favourable environment for the successful implementation of TQM.

2.4.2 Supplier related factors for TQM performance in construction industry

Razak bin Ibrahim et al. (2010) and Shehu et al. (2014) in their studies reported that the Malaysian construction industry is accompanied by problems, such as delays, cost overruns, and poor quality work in government projects, such as school buildings and community college buildings. Likewise, local newspapers reported on similar quality problems after project completion such as cracked runways, uneven taxiways, sinking aircraft parking bays, recurring flooding, and water ponding at the apron. All these quality problems have raised public safety concerns and the quality standards of the Malaysian construction industry have been directly questioned.

Odusami et al. (2010) opined that the construction industry in the UK had taken up the challenges of quality management hence leading to increase in market shares and improvement in customer satisfaction unlike in Nigeria where corruption practices and reconstruction of the oil boom has led to poor quality construction projects, scarcity of materials, poor workmanship, poor quality output, delays, cost overrun and collapse of work due to not adhering to quality management.

The study conducted by Suganthi et al. (2017) in India focused on the factors affecting total quality management (TQM) in construction projects, since TQM is the key focus for competitiveness. In this study data from site engineers and contractors included the information regarding organizational factors, supplier related factors,

employee training factors, equipment factors and process improvement factors. If correctly applied they assisted a construction company in improving its performance. The results showed that supplier related factors, employee involvement and organizational factors have to be considered as important factors in implementing TQM in construction projects.

A study conducted by Njenga (2017) investigated the influence of contractor relationships on total quality management practices in context of the Kenyan construction industry. The findings showed that contractor-client relationships had the most significant effect on TQM practices, customer focus and management was the most practiced TQM principle and procedural barriers are a hindrance to TQM practices in the construction industry in Nairobi County. The study concludes that contractor relationships have a positive effect on TQM practices in the Kenyan construction industry. The study recommends that customer focus and management should be the focus of contractors in practising total quality management in their work. Through collaborating and cooperating with the client during the construction process, contractors can be able to meet the client quality requirements thus achieving total quality management.

2.4.3 Employee Training factors for TQM performance in construction industry

Alsayyed (2019) carried out a study to identify and rank factors of training and development and motivation in construction companies in Jordan and determined the impact of these practices on the performance of these companies. The data was

collected using questionnaire. The findings revealed that there were strong and positive relationships between training and development, and motivation of employees and the performance of construction companies. In addition, the most important factors of training and motivation that can improve construction company's performance are self-directed, learning transfer, learning environment, trust, communication style and interpersonal relationship.

A study conducted by Aghimien et al. (2019) assessed TQM practices in construction project delivery in Gauteng, South Africa. The study adopted a quantitative approach through a questionnaire survey, and information was harnessed from construction participants involved in the delivery of civil engineering projects within the study area. The findings of the study revealed that the most adopted TQM practices are customer focus, supplier quality management, strategic planning, and employee relations. In order to improve the adoption of TQM practices, measures such as ensuring customer involvement, top management involvement, and commitment, education and training of engineers on TQM practices, effective customer-supplier relationship, effective communication (internal and external), and primary customer focus are important. This study adds value to the body of knowledge as it gives an insight on the TQM practices being adopted in the delivery of civil engineering projects within the study area as well as the measures to be put in place in order to ensure improved adoption of TQM.

A study conducted by Ajayi and Osunsanmi (2020) in Nigeria intended to assess the constraints and challenges in the implementation of TQM of construction companies.

The cross-sectional research design was used for this study and the population entailed construction professionals in indigenous and expatriate construction companies. Random sampling procedure was used to select the respondents. A total of 50 questionnaires were distributed and 30 were retrieved and used for the analysis. The results showed that the factors affecting the implementation of TQM are management commitment factors, the role of quality department and training and education. The challenges of TQM are lack of available quality system documentation, lack of understanding of the process requirements and high cost of TQM implementation. It was concluded that Nigeria construction companies did not have quality control and assurance manuals that are a guide to monitor the quality of the end products and as such most projects are abandoned as a result of poor quality workmanship. It was therefore recommended that Nigeria construction companies should develop a framework for the purpose of quality standard and for them to compete with their counterparts globally.

A study by Alsayyed (2019) found that not all industries that implemented TQM had positive satisfaction. It was opined that for public organizations TQM factors affecting their implementation are leadership, training, organizational structure, communication, incentives, measurements and evaluation and teamwork. In addition, they noted that for management of strong teamwork, appropriate training, incentives, evaluation and effective communication contributed to a public organization’s success. However, failure of TQM implementation was primarily due to lack of integration of TQM with cultural change. Besides, they identified the types of organization culture to ensure successful TQM implementation and relate these

organisation cultures between each other to show their relationship positively and negatively to TQM performance.

2.5 Research Gap

Studies reviewed have shown the importance of TQM in maintaining industry performance. Although TQM literature has evolved over the years, research and application in the construction industry in Tanzania is still limited. TQM literature has focused primarily on other sectors including manufacturing and services, whereas studies in the construction industry are scarce. The existing research has typically focused on implementation, critical success factors, and barriers to TQM whereas the factors influencing TQM performance in construction industry is under-researched. This is the gap this research sought to fill.

2.6 Conceptual Framework

Figure 2.1 provides the conceptual framework. This is defined as an abstract idea or a theory used to develop new concepts or to reinterpret existing ones (Yin, 2003). It gives the relationship between the dependent and independent variables. Organisational factors, supplier related factors and employee training factors are the independent variables while construction industry performance through TQM is a dependent variable. Below is the illustration of a conceptual framework.

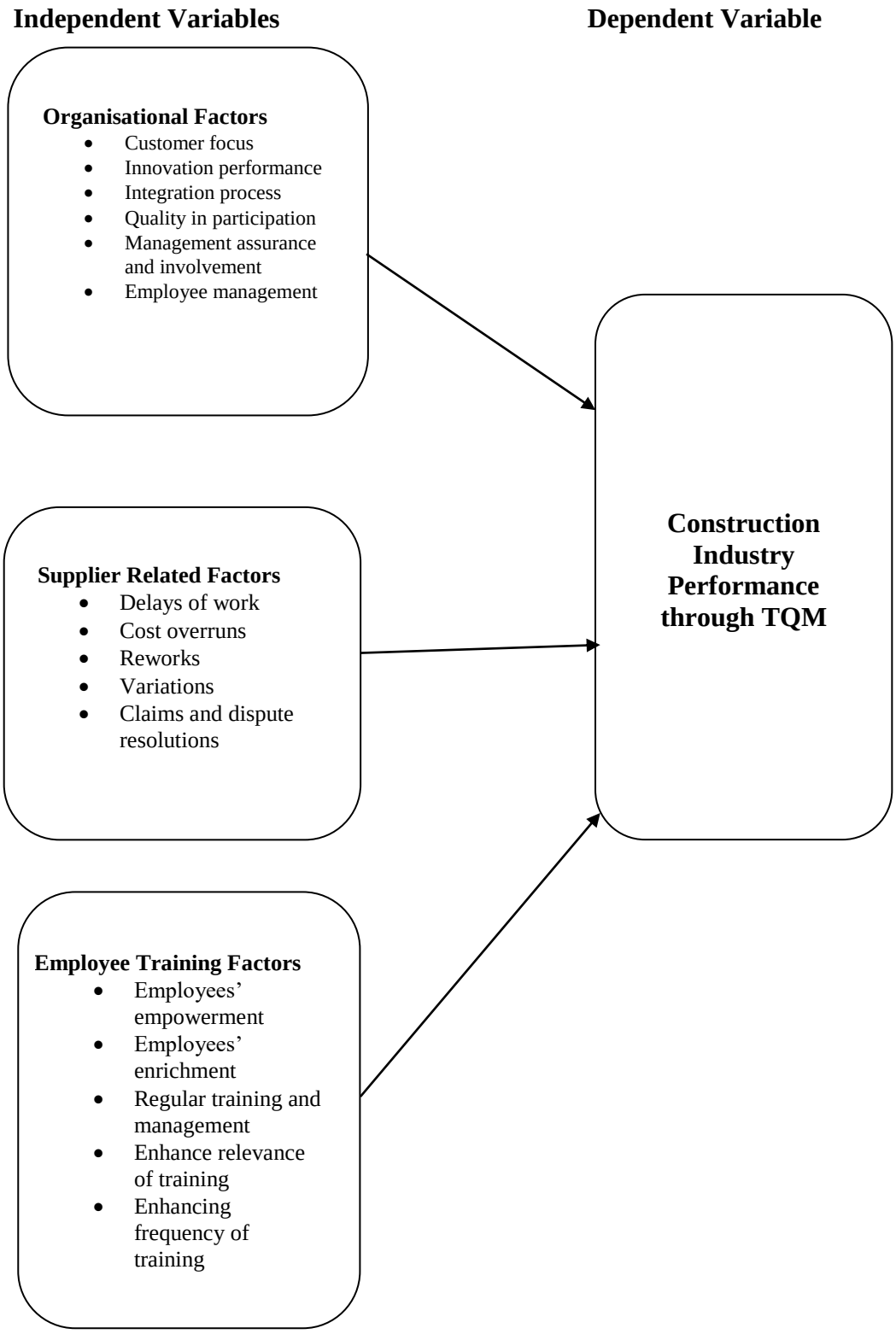

Figure 2.1: Conceptual Framework

Source: Researcher's Model (2023)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Chapter Overview

This chapter presents the systematic approach through which this research was conducted. It consists of research philosophy, research design, study area, population and sample size, sampling procedures, types of data, data collection tools, reliability and validity, data management and analysis, and ethical considerations.

3.2 Research Philosophy

Research philosophy is a belief about how data about a phenomenon should be gathered, analyzed and used (Yin, 2003). The term epistemology (what is known to be true), as opposed to doxology (what is believed to be true), encompasses the various philosophies of the research approach (Greene *et al*., 2010). Four main trends of research philosophy are distinguished and discussed: the positivist research philosophy that claims that the social world can be understood objectively as the scientist is an objective analyst and, based on it, dissociates himself from personal values and works independently; the interpretivism research philosophy that claims that based on the principles it is not easy to understand the social world as the social world can be interpreted subjectively (Creswell, 2009). On the other hand, the pragmatist research philosophy deals with the facts and considers the practical results to be important where researchers have freedom of choice and pragmatists do not see the world as an absolute unit. Finally, the realistic research philosophy that is based on the principles of positivist and interpretivist research philosophies with

assumptions that are necessary for the perception of the subjective nature of the human (Greene *et al*., 2010). Therefore, in this study, a pragmatic philosophy was used as it focuses on mixed or multiple approaches. It also utilizes triangulation that involves quantitative and qualitative approaches as this study used both quantitative and qualitative approaches.

3.3 Research Design

In this study the researcher will utilize descriptive research design. A descriptive study describes the characteristics of a particular individual, or a group (Kothari, 2004). The study will seek to establish the factors that influence implementation of TQM in organizations therefore descriptive study is the right approach. A case study survey will be adopted to ensure specific data are collected for this study. The survey will use prepared questionnaires and interviews to get the information from selected sample.

This design is appropriate for descriptive purposes and the determination of the relationship between the variables. Organizational factors, supplier related factors and employee training factors are the independent variables while construction industry performance through TQM is a dependent variable. Multiple regression analysis will be used to predict the relationship that exists between variables as assumed that more than one independent variable and one dependent variable are used (Hair et al., 2014).

3.4 Research Approach

The study applied a mixed approach that utilizes both qualitative and quantitative

approaches to obtain the required data. Qualitative approach aims to explore and discover issues about the problem on hand, because very little is known about the problem (Cresswell, 2009). Qualitative data sources include observation and participant observation (fieldwork), interviews, documents and texts, and the researcher's impressions and reactions (Hair et al., 2014). Additionally, quantitative approach makes use of questionnaires, surveys and experiments to gather data that is revised and tabulated in numbers, which allows the data to be characterised by the use of statistical analysis (Yin, 2003). Quantitative approach presents statistical results represented by numerical or statistical data (Sekaran, 2003).

3.5 Study Area

This study was conducted at TANROADS, Dar es Salaam. The reason for conducting the study in this area is that little is known or no studies have been conducted at TANROADS to examine the factors influencing TQM performance. This study aimed at filling this gap.

3.6 Population and Sample Size

3.6.1 Population

Cooper and Schindler (2014) describe the study population as those people, events or records that contain the needed information and can answer the research questions. This study was conducted at TANROADS, Dar es Salaam with an estimated population of 116 participants (TANROADS Report, 2020).

3.6.2 Sample Size

The sample size is an important feature of any empirical study in which the goal is to make inferences about the population from a sample. Based on empirical literature the population size, a sample or sub-sample of 30 cases, is the bare minimum for studies (Bailey, 2004). Similarly, other scholars such as Tabachnick & Fidell (2007) provide a formula as $N \geq 50 + 8\ M$ (where M= number of variables, while N = number of participants). Therefore,

$$N = 50 + 8*3$$

$$N = 50 + 24$$

$$N = 74$$

The sample size is 74 participants.

Table 3.1: Sample Size

Category	Population	Sample
TANROADS management	22	12
Site Engineers	17	10
Quality Assurance Engineers	10	8
Contractors	67	44
TOTAL	**116**	**74**

3.7 Sampling Procedures

A purposive sampling procedure was used because the researcher can select individuals who have required information depending on the nature of the problem. The purposive method was used by focusing on people with good knowledge and understanding regarding the factors influencing TQM performance in the construction industry with reference to TANROADS.

3.8 Types of Data

Data are facts, figures and other elementary materials past and present serving as bases for study and analysis (Saunders et al., 2012). To gather sufficient and convenient data, the researcher used both primary and secondary data. Primary data are those which are collected afresh and for the first time, and thus happen to be original. The primary data were gathered through questionnaires and in-depth interview. Moreover, secondary data were obtained from published and unpublished reports on TQM in construction industry.

3.9 Data Collection Tools

To be able to realize the study objectives, the study used a well-designed questionnaire and in-depth interview as the main data collection tools. Questionnaires were developed and administered to various participants such as quality assurance engineers and contractors while being analysed descriptively through SPSS software. Closed-ended questions were in the form of multiple choices and respondents were asked to put a tick against the answer of their selection. Questionnaires are preferred because they are efficient, cheap and easy to be administered (Creswell, 2009). Moreover, in-depth interviews were administered to TANROADS management and site engineers while being analysed through content analysis. The advantage of this method is that it enables the researcher to evaluate the entire situation over the study concerned. It is convenient as it gathers information from a number of people at minimum cost (Kothari, 2009).

3.10 Reliability and Validity of Data

3.10.1 Reliability

Reliability refers to the consistency of a research study or measuring test or the repeatability of findings. If findings from the research are replicated consistently they are reliable (Cresswell, 2009). Mohajan (2017) defines reliability as the ability of the measurements or the degree to which an instrument measures the same way each time it is used under the same conditions with the same subjects. Since the reliability of data goes with the accuracy or precision of a measuring instrument, in this research study, reliability was concerned with the questions' consistency of responses in repeated measurements that resulted into Cronbach Alpha of 0.8 (Carmines & Zeller, 2006).

3.10.2 Validity

Validity is defined as the instrument's ability to measure exactly what concept it is supposed to measure (Cresswell, 2009). It also refers to the credibility or believability of the research. To validate the data and instruments (questionnaires and in-depth interview) used in the research, the researcher asked the experts to recommend their representativeness and suitability. Moreover, in this study, a pilot study was carried out to pre-test the questionnaires in the respective study area for their validity; afterward, corrections were done in order to obtain reliable data for the research (Mohajan, 2017).

3.11 Management and Analysis of Data

3.11.1 Data Management

Data from the field were edited, coded and analyzed. At the end of every field data collection day, the filled questionnaires were checked for completeness and consistency of information before storage. The coded items were then analyzed with the aid of computer software for analyzing data (Kothari, 2004). For closed-ended questions, the researcher assigned numbers to them directly before interpreting them with the aid of SPSS software version 20 analysis.

3.11.2 Data Analysis

The data from the completed questionnaires were cleaned, coded and entered into the computer using the statistical package for social sciences (SPSS) for analysis. The software package enabled the researcher to analyze the data descriptively into frequencies and percentages. Qualitative data from in-depth interviews were coded and analysed through content analysis where themes and emerging patterns were coded from the interview transcripts. Also, qualitative data from interviews were analysed using content analysis focusing on the observer's impression. Content analysis involved transcribing all information from verbal discussions with informants followed by breaking the recorded information into meaningful small units of thematic information, subjects and tendencies and presented as a text.

3.12 Ethical Considerations

All necessary procedures were followed to conform to the ethical standards of research. The researcher sought permission from the relevant authorities before

carrying out the research. All information obtained in this research were strictly used for academic purposes and respondents were assured of the confidentiality of information given. Moreover, anonymity together with accessibility to research information were observed (Cresswell, 2009). Treatment was done according to the organizational protocol for the management of data collection. Other issues considered were as follows;

i) Informed consent

Participants were given a written statement that explains all the aspects of the study. They were required to formally consent to participate before the commencement of the study by signing the consent form.

ii) Deception

Participants were given the choice of whether they were willing to participate before engaging in the study. The researcher could not mislead or coerce any of the participants into participating.

iii) Confidentiality and anonymity

Information obtained from the participants was held with confidentiality. This ensured that no one has access to individual information or the names of the participants except the researcher (Cresswell, 2009). In addition, participants were assured that their personal information, including their names and addresses, would not be revealed in any way without their permission.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Chapter Overview

This chapter presents the results and discusses the findings. It focuses on examining the factors influencing TQM performance in the construction industry with reference to TANROADS, Dar es Salaam. It commences with presenting the demographic information followed by objectives as hereunder.

4.2 Demographic Information

The demographic information included gender, age, length of service, employment status and education level as presented in Table 4.1.

Table 4.1: Demographic Information

Category	Frequency	Percentage %
Gender		
Male	46	62.2
Female	28	37.8
Age (in years)		
< 20	00	0.0
21-30	12	16.2
31-40	38	51.4
41-50	14	18.9
51 and above	10	13.5
Length of service with the organisation (in years)		
Less than 5	22	29.7
More than 5	52	70.3
Employment status		
Civil servant	30	40.5
Contractor	44	59.5
Education level		
Diploma	08	10.9
Degree	48	64.8
Masters	16	21.6
PhD	02	02.7

Source: Research data, 2023

4.2.1 Gender

The results in Table 4.1 show that the gender of the respondents consisted of 62.2% male and 37.8% female. Males dominated the study from the fact that, most of them were found to be contractors and participated in managing issues in the construction industry. However, the few females found in the study contributed a lot in the study.

4.2.2 Age

The results in Table 4.1 show the age distribution that there were no (0%) respondents aged less than 20 years. Yet, the respondents who were between 21 to 30 years occupied 16.2%, those between 31 to 40 years were 51.4%, those between 41 to 50 years were 18.9% and those between 51 and above were 13.5%. Moreover, the results show that respondents aged between 31 to 40 years occupied a great percentage from the fact that this is the age bracket consisting of youths who in one way or the other were eager to undertake construction activities while being coached by those who were 51years and above. Likewise, the presence of other respondents was beneficial to the facilitation of construction activities.

4.2.3 Length of service with the Organisation

The results in Table 4.1 show that respondents who had worked for less than 5 years occupied 29.7% while those who had worked for more than 5 years were 70.3%. It was found that those who had worked for a longer time were able to accommodate the challenges that came by in a manner suited to the industry.

4.2.4 Employment Status

The results in Table 4.1 show that 40.5% of respondents were civil servants while

59.5% were contractors. Civil servants included TANROADS management, site engineers and quality assurance engineers. Moreover, the group that contained the majority of respondents (the contractors) was of assistance towards examining the factors influencing TQM performance in the construction industry.

4.2.5 Education Level

The results in Table 4.1 show that 10.9% of respondents had a diploma; 64.8% were of Bachelor's degree level, 21.6% were of Master's level and 2.7% had PhD level of education. The presence of respondents with Master's and PhD level of education was important as these elaborated well issues that concern TQM from their highest level of understanding while ensuring that quality issues in construction are maintained. Yet, the contribution of those who had diploma or degree was valuable from the knowledge gained on the matter.

4.3 Organisational factors for the TQM performance

The first objective of the study examined the organisational factors for TQM performance at TANROADS. Questionnaires and interviews were administered among respondents. The respondents' opinions are presented in Table 4.2 as follows;

Table 4.2: Organisational Factors

Statements	% strongly agree	% agree	% uncertain	% disagree	% strongly disagree
Customer focus	70	20	0	10	0
Innovational performance	80	10	10	0	0
Integration process	80	20	0	0	0
Quality in participation	85	15	0	0	0
Management assurance and involvement	90	0	10	0	0
Employee management	85	0	0	15	0

Source: Field data, 2023

The results in Table 4.2 indicate that 70% of respondents strongly agreed while 20% of respondents agreed that customer focus was one of the organisational factors at TANROADS Dar es Salaam that influenced TQM performance in the construction industry. This implies that an organisation that focuses on customers improves sales, business and profit where customers become interested in dealing with such an organisation. It was found that with TQM usage, TANROADS was able to recognize its customers' strengths and weaknesses in order to enable deliverance of quality services needed for the construction of roads that are under its management for public use. The statement above concurs with Mohamed et al. (2014) who asserted that any organisation that intends to deliver high quality products or services should instill into its employees and suppliers the responsibility to deliver quality service that meets the demands of customers or consumers. In this case, customers are the road users. Yet, 10% of respondents disagreed on the matter.

One of the key informants was of the following view;

> *The most important asset for any organisation is its customers. Therefore, for TANROADS to enhance its dealings while improving the services, customers/people it serves are regularly informed of what goes on and making sure that contractors work in line with the standards needed (KI, 1).*

On the other hand, the results in Table 4.2 indicate that 80% of respondents strongly agreed while 10% of respondents agreed that the other factor towards TQM performance was innovational performance. Moreover, 10% of respondents were undecided on the matter. This implies that TQM in the construction industry (TANROADS in particular) has a positive impact on innovational performance regarding customer focus and organisational management. It was found that site engineers at TANROADS were eager to supervise the works and apply all innovations brought about by contractors in order to attain quality services. This is in line with Kober et al. (2012) who stated that TQM predicts that profit follows quality and in terms of construction industry, people served by roads profit when utilizing the roads constructed. Therefore, the adoption and application of Total Quality Management (TQM) is likely to enhance the performance of a business.

Another key informant was of the following view;

> *Innovational performance brought about by contractors influences TQM to prioritize quality, flexibility towards services rather than the cost incurred where customers/people using roads become the ultimate users who appreciate the quality provided at a reasonable price (KI, 2).*

Furthermore, the results in Table 4.2 indicate that 80% of respondents strongly agreed while 20% of respondents agreed that integration process was among organisational factors for TQM performance at TANROADS, Dar es Salaam that enabled the tying together of quality processes needed in the construction industry

whereby data could move from one system to another for the facilitation of quality construction. This implies that TANROADS was able to share necessary data with contractors (upon need) for the purpose of enabling quality service provision. This is in line with Shehu et al. (2014) who asserted that any organisation that integrates its information towards TQM with its external customers has a possibility of performing better as any output in customers' hands remains part of the product cycle.

One of the key informants opined that;

> *TANROADS was able to integrate its information to contractors in order to pursue TQM where improvement was observed on both parties. This resulted into satisfying clients' needs, minimizing expenses while contractors attain profit and make sure that safety regulations are adhered to (KI, 3).*

Similarly, the results in Table 4.2 show that 85% of respondents strongly agreed while 15% of respondents agreed that one of the organisational factors include quality participation that enabled each part to continuously participate in improving teamwork by creating cross-functional teams and knowledge sharing where necessary. This implies that with parties participating in enhancing quality, TANROADS achieved a state of reducing costs through better cost management. This is in line with Rumane (2010) who stated that quality enables performance with customer expectations' attainment.

Additionally, the results in Table 4.2 show that 90% of respondents strongly agreed that management assurance and involvement were factors influencing TQM performance in the construction industry. Yet, 10% of respondents were undecided on the matter. This implies that TANROADS management involved contractors in

works for the purpose of enabling thorough quality achievement. It was found that the TANROADS engagement and participation resulted into quality supervision of works while enabling contractors perform their jobs with confidence. This concurs with Coelho et al. (2021) who opined that leadership and top management commitment, top management support, project manager competence, quality policy, supplier management, limited cash flow to manage TQM, employee involvement, client involvement and feedback by project participants are key issues to enable management involvement and assurance of quality in the construction industry.

One of the key informants observed;

> *It has been noted that significant improvement in quality process has enabled contractors achieve superior outcomes while completing works in time (KI, 4).*

More so, the results in Table 4.2 indicate that 85% respondents strongly agreed that employee management was among the factors influencing TQM performance in the construction industry from the fact that many organisations in the construction industry struggle to achieve acceptable levels of quality while managing employees in their project delivery endeavours but have either no formal quality management processes or their processes are deficient in managing employees in one way or the other. This was obvious in the study area as most contractors could not manage well their employees towards solving TQM challenges that came by. This is in line with Njenga (2017) who opined that organization obligation is very important for implementing TQM in any company and if the organization loses interest in quality then everyone in the organization will do so. Therefore, the success of TQM will

depend mostly on the top of the pyramid where cost is minimized and funds are saved when the project team implements TQM while if no quality procedures are present within the team, the project will suffer a commercial failure.

One of the key informants said;

> *The essence of employee management in construction industry and others is to have employees who have responsibilities of identifying quality defects and proactively recognise threats for quality and continuous improvement. Therefore, employees in this study need to have no fear of reprimand from management for failing to achieve total quality (KI, 5).*

Moreover, 15% of respondents disagreed that employee management was not a factor necessary to the construction industry such as TANROADS from the fact that each organisation has its own way of managing its employees towards TQM; therefore employees may be oriented to fit in on various works.

Generally, the results show that customer focus being one of the organisational factors at TANROADS Dar es Salaam influenced TQM performance in the construction industry where customers' strengths and weaknesses were recognised in both parties in order to enable deliverance of quality services needed for the construction of roads that are managed for public use. Likewise, innovational performance in the construction industry (TANROADS in particular) had a positive impact from which site engineers at TANROADS were eager to supervise the works and apply all innovations brought about by contractors in order to attain quality of services. Moreover, integration process enabled the tying together of quality processes needed in the construction industry where data could move from one system to another for the facilitation of quality construction to both parties as necessary data were shared with contractors for the purpose of enabling quality

service provision. More so, quality participation enabled each party to continuously participate in improving teamwork where parties achieved a state of reducing costs through better cost management. Furthermore, employee management influenced TQM performance in the construction industry from the fact that organisations struggle to achieve acceptable levels of quality while managing employees in their project delivery endeavors.

4.4 Supplier-related factors for TQM performance

The second objective of the study identified supplier related factors for TQM performance at TANROADS. Questionnaires and Interviews were administered among respondents. The respondents' opinions are presented as in Table 4.3 as follows;

Table 4.3: Supplier-related Factors

Statements	% strongly agree	% agree	% uncertain	% disagree	% strongly disagree
Delays of works	70	0	0	30	0
Cost overruns	90	10	0	0	0
Re-works	80	0	0	20	0
Variations	85	15	0	0	0
Claims and dispute resolutions	75	0	0	0	25

Source: Field data, 2023

The results in Table 4.3 indicate that 70% of respondents strongly agreed that delays of works among contractors were supplier-related factors. These produced risks in terms of technical, social, economic, legal, financial and resource construction where

early and delayed payment to contractors, information delivery in time or later, funding problems, poor project management, compensation issues and disagreement on valuation prevailed in construction industry towards performance. This implies that when such risks are not accommodated, the quality of works becomes jeopardized. This statement concurs with Ebrahimi and Sadeghi (2013) who reported the impact of supplier delays and inability of entities to pay the suppliers in time. Moreover, 30% of respondents disagreed on the matter from the fact that the delays are in some ways organised to make additional costs available for client-supplier needs. With this situation, some technicalities need to be introduced to get rid of such delays.

One of the key informants had this to say;

> *The effects of delays are costly to all parties and are often resulting into disagreement in terms of payments, arbitration, litigation and total abandonment of projects. Moreover, lack of coordination and conflicts between parties result into ineffective quality services (KI, 7).*

On the other hand, the results in Table 4.3 indicate that 90% of respondents strongly agreed while 10% of respondents agreed that cost overruns are among supplier-related factors that influence TQM performance in the construction industry. It was found that cost overruns in this study emanated from the changing of design and scope by client during construction, poor planning and scheduling of projects. The statements above are in line with Mehmet and Emre (2012) who reported that cost overruns stem from underestimating of costs and schedules by a client.

One of the key informants had this to say;

> *Cost overruns result into time delay in project implementation that add costs where in most cases increase cost budget (KI, 8).*

The results in Table 4.3 show that 80% of respondents strongly agreed that re-works are among the factors influencing TQM performance in the construction industry. This implies that re-works result from dissatisfaction between parties in the project implementation. It was found that, in most cases, re-works in the construction industry could emanate from errors, omissions, failures, changes and poor communication and coordination when executing the works. This is in line with Mazher et al. (2015) who affirmed that re-works has been a challenge in the execution of works that lead to cost and schedule overrun, material wastage and client dissatisfaction. Also, re-works lead to legislative disputes where costs emanating from that rise to 10% of the project cost. Yet, 20% of respondents disagreed that re-works are important towards TQM performance from the fact that parties can agree on matters to rectify and manage the way issues can be perfectly done. It is from that fact that re-works are vital in project execution.

One of the key informants was of the following view;

> *In construction industry, re-works cannot be ignored as it helps organisations to deal with errors and challenges more efficiently while saving time and money. Yet, re-work results into cost of correcting defects to make them fit for use something that broadens extra operations to be rectified (KI, 8).*

Similarly, the results in Table 4.3 show that 85% of respondents strongly agreed while 15% of respondents agreed that variations are among factors influencing TQM

in the construction industry. This implies that with alterations or additions during project execution, variations come by something that raises the project costs. Therefore, variations affect the final cost of the project where additions or omissions are done. Moreover, variations can be managed through planning in advance, checking figures as often as possible, monitoring subcontractors' behaviours, discovering how to manage variations easily etc. The statements above concur with Suganthi et al. (2017) who reported that variations are inevitable in construction projects as the sheer diversity of variations can make it difficult to predict in advance which issues might arise during the projects' life span.

One of the key informants said;

> *In construction industry, companies need to be prudent with their finances through planning in advance, becoming prepared for the late costs and managing variations as they come by (KI, 9).*

Finally, the results in Table 4.3 indicate that 75% of respondents strongly agree that factors such as claims and dispute resolutions influence TQM in construction industry. This implies that, there is no project execution that does not engage claims and dispute resolution between parties. Therefore, it was found that when claims were raised by parties, resolutions were done to enable thorough execution of projects. The statement above concurs with Mohamed et al. (2014) who stated that if disputes are not resolved promptly they may tend to drag on, escalate and cause project delays that lead to claims requiring litigation proceedings. Ultimately, these may degrade the quality of works. Yet, 25% of respondents strongly disagreed that

claims and dispute resolutions are not factors influencing TQM performance but issues that are present and need to be tackled during project execution.

Generally, the results show that supplier-related factors for TQM performance included delays of works, cost overruns, re-works, variations and claims and dispute resolutions. These have immense impacts. Delays of works may result from information delivery in time or later, funding problems, poor compensation issues and disagreement on valuation, things that lead to poor quality of works. Cost overruns on the other hand, emanate from change of design and scope by client during construction, poor planning and scheduling of projects. Yet, re-works originate from errors, omissions, poor communication and coordination when executing the works that lead to 10% of project cost. More so, variations are inevitable in construction projects as the sheer diversity of variations can make it difficult to predict in advance which issues might arise during the projects' life span. Moreover, claims and dispute resolutions enable parties to be accountable while avoiding degrading the quality of works.

4.5 Employee Training factors for TQM performance

The third objective of the study examined the employee training factors for TQM performance at TANROADS. Questionnaires and interviews were administered among respondents. The respondents’ opinions are presented as in Table 4.4 as follows;

Table 4.4: Employee Training Factors

Statements	% strongly agree	% agree	% uncertain	% disagree	% strongly disagree
Employees' empowerment	90	10	0	0	0
Employees' enrichment	95	05	0	0	0
Regular training and management	60	30	0	10	0
Enhancing relevance of training	85	15	0	0	0
Enhancing frequency of training	90	0	10	0	0

Source: Field data, 2023

The results in Table 4.4 indicate that 90% of respondents strongly agreed while 10% of respondents agreed that employees' empowerment is a factor towards TQM performance in the construction industry from the fact that when employees in construction industry are empowered with knowledge; the execution of works would be in a good quality. This implies that empowerment encourages employees to respond to quality issues enabling them the resources and authority to do so for facilitating improvement decisions in their jobs. The statement above concurs with Kober et al. (2012) who stated that employees' empowerment has a dual impact as from the organisation's side, employee empowerment improves performance, innovations and the quality of works while from the employee side, employee empowerment increases self-efficacy, work motivation and organisational identification. Moreover, employees' empowerment leads to high level of employee satisfaction, a sense of shared purpose, and greater collaboration towards delivering enhanced value to customers.

Another key informant was of the following view;

> *In construction industry, employee empowerment has been considered as the most important principle of TQM because of its assumed relationship with customer satisfaction. Therefore, TANROADS as well as contractors have been empowering their employees towards enriching them with the right technology, systems etc while availing them opportunities to enhance the quality of support (KI, 10).*

On the other hand, the results in Table 4.4 indicate that 95% of respondents strongly agreed while 5% of respondents agreed that employees' enrichment was a factor that influenced TQM performance in the construction industry from the fact that enrichment enables employees to prioritize quality, flexibility and service provision towards profitability. The statement above is in line with Shehu et al. (2014) who stated that when employees are enriched with knowledge, satisfaction prevails while enabling them to perform towards TQM guidelines.

Additionally, the results in Table 4.4 show that 60% of respondents strongly agreed while 30% of respondents agreed that regular training and management of employees are factors that influence TQM performance in the construction industry. This implies that when training and management of employees are executed, employees become equipped towards customer focus and satisfaction whereby quality management training helps learners to understand ways of improving customer focus and satisfaction. Moreover, 10% of respondents were in disagreement on the matter from the fact that it is not training alone that facilitates TQM in construction industry as several factors do.

Another of the key informants was of the following view;

> *In the study area, training and management of employees are done to improve the processes taken by parties towards achieving their goals (KI, 11).*

Nonetheless, the results in Table 4.4 indicate that 85% of respondents strongly agreed while 15% of respondents agreed that enhancing relevance of training was among the factors that influence TQM performance in the construction industry from the fact that when employer and employees see the relevance of training, quality attainment is made simple. The statement above is in line with Rumane (2010) who reported that TQM in the construction industry seeks to improve quality and performance to meet customers' expectations when training is undertaken. Therefore, by enhancing training, issues get integrated on quality functions and processes, leading to continuous improvements in the industry.

One of the key informants observed;

> *The relevance of training in construction industry was made real in the study area through enabling the improvement of operational performance that ultimately affected other dimensions of performance such as financial and customer satisfaction. Here the people who used the roads got impressed and satisfied by the jobs done (KI, 12).*

Finally, the results in Table 4.4 indicate that 90% of respondents strongly agreed that enhancing frequency of training was among the factors that influence TQM performance in the construction industry from the fact that frequent training enables employees to capture new ideas, knowledge and technology relevant for use in their day-to-day operations. This was obvious in the study area as both client and

contractor were eager to enable their employees acquire up-to-date knowledge for the enhancement of the construction industry. Moreover, 10% of respondents were undecided on the matter. This is in line with Ajayi and Osunsanmi (2020) who reported that TQM improves employees' skills and as a methodical quality enhancement way for company extensive organisation for the tenacity of enhancing efficiency regarding superiority, output, customer's contentment as well as efficiency. TQM as a plan that targets to generate and interchange additional proficient and quality products, through accomplishing collaboration among organization members may be ascertained when employees are capacitated through training towards organisational performance.

One of the key informants was of the following view;

> *When an organisation invests on frequent training of its employees,it achieves management commitment and understanding, enhances customer focus, improves employee's involvement and participation. Therefore, the organisation assumes the possibility of meeting customers' expectations (KI, 13).*

Generally, the results show that employee training factors influenced TQM performance in the construction industry in the studied area. While employees' empowerment encouraged employees to respond to quality issues for facilitating improvement decisions in their jobs, employees' enrichment prioritized quality, flexibility and service provision towards profitability. Yet, while regular training and management of employees equipped them towards customer focus and satisfaction, training was enhanced to be relevant by focusing on frequency of training to capture new ideas, knowledge and technology relevant for use in their day-to-day operations.

4.6 Inferential Statistics

TQM performance was correlated with the factors taken from the construction industry thereby showing the relationship between variables. Therefore, multiple regression analysis was carried out to find the relationship regarding cost effectiveness, time management, quality enhancement and customer satisfaction; and TQM performance.

Moreover, the assumptions are that the findings of the regression analysis ought to indicate its R Square variable implying that, independent variables explain the percentage of the model variations. The results indicate that, the model was statistically significant at (p<0.05). Table 4.5 shows the analysis.

Table 4.5: Regression Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Sig
1	.583[a]	.339	.283	1.018	.001

The regression analysis indicated that the coefficient of correlation R was 0.583 an indication of positive relationship between variables. Coefficient of adjusted determination R^2 was 0.283 which changes to 28.3% an indication of changes of dependent variable that can be explained by cost effectiveness, time management, quality enhancement and customer satisfaction. The residual of 71.7% can be explained by other variables beyond the scope of the current study. This is in concurrence with Davis et al. (2016) who reported that changes in construction

industry performance through TQM is the outcome of cost effectiveness, time management, quality enhancement and customer satisfaction. Also, concurs with Suganthi et al. (2017) who asserted that the industry performance may be affected by cost overruns and poor quality enhancement from the contractors that lead to completion challenges.

Table 4.6: Regressions Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.047	.478		6.372	.000
	Cost effectiveness	-.531	.152	-.626	-3.493	.001
	Time management	.165	.307	.077	.537	.594
	Quality enhancement	-.273	.205	-.514	-4.013	.000
	Customer satisfaction	.207		.137	.889	.378

Regression coefficients on Table 4.6 suggest that, two variables were significant predictors ($p < 0.05$) of the model that are cost effectiveness and quality enhancement while the other two variables were insignificant, that are time management and customer satisfaction. This informs that one unit decrease of cost effectiveness explains -0.531 decrease in TQM performance. This is in concurrence with Evans et al. (2013) who reported that investing in costing results in bridging the gap towards TQM performance. An increase in one unit of time management suggests 0.165 unit increase of TQM performance. The statement above is in agreement with Rawsal (2018) who reported that when time management is linked

with TQM performance the end result is to industry performance. Also, one unit decrease in quality enhancement explains -0.273 decrease in TQM performance. This is in line with Banerjee and Jackson (2017) who asserted that enhancing quality results into TQM performance while one unit increase of customer satisfaction suggests 0.207 increase of TQM performance.

The following regression model was used:

$$\mathbf{Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon}$$

Then;

$$\mathbf{Y = \beta_0 + CE\beta_1 + TM\beta_2 + QE\beta_3 + CS\beta_4 + \varepsilon}$$

Whereby:

Y = TQM performance

β_0 = Constant

β_1 = regression coefficient of cost effectiveness

β_2 = regression coefficient of time management

β_3 = regression coefficient of quality enhancement

β_4 = regression coefficient of customer satisfaction

CE = Cost effectiveness

TM = Time management

QE = Quality enhancement

CE = Customer satisfaction

ε = error term

Hence,

$$\mathbf{Y = 3.047 + (-0.531)\ \beta_1 + 0.165\ \beta_2 + (-0.273)\ \beta_3 + 0.207\ \beta_4 + \varepsilon}$$

4.7 Regression Analysis

The results from the regression analysis indicated a positive relationship between variables where the coefficient of adjusted determination R^2 was 0.283 which changes to 28.3% an indication of changes of dependent variable to be explained by cost effectiveness, time management, quality enhancement and customer satisfaction. Yet, the residual of 71.7% can be explained by other variables beyond the scope of the current study. This is in concurrence with Davis et al. (2016) who reported that changes in construction industry performance through TQM is the outcome of cost effectiveness, time management, quality enhancement and customer satisfaction.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Chapter Overview

This chapter presents the conclusion and recommendations arising from the study findings. It starts with the conclusion, then recommendations, and a need for further studies.

5.2 Summary of the study findings

The research assessed factors influencing total quality management performance in the construction industry, where Tanzania National Roads Agency was used as case study. The research had three specific objectives; first, to examine the organisational factors for TQM performance at TANROADS, Dar es Salaam. Secondly, to determine the supplier- related factors for TQM performance at TANROADS, Dar es Salaam. The third specific objective was to examine the employee training factors for TQM performance at TANROADS, Dar es Salaam.

The findings resulting from the study found that customer focus being one of the organisational factors at TANROADS Dar es Salaam influenced TQM performance. Also the results show that supplier-related factors for TQM performance included delays of works, cost overruns, re-works, variations and claims and dispute resolutions. These have immense impacts. The results show that employee training factors influenced TQM performance in the construction industry in the studied area. The results from the regression analysis indicated a positive relationship between

variables where the coefficient of adjusted determination R^2 was 0.283 which changes to 28.3% an indication of changes of dependent variable to be explained by cost effectiveness, time management, quality enhancement and customer satisfaction. Yet, the residual of 71.7% can be explained by other variables beyond the scope of the current study. This is in concurrence with Davis et al. (2016) who reported that changes in construction industry performance through TQM is the outcome of cost effectiveness, time management, quality enhancement and customer satisfaction.

5.3 **Implication of the results**

From the results obtained in the study it is evident that it is important to develop policies, processes, and procedures to improve the approach and methods to deliver on quality. There has to be management commitment to quality and continuous quality improvement. Construction industry professionals should be aware of the importance of quality training.

5.4 Conclusion

This study examined the factors influencing TQM performance in the construction industry with reference to TANROADS in Dar es Salaam. The conclusion is presented based on each specific objective as follows;

5.4.1 **Organisational factors for TQM performance**

It was revealed that various organisational factors such as customer focus, innovational performance, integration process, quality of participation, management assurance and involvement and employees' management influenced TQM

performance at TANROADS Dar es Salaam. Customer focus influenced TQM performance in the construction industry where customers' strengths and weaknesses would be understood in both parties in order to enable deliverance of quality services needed for the construction of roads that are managed by it for public use.

Likewise, innovational performance in the construction industry (TANROADS in particular) had a positive impact from which site engineers at TANROADS were eager to supervise the works and apply all innovations brought about by contractors in order to attain quality of services. Moreover, integration process enabled the tying together quality processes needed in construction industry where data could move from one system to another for the facilitation of quality construction to both parties as necessary data were shared to contractors for the purpose of enabling quality service provision.

More so, in this study quality participation enabled each party to continuously participate in improving teamwork where parties achieved a state of reducing costs through better cost management. Furthermore, employee management influenced TQM performance in construction industry from the fact that organisations struggle to achieve acceptable levels of quality while managing employees in their project delivery endeavours.

5.4.2 **Supplier-related factors for TQM performance**

Furthermore, the results show that supplier-related factors for TQM performance included delays of works, cost overruns, re-works, variations and claims and dispute

resolutions. These had immense impacts as delays of works resulted from information delivery in time or later, funding problems, poor compensation issues and disagreement on valuation something that led to poor quality of works.

Cost overruns on the other hand, emanated from changing of design and scope by client during construction, poor planning and scheduling of projects. Yet, re-works originated from errors, omissions, poor communication and coordination when executing the works that lead to 10% of project cost. More so, variations were inevitable in construction projects as the sheer diversity of variations can make it difficult to predict in advance which issues might arise during projects' life span.

Moreover, claims and dispute resolutions enabled parties to be accountable while avoiding degrading the quality of works.

5.4.3 **Employee Training factors for TQM performance**

Additionally, the results show that employee training factors influenced TQM performance in the construction industry in the studied area. It was found that while employees' empowerment encouraged employees to respond to quality issues for facilitating improvement decisions in their jobs, employees' enrichment prioritized quality, flexibility and service provision towards profitability. Yet, regular training and management of employees equipped employees towards customer focus and satisfaction while training being enhanced became relevant by focusing on frequency of training that enabled employees to capture new ideas, knowledge and technology relevant for use in their day-to-day operations.

5.5 Recommendations

The subsequent recommendations are put forward based on conclusion as follows;

5.5.1 Organisational factors for TQM performance

Organisational factors such as customer focus, innovational performance, integration process, quality of participation, managing assurance and involvement and employees' management were key factors that influenced TQM performance. It is recommended that when an organization invests in such issues quality service may be delivered and achieved.

5.5.2 Supplier-related factors for TQM performance

Supplier-related factors such as delays of works, cost overruns, re-works, variations and claims and dispute resolution proved the need for parties to manage their dealings in order to have TQM performance. It is recommended that in order to avoid 10% project cost additions, the need to accommodate them is important during projects' life span.

5.5.3 Employee Training factors for TQM performance

Employee training factors such as employees' empowerment, employees' enrichment, regular training and management, enhancing relevance of training and enhancing frequency of training seemed to be vital in the construction industry. It is recommended that employees need to be capacitated for the purpose of capturing new ideas, knowledge and technology relevant for use in their day-to-day operations.

5.6 Limitations of the study

This study was conducted at TANROADS office in Dar es Salaam, with only contractors and 74 respondents. Some respondents were unwilling to give accurate information due to the fact that the information required may be sensitive or confidential. Therefore considering the study coverage, results may not be generalized.

5.7 Areas for Further Studies

The study examined the factors influencing TQM performance in the construction industry with reference to TANROADS, Dar es Salaam. It is advised that further studies be done on the factors influencing Total Quality Management performance in the construction industry with case studies in railways sector in order to find out how these factors affect the same. The sector is widely growing attracting high value projects. Therefore broadening awareness and understanding about TQM will improve quality of implementation and ensure good performance of the projects by implementing organizations. The studies could use different research methodology and increase the sample size in order to obtain more relevant results.

REFERENCES

Aghimien, D, Aigbarboa, C, Thwalah, W and Mothiaba, H (2019). Total Quality Management practices in Construction Project Delivery in South Africa. 1st International Conference in Sustainable Infrastructure Development. *Journal of Management*, 4, (6); 56-80

Ajayi, O and Osunsanmi, T (2020). *Constraints and Challenges in the implementation of Total Quality Management in Contracting Organisations.* Lagos. University of Lagos

Albert. W. T (2012). "Lessons learned from large construction project in Saudi Arabia", Benchmarking: *An International Journal*, 19, (3),. 308-324.

Ali, AS, and Rahmat, I (2010). "The Performance Measurement of Construction Projects Managed by Iso-Certified Contractors in Malaysia." *Journal of Retail and Leisure Property* 9 (1): 25-35.

Alsayyed, N (2019). The Effects of Training and Utilizing Employees in Construction Companies: The case of Jordan. *International Journal of Information, Business and Management:* 11, (2); 1-25

Bailey, M (2004). *Perfect Sample Size in Research*. New Jersey: Macmillan.

Banerjee, H and Jackson, I (2017). The Role of TQM in enhancing the quality of private health care services. *Problems and Perspectives in Management*. 18, 2, 4-78

Besterfield, K (2008). Factors affecting the success of a construction project.*" Journal of Construction Engineering Management*, 130(1), 153-155.

Bowen, M (2010) Factors influencing project success: The impact of human resource management". *International Journal of Project Management*, 22(1), 1-11.

Carmines, J and Zeller, Y (2006). *Proposal and thesis writing*: *An introduction*: Pauline's Publication Africa: Nairobi (Kenya).

Coelho, C, Mojtaledi, M, Kabirifar, K, Yazdani, M (2021). Influence of Organisational Cultures on TQM Implementation in the Australian Construction Industry. *Building Journal*. 6 (1), 1-15

Cooper, J., and Schindler, M. (2014). *Perfect Sample Size in Research*. New Jersey: Macmillan.

Cresswell, P (2009). *Research Methodology Methods & Techniques, Second Edition,* New Delhi: New Age International publisher

Ebrahimi, M, and M Sadeghi. (2013). "Quality Management and Performance: An Annotated Review." *International Journal of Production Research* 51 (18): 5625-5643.

Frank, J and Ronald, F (2013). Critical success factors for different project objectives." *Journal of Construction Engineering Management,* 2: 234-362

Green, F, Stading, J. & Vokurkia, E. (2010). Management theory and total quality: Improving research and practice through theory development. *Academy of Management Review,* 19(3), 392-418

Hair, T, Mansoor, K and Harari, O. (2014). "Ten Reasons Why TQM Doesn't Work." *Management review* 82 (1): 33.

Harari, J. C. (1993). Beyond process: TQM content and firm performance. *Academy of Management Review*, 21(1), 173-202

Hooknakker. P, Carayon. P and Loushine. T (2010), "Barriers and benefits of quality management in the construction industry: An empirical study", *Total Quality Management,* 21,. (9),.953-969.

Kenya Institute of Management (2009). *Total Quality Management: Theory, Concepts and Practice.* Macmillan Publishers

Kober, R, Subraamanniam, T and Watson, J. (2012). "The Impact of Total Quality Management Adoption on Small and Medium Enterprises' *Financial Performance." Accounting & Finance* 52 (2): 421-438.

Kothari, C.R (2009) *Research Methodology, 3rd edition,* New Delhi. New International (P) Limited

Mazhar, G, Ousoo, K and Foster, S. T. Jr., (2015). Does Six Sigma improve performance? *The Quality Management Journal,* 14, (4). 7-20

Mehmet, L, and Emre, P (2012). Quality management re-visited: a reflective review and

agenda for future research. *Journal of Operations Management*, 20, 91–109

Mfugale, J (2019). Challenges to Successful Implementation of TQM Practices. *International Journal of Construction Management*. 5, 4, 22-75

Mohamed. A, Noureddine. A. M, Abdulaziz. G and Mabrouk. T. (2014). "An empirical study of quality management systems in the Saudi construction industry", *International Journal of Construction Management*., http://dx.doi.org/10.1080/15623599.2014.9222724.

Mohajan, R (2017). *Fundamental of research methodology and statistics*. New Age International.

Mugenda, A and O. Mugenda (2003). *Research Methods: Qualitative and Quantitative Approaches.* Nairobi: Acts Press.

Njenga, R (2017). *The influence of Construction relationship in TQM practices in construction industry in Kenya.* Nairobi. Strathmore University.

Odusami, K.T., Bello, W.A. & Williams, O. (2010). *An evaluation of quality performance indicators at corporate and project levels in Nigeria*. The Construction, Building and Real Estate Research Conference of the Royal Institution of Chartered Surveyors held at Dauphine University, Paris, 2-3 September, 2010.

Peter. H, Pascale. C & Todd. L. (2010). "Barriers and benefits of quality in the construction industry: An empirical study",. 21, (9),. 953-969

Ramezani, P and Gharleghi, O (2013). Design and Build project success factors; Multivariate analysis." *Journal of Construction Engineering Management*, 127(2), 93-100.

Razak Bin Ibrahim, A, Roy, M, Ahmed, Z and Imtiaz, G,. (2010). "An Investigation of the Status of the Malaysian Construction Industry." Benchmarking: An International Journal 17 (2): 294-308.

Rawsal, U (2018). *Performance Theory*. Routledge. Taylor and Franscis Group

Rumane, A R. (2010). Quality Management in Construction Projects: CRC Press.

Sadashi, E (2003). *Introduction: The quality movement and organization theory. The Quality Movement and Organizational Theory*. Sage,

Thousand Oaks, pp. xiii-xxix.

Saunders, M - Lewis, P - Thornhill, A. (2012). *Research methods for business students, 5th ed.* (5 ed.). Harlow: Pearson Education.

Sekaran, K (2003). The Evolving Theory of Quality Management: The Role of Six Sigma. *Journal of Operations Management*, 26, 630–650.

Shelu, K, Fening, A, Amaria, P & Frempong, E (2014). Linkages between TQM and Organisational Survival in Manufacturing Companies in Ghana. *International Journal of Business and Social Science,* 4, 10, 1-15

Sila, I, and Ebrahimpour, M (2002). "An Investigation of the Total Quality Management Survey Based Research Published between 1989 and 2000: A Literature Review." *International Journal of Quality & Reliability Management* 19 (7): 902-970.

Suganthi, P, Somalakshmi, R, Priyavadhana, C (2017). A study of factors affecting TQM in construction projects. *International Journal of Civil Engineering*; 3 (1), 1-12

Tabachnick, O and Fidel, K (2007). Conceptualization of Cross-Sectional Mixed Methods Studies in Health Science: A Methodological Review. *International Journal of Quantitative and Qualitative Research Methods*, 3(2), 66–87.

Yin, R.K. (2003). *Case Study Research: Design and Method: Applied Social Research Methods, Vol.5*: Sage Publications Ltd.

Zadry, O and Yusuf, M (2016). TQM Practices Corporate Strategies. *Asia Pacific Management Review,* 17, 2, 177-194

APPENDICES

Appendix 1: Questionnaire for Quality Assurance Engineers & Contractors

Dear Prospective Respondent;

This questionnaire is designed to solicit information from you. The purpose of this research is for the academic award of a Master's degree in Project Management from the Open University of Tanzania. Kindly fill in the required information as per the researcher's requirement.

Gender: Male ( ), Female ( )

Age: under 20 ( ), 21 to 30 ( ), 31 to 40 ( ), 41 to 50 ( ), over 50 ( )

Length of services with the organization (In years) ----------,

Employment status: Civil servant ( ), Contractor ( )

Education level: Diploma ( ), Degree ( ), Masters ( ), PhD ( )

For each of the following aspects shown below rate your level of agreement using the following scale provided

Agreement: 1= strongly agree, 2= Agree, 3= Not sure, 4= Disagree, 5= strongly disagree

Na.	Organisational Factors	Level of agreement				
1.	Customer focus	1	2	3	4	5
2.	Innovational performance	1	2	3	4	5
3.	Integration process	1	2	3	4	5
4.	Quality in participation	1	2	3	4	5
5	Management assurance and involvement	1	2	3	4	5
6	Employees management	1	2	3	4	5
7	Participation management style	1	2	3	4	5
	Supplier related factors	**Level of agreement**				
8	Delays of works	1	2	3	4	5
9	Cost overruns	1	2	3	4	5
10	Re-works	1	2	3	4	5
11	Variations	1	2	3	4	5
12	Claims and dispute resolutions	1	2	3	4	5
	Employee training factors	**Level of agreement**				
13.	Employees' empowerment	1	2	3	4	5
14	Employees' enrichment	1	2	3	4	5
15	Regular training and management	1	2	3	4	5
16	Enhancing relevance of training	1	2	3	4	5
17	Enhancing frequency of training	1	2	3	4	5
18	Enhancing timeless of training	1	2	3	4	5

	Performance	Level of agreement				
19	Cost effectiveness	1	2	3	4	5
20	Time management	1	2	3	4	5
21	Quality enhancement	1	2	3	4	5
22	Customer satisfaction	1	2	3	4	5

Appendix 2: In-depth Interview for TANROADS management and Site Engineers

i) What are the organisational factors for TQM performance at TANROADS, Dar es Salaam?

ii) What are supplier related factors for TQM performance at TANROADS, Dar es Salaam?

iii) What are the employee training factors for TQM performance at TANROADS, Dar es Salaam?

Appendix 3: Research Budget

Proposed activities	Estimated cost
Proposal preparation	300,000
Data collection and documentation	200,000
Data analysis and organization	300,000
Thesis development and referencing	250,000
Thesis printing, submission, and correction	300,000
Thesis printing and submission	200,000
Stationary services	100,000
Total	**1,650,000**

Appendix 4: Work Plan

The study will be completed on 2022 as the Schedule of Activities show hereunder.

No	Activity	Duration								
		Year 2022								
		January	February	March	April	May	June	July	August	September
1	Concept note submission									
2	Completion of preparation of Research Proposal, Questionnaire and Submission of Research Proposal									
3	Pilot study and Questionnaire testing									
4	Field work and Data collection									
5	Data Processing and Analysis									
6	Dissertation writing, correction and Submission									

THE OPEN UNIVERSITY OF TANZANIA

DIRECTORATE OF POSTGRADUATE STUDIES

P.O. Box 23409
Dar es Salaam, Tanzania
http://www.out.ac.tz

Tel: 255-22-2668992/2668445
ext.2101
Fax: 255-22-2668759
E-mail: dpgs@out.ac.tz

Our Ref: PG201801269

1st September 2022

Chief Executive,

The Tanzania National Roads Agency (TANROADS),

P.O.Box 3134,

ARUSHA.

RE: RESEARCH CLEARANCE

The Open University of Tanzania was established by an Act of Parliament No. 17 of 1992, which became operational on the 1st March 1993 by public notice No.55 in the official Gazette. The Act was however replaced by the Open University of Tanzania Charter of 2005, which became operational on 1st January 2007.In line with the Charter, the Open University of Tanzania mission is to generate and apply knowledge through research.

To facilitate and to simplify research process therefore, the act empowers the Vice Chancellor of the Open University of Tanzania to issue research clearance, on behalf of the Government of Tanzania and Tanzania Commission for Science and Technology, to both its staff and students who are doing research in Tanzania. With this brief background, the purpose of this letter is to introduce to you **Mr. NINDIE, Kenneth George, Reg No: PG201801269** pursuing **Master of Project Management (MPM).** We here by grant this clearance to conduct a research titled **"Factors Influencing Total Quality Management Performance in Construction Industry in Tanzania: A Case Study of Tanzania National Roads Agency, Dar es salaam"** He will collect his data at your office from 2nd September 2022 to 30th September 2022.

In case you need any further information, kindly do not hesitate to contact the Deputy Vice Chancellor (Academic) of the Open University of Tanzania, P.O.Box 23409, Dar es Salaam.Tel: 022-2-2668820.We lastly thank you in advance for your assumed cooperation and facilitation of this research academic activity.

Yours,
THE OPEN UNIVERSITY OF TANZANIA

Prof. Magreth S.Bushesha
DIRECTOR OF POSTGRADUATE STUDIES.