KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, KUMASI, GHANA

THE APPLICATION OF TOTAL QUALITY MANAGEMENT ON GHANAIAN CONSTRUCTION SITE: A CASE STUDY OF TEMA PORT

By

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BSc. Civil Engineering

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DECLARATION

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

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ABSTRACT

In the manufacturing and service industries, it has been testified that the implementation of TQM has led to improvements in competitiveness, quality and productivity in only 20-30% of the organizations that have applied it. However, the evidence of improvements in companies applying TQM practices is quite low, particularly in the construction industry in Ghana. The main objective of the study was to ascertain the challenges of effective TQM practices on construction sites within the Tema Port. Specifically, the study sought to establish the extent of application of TQM principles on construction sites at the port, to determine the extent of TQM practices; and then to ascertain the challenges faced in effective TQM implementation. Data was collected from a sample of 50 construction project personnel at the GPHA in Tema using questionnaires and the Relative Importance Index technique (RII) was applied to be able to rank the factors under each objective. The overall RII for evidence of the existence of RII principles was 0.585 (medium). This means that generally TQM principles were not very evident in the activities of construction companies at the Tema Port. Generally, the RII for TQM practices was 0.45 (low). Generally the RII for Challenges against effective TQM implementations was 0.766 (high). This means that challenges against effective TQM implementation were high at the Tema Port. The findings indicate that implementation TQM practices are still at nursery stage within the construction industry as principles and practices were found to be at medium level of observation. There is low evidence of the principles and observation of TQM practices within the activities on construction sites. The low level of practice can be attributed to the high level of challenges experienced in ensuring effective implementation of TQM practices. The study therefore recommended management commitment, education and training for staff, as well as government initiative to make TQM standards mandatory.

Keywords: Quality Management, Construction Site, Tema Port

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DEDICATION

I am dedicating this thesis to my beloved wife, Veronica Nmah Atingamogra.

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CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND

Total Quality Management is a multifaceted concept that has been globally utilized in diverse economic sectors (Bergquist, Garvare, and Klefsjö, 1999). More importantly, the implementation of TQM in some construction companies has been a success thus resulting in great improvement in the quality of production in those organizations. However, accomplishment of satisfactory quality level in the construction industry has been a long standing problem with great expenditure of time, money and resources (both human and material) wasted annually because of inefficient and non-existent best quality management approaches.

TQM is achieved through an integrated effort among personnel at all levels to increase client's satisfaction by continuously enhancing outcomes. In that regard, TQM provides the culture and climates essential for innovation and for technology advancement. This work is necessary because TQM demands that companies maintain this quality standard in all aspects of its businesses. This necessitates that things are done right the first time and that defects and waste are eliminated from operations.

Total Quality Management (TQM) is a management philosophy which appears to have been extensively implemented in the manufacturing and other services industries and it shows how significant it can improve the quality in these fields (Yusuf, Gunasekaran, and Dan, 2007). The construction industry is getting competitive every day.

To be successful, TQM practices have to be given top priority in any organization's strategic management. This requires that a continuous improvement process be recognized within an organization to provide quality management.

According to Oruma, Mironga and Muma (2014), Total Quality Management (TQM) is one of the management approaches that organizations can adopt to achieve continuous quality improvement in the operations and meet customer needs and expectations. The meaning of quality in construction industry varies from that of the manufacturing industry in that the product is non-repetitive, unique and has specific requirements. In a construction project delivery, there are several services, goods and materials that are required for successful completion of a project. This means that there are suppliers who provide these inputs in an ongoing construction project. A contractor-supplier relationship is the relationship of the contractor with organizations and persons that provide required supplies in the project (Mirawati et al., 2015).

In construction project delivery, the total management approach is a major concern and not just the quality of the product and equipment used. Once the project is completed, it is very difficult to correct nonconformities in a construction project. This makes quality management in any construction project an essential part because it helps avoid these non-correctable mistakes (Rumane, 2011). Polat et al. (2011) study affirmed that TQM practices in the construction industry lead to improved relationships with architects, engineers and subcontractors. In the same vein, Harrington, Voehl and Wiggin (2012) argued that failure to involve suppliers, subcontractors, and others in the process chain creates a major difficulty in implementing TQM. Suganthi et al. (2017) study also found that supplier related factors influenced the implementation of TQM in the construction project delivery. The contractor-client relationship has been shown to influence TQM practice to meeting and exceeding the demands of the clients as a measure of quality.

Ke et al. (2013) found that meaningful project quality and client satisfaction are birthed from higher quality of relationships during project implementation stage. It is usually recognized that the implementation of TQM in the construction industry promises several benefits such as more

repeat customers, reduced rework, improved employee job satisfaction, higher productivity, improved budget performance, improved schedule performance, better chances in bidding process with pre-qualification, increased market share, etc. (Hoonakker et al., 2008).

Despite the promised benefits , the implementation of total quality management in the construction industry is a challenge due to the uniqueness of the industry such as one one-of-a-kind product, lack of top management's leadership and support, unqualified workforce, and lack of effective teams (Arditi, and Gunaydin, 1997; Koh, and Low, 2010). Moreover, due to the lack of awareness of the cost of non-conformance to quality that is, the cost of rework, waste, errors, customer complaints, budget deficiencies, and schedule delays, which is much higher than that of operating a quality program, many organizations often consider quality management as extra cost (Elghamrawy and Shibayama, 2008).

1.2 PROBLEM STATEMENT

In both developed and developing economies, construction sector contributes more than 10% and 4% respectively to the GDP (Bon and Mustafa, 2013). In the construction industry, clients continue to express their displeasure on the low standard of total quality management principles and practices being implemented by contractors in Ghana Kpamma(2009)

The industry continues to face challenges relating to cost and time overruns and quality issues (Chin-Keng and Hamzah, 2011). In the recent past, the manufacturing sector for developed countries has witnessed the successful implementation of TQM, however the pace of acceptance and execution has remained slow in the construction sites (Kazemi, 2016). There is a gross confusion in the construction industry with regards to TQM and its related aspects, quality control (QC) and quality assurance (QA),believing that compliance to ISO 9001 and 9002 standards on

QA covers the entire application of TQM in construction project delivery (Jaafari, 2001). This mistaking notion has led to the use of these terms interchangeably. TQM is a much broader and more comprehensive concept with QA and QC as its related sub-elements. Thus QA and QC do not represent the only elements that make up TQM. Organisations use TQM on a continuous basis even if they await the implementation of a new project, thus making TQM a strategic philosophy. QA and QC are deployed during project execution (Harrington and Voehl, 2012).

The non-conformance of construction companies to the principles and procedures of TQM implementation has hindered the adoption of TQM by construction companies (Noi, 2016). Not having a clear understating of the term, different construction companies adopt TQM in the different ways depending on their understanding. Some use some bits and pieces of the principles, which can be said to be a half-hearted approach to it, whereas others run TQM like a program which is expected to perform the magic by itself. This is the reason why most construction companies often fail to meet up to their expected target from implementing TQM (Ugboro and Obeng, 2000).

Several studies conducted on TQM have identified two focal areas: the factors within TQM and the critical factors for the implementation of the philosophy (Yusof and Aspinwall, 1999). While many studies have looked at the abovementioned factors, it is worth noting that most of these studies have been conducted in the manufacturing and service industry.

In the service and manufacturing industries, it has been testified that the implementation of TQM has led to improvements in competitiveness, quality and productivity in only 20-30% of the organizations that have applied it (Chetty, Naidoo, and Seetharam, 2015; Wang et al., 2010).

A survey conducted in Georgia on manufacturing companies established that profitability, market share, communication, productivity employee satisfaction, among others are some of the benefits

derived from TQM implementation (Dale, et al, 2000). Rategan (1992) conducted a study on the implementation of TQM and established that a 90% improvement rate in operating procedures, employee relations, customer satisfaction, and financial performance is realized due to the a successful implementation of total quality management. In all the studies mentioned, there is little discussion on developing an effective TQM framework for construction sites.

In Ghana, very limited research on TQM if any has been carried out in Construction industry. For example, a Ghanaian study by Didik, Moses and Patdomo (2011) noted that TQM is a better method of management that encourages improvement in organizational performance. According to Korankye (2013) most of the organizations in Ghana were adopting TQM practices to produce better products and meet customer needs. Empirical studies provided evidence that firms winning quality awards are those practicing the TQM management strategy. An integrated total quality management system reduces errors and wastage of resources leading to effective and proficient administration. The aim of this study is to bridge this gap by looking at developing and ascertaining the challenges of effective TQM implementation on construction sites in Ghana, specifically the Tema Port. Besides, Tema Port will be chosen because it has well established Construction Companies of which some are already implementing TQM.

1.3 AIM OF THE STUDY

The main aim of the study is to develop an effective TQM framework on construction sites in Ghana, specifically the Tema Port.

1.4 OBJECTIVES

The aim of the study shall attain specifically to:

- Determine the principles or approaches to TQM
- Determine the TQM practices.
- Determine the challenges of TQM practices on construction site.

1.5 RESEARCH QUESTIONS

For the objectives to be achieved, this study will be steered by the following specific questions:

- What are the principles or approaches to TQM?
- What are the TQM practices?
- What are the challenges of TQM practices on construction site?

1.6 SIGNIFICANCE OF THE STUDY

This study is designed to provide information to management of GHPA on how they have fared in their practice of total quality management on construction project delivery, thereby enhancing organizational effectiveness. One rationale for this research is to help examine the implementation of TQM on construction projects execution and its effects which will ultimately help identify the areas for urgent action. Again, an understanding of the various TQM practices employed at Tema Port would aid to better the level of construction project implementation which would impact on its overall business output.

It is also hope that, this study would be of help to the various stakeholders in the construction industry : government, private sector, and contractors to develop and incorporate TQM in the design and implementation of construction projects. Again, with the findings of the this

research the construction sector will experience improved productivity, profit, as well as quality of construction works.

Also, Government, the biggest client in the construction sector, stands to gain from the results of this study. Further, the study encouraged further researchers on the area to research as it is not exhaustive. The study also will benefit scholars who would wish to commence further studies aimed at examining the influence of TQM on the delivery of construction projects. It will serve as a reference document for the students at KNUST and the nation.

1.7 SCOPE OF THE STUDY

The study is limited to ascertaining the challenges of effective TQM implementation on construction sites in Ghana, specifically the Tema Port as a single case study. Additionally, Tema Port was chosen because it has well established Construction Companies of which some are applying TQM. Also, the case will be studied because it is illustrative of a situation or because it is critical.

1.8 OVERVIEW OF RESEARCH METHODOLOGY

The research will adopt a descriptive survey research design. The design is preferred since the study seeks to describe a phenomenon by fact finding and investigative process. Quantitative research approach will be used since the expected information from the field involved factual elements that would be presented using descriptive statistics. The target population of this study comprise of project managers, project supervisors, project team members and other important individuals deemed to possess information relevant for the research. Convenience sampling techniques was applied. The questionnaires distributed formed the research instrument for this

study. The questionnaires was scrutinized for completeness and consistency of information at the end of every field data collection day before storage. Analysis was done using Statistical Package for Social Science (SPSS). The data was tabulated by making logical interpretation, conclusion and recommendation. Descriptive statistics (i.e. frequency analysis) was computed for presenting and analysing the data. Data was presented in the form of frequency distribution tables, graphs and pie charts that will aid analysis and explanations. The Relative Importance Index technique was applied in analysis to provide answers to the research questions.

1.9 ORGANISATION OF THE STUDY

The study is sub-divided into five chapters. Chapter one will be the introduction and this outlines the background to the study and the problem statement. It goes on to zero-in on the objectives of the study, the research questions, scope and significance of the study, limitations of the study, outline of research methodology as well as organization of the study. Chapter two discusses the key theoretical concepts included in the topic according to the notions of diverse authors, as well as other relevant literature. Chapter three deals with methodology of the study which take account of the research design, target and study population, sampling techniques, instruments for data collection, techniques for data analysis etc. Chapter four presents, data presentation, analysis and discussions. Finally, chapter five, deals with summary of findings, conclusion and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

The literature review in this chapter highlights what various researchers and authors have emphasized regarding the topic under study.

2.2 THEORETICAL FRAMEWORK

This study was guided by Deming and Crosby's theory.

2.2.1 DEMING'S THEORY

Deming's theory of TQM was built on fourteen points of management (Deming, 1993). It was based on the philosophy plan-do-check-act. He argued that ratio-quality is equivalent to output of workforce over total costs (Deming, 1993). In the same afore-referenced research, Deming stated that if an organization solely concentrates on reducing costs then its quality of output goes down. In order for a company to remain at a competitive edge it has to offer quality products into the market. Poor quality is an expense to company because it has to put more resources in marketing the poor-quality products (Deming, 1993). In his theory Deming adopted four key concepts which are system appreciation, variation knowledge, knowledge theory, and psychology knowledge. In TQM it is vitally important to understand company's processes, and how they work, causes of variation, human nature and anything worth knowing about that organization. This will aid the company to facilitate continual improvement process and trainings (Deming, 1993). Further, he contended that there should be constant purpose in total quality management and adoption of new philosophies. There should be continual improvements regarding staff knowledge, product quality

and management style. TQM should not be based on mass inspection or awarding businesses based upon prices.

For TQM to be achievable there should be continuous production and service, trainings and cutting edge leadership. Any organization striving to attain TQM should break the barriers in the various departmental level. Free and ease flow of information should be evident in the company (Deming, 1993). Deming demonstrated the Plan-Do-Check-Act in cycle created for continuous improvement. During the planning phase, objective and actions are set first. Implementation process begins thereafter by taking actions to ensue improvements in the organization. Periodical checks are ensured to maintain the set quality. Deliveries made by suppliers should be highly inspected to ensure standard quality is maintained. Lastly, acting is required to ensure that intended changes in the continuous improvement (CI) are achieved. Management should guarantee that right and exact things are carried out timely and customers are satisfied (Deming, 1993).

2.2.2 CROSBY'S THEORY

Crosby (1979) also credited for the initiation of TQM movement. He argued similarly to Deming but indicated that money expended on quality is money well spent. One key commitment of management should be that for quality. Crosby defines quality as adherence to requirements and prevention is the ideal way to ascertain quality. Also, he posed challenge that zero mistakes are the performance standards of quality. Furthermore, Crosby's theory stated that the measure of quality is the price of nonconformity. More precisely consistency in producing conforming products and services at optimum price should be the ideal target (Crosby, 1979).

Continuous quality improvements can be accomplished through total commitment from management. This is realistic where quality leadership in a company is manifested. Significantly,

an organization should form quality improvement teams to champion for quality improvements in the management, product and service. Specifically, each department should nominate a person to the team for quality in the company to create equal opportunity for participation (Crosby, 1979). Also, each quality improvement activity should have metrics for measurement. Every organization that strives at achieving TQM is expected to decide on the cost of quality and gains attributed to improvements. For management to function effectively, it should be in a position to encourage its employees to fix their mistakes and create zero-defect committee. Also, every member staff in that organization should comprehend steps to quality. To keep quality management root causes of errors must be established and eliminated from the system or process (Crosby, 1979). Communication on both current and anticipated non-conformance issues should be done to permit timely corrections. (Rashid, Taib, and Ahmad, 2006) indicated that a company is a combination of several departments which involve different sectors in the economy hence there is need to address collectively by representation from all functions. The life span of a company is determined by the commitment to continuous improvement.

Crosby (1979) presents a 14-step program for quality improvement. The 14 steps emphasise in particular management commitment, a participative company culture for developing quality awareness and action throughout the organization, an emphasis on defects prevention over inspection and the continuous nature of the quality improvement method. They are:- commitment by management —clarify management position regarding quality; quality improvement team--establish a committee to run the program for quality improvement*;* measurement of quality--present a display of current and possible non-conformance issues in a way that allows for unbiased evaluation and corrective action; quality evaluation cost--state the requirements of the cost of quality and clarify its use as a tool for management, quality awareness--state the means of raising

the personal concern felt by all personnel towards product/service conformance and the reputation of the company; corrective action--describe in a logical manner the method of addressing quality issues that have been recognized through the previous steps; planning for zero-defect—scrutinize , find and implement the activities necessary prior to the inauguration of the 'zero-defect' program; educating the employees - ascertain and introduce the training that employees are expected to have to be able to carry out their part in the quality improvement process; zero-defects day--make an event that will inform employees, through personal experience, that a change is in place; setting your goal—encourage individuals to establish improvement goals at all times by turning your pledge and commitment into actions,; error cause removal--empower the individual employee by providing a method of relaying to management the situations that make it impossible for them to meet the pledge to improve; recognition—active participants must be appreciated; quality councils—provide a forum for the quality professionals for planned communication on a regular basis; repeat it several times- stress the need to continue to prioritize the goal for the quality improvement process.

2.3 TOTAL QUALITY MANAGEMENT

The main objective of TQM is to ensure continuous improvement in the employees, systems, processes and environment so as to obtain improved customer service and increased profits through prudent management in the whole company (Mohammed, Tibek, and Endot, 2013). The motivation for the implementation of TQM is the benefits that organization and its clients get, thus it is regarded a double-sided competitiveness tool.

It is vitally important to note that irrespective of a company’s size or operation, TQM can be implemented. However, the company’s understanding of the process and the strategy adopted will

influence the success of the implementation process. One key principle that must govern the implementation of TQM in an organization is that it must cover the entire company; management must play a leading role while encouraging every employee to be deeply involved and every function in the organization must be involved (Matlhape and Lessing, 2002).

Usage of TQM is a detailed procedure that requires some serious energy and assets. It is a procedure that must be started and overseen by the best administration. The best management must make accessible every single basic asset required and in addition the hierarchical structure and culture required. The procedure must spotlight on discovering, meeting and surpassing client needs and desires through aggregate organisation of everybody in the organisation and through constant change. This procedure requires remarkable abilities and cooperation that call for constant workers preparing and advancement (Oluwatoyin and Oluseun, 2008).

It is critical to take note of that there are factors that may restrain fruitful execution of TQM. Sadikoglu and Olcay, (2014) allude to them as obstructions of TQM usage. These variables incorporate; absence of best management duty which is related with absence of basic assets and poor authority prompting poor representative strengthening and inspiration, poor or feeble authoritative vision and plan proclamation that weakens worker's endeavours in quality projects. Another essential factor is government impact that is related with organization and moderate frameworks. Absence of positive quality strategy or low government support of value programs makes it a test to receive and execute quality activities.

2.3.1 PRINCIPLES OF TOTAL QUALITY MANAGEMENT

The standards of TQM are recorded by ISO as takes after (Brown and van der Wiele, 1996): client centre, inclusion of individuals, administration, nonstop change, accurate way to deal with basic

leadership, process approach, framework way to deal with administration, and commonly advantageous provider connections. In the construction business, accomplishment of adequate levels of value has for quite some time been an issue. As indicated by Arditi and Gunaydin (1997), in every year, there are expansive consumptions of time, cash and assets (both human and material) because of wasteful or non-existent quality management strategies. As of late, the construction organizations have begun to embrace TQM as an activity to take care of the quality issues, Witcher (1995) bolstered this approach by expressing if at any time an industry required a take-up for idea of TQM it is the development business' (Al-musleh, 2010). Add up to Quality Management was right off the bat embraced in the assembling business and as of late it was received in the development business. Along these lines, it tends to be said that construction industry has fallen behind alternate businesses in embracing TQM. What's more, the purpose behind this slack were; the recognition that TQM had a place with assembling industry just, troubles in estimating (what to quantify and how to gauge) the aftereffects of the consistent change process and the discernment that utilization of TQM was exorbitant and required an extensive stretch of time (Al-Musleh, 2011).

Low and Peh (1996) suggested seven basic steps of TQM application in the construction projects which are shown in the Table 1 (Shoshan and Çelik, 2018).

Table 0.1: Steps of TQM application in the construction industry

No.	Steps
Step 1	Obtain the commitment of the client to quality
Step 2	Generate awareness, educate, and change the attitudes of staff
Step 3	Develop a process approach toward TQM
Step 4	Prepare project quality plans for all levels of work
Step 5	Institute continuous improvement
Step 6	Promote staff participation and contribution using quality control circles and motivation programs
Step 7	Review quality plans and measure performance

According to Pialles, (2017), the quality in the construction industry can be achieved by following principles:

i. Properly defined scope of work.

ii. Establishment of organizational leadership to achieve the specified quality goals.

iii. Application of continuous improvement at each level by:

- Owner: specify the latest needs.
- Designer: include the latest quality materials, products, and equipment in the specification.
- Constructor: use the latest construction equipment to build the facility.

iv. Establishment of performance measures by:

- Owner: checking and ensuring the satisfaction of contract documents with needs and compliance of work done with these documents.

- Contractor: construct the project according to contract documents by using the materials, products, and equipment that fulfil the specified requirements.
- Consultant: supervise the contractor's work as per contract documents and the specified standards.

v. Participation of all project team members in the quality improvement process.

vi. Existence of training and education plans for managers, engineers, supervisors, and office staff

2.3.2 Total Quality Management Practices

From the principle of total quality management (TQM), and the management hypotheses, it is obvious that TQM rehearse is organized towards one theory that is squander decrease and ceaseless change, with a specific end goal to accomplish a shared objective; consumer loyalty (Lleshi and Lani, 2017; Schindler, Puls-Elvidge, Welzant, and Crawford, 2015). Know that the accomplishment of consistent change expects individuals to recognize what assignment to do at a given time and how to do it. This further reverberated somewhere in the range of four fundamental overseeing rules that ought to be engaged with add up to quality administration: individuals based administration, meeting past consumer loyalty, consistent change and actuality based administration. Every one of these standards, if all around executed, will result to enhanced business process. Essentially, to accomplish this, every one of the standards is converted into work on utilizing some centre ideas. The successful utilization of the centre ideas is dictated by the effectiveness of best management initiative towards their drive or excitement towards business greatness (Yusuf et al., 2007). The centre ideas include: consumer loyalty, cooperation, methodical procedure of working, predictable estimation, tolerating disguised clients; individuals make

quality, counteractive action, ceaseless change framework (Morumudi, 2017). As per Talib and Rahman (2012), TQM depends on three essential standards: client introduction, process introduction and ceaseless change. Taking a gander at a portion of these basic standards, it is most essential for each partner to have an intentional comprehension of TQM, its significance and positive long haul impact it will have in hierarchical structure.

A preliminary step in TQM practice is to evaluate the association's present reality. Applicable preconditions need to do with the association's history, its present needs, encouraging occasions prompting TQM and existing representative nature of working life. On the off chance that the present reality does exclude essential preconditions, TQM execution ought to be deferred until the point when the association is in a state in which TQM is probably going to succeed (Moura, 2016). As indicated by El-Morsy, Shafeek, Alshehri, and Gutub (2014), TQM helps in enhancing the nature of items and furthermore decreases the piece, improve and the requirement for cushion stock by building up a steady creation process. He contended that TQM will diminish the cost of generation and time of creation. Persistent change which is an element of TQM is said to lessen the item process duration along these lines enhancing efficiency (Morumudi, 2017). Numerous other TQM practices, for example, preparing, data framework administration, association with providers and so forth positively affect operational execution. The productive management treatment of these practices will enhance effectiveness and no uncertainty influence the gainfulness of the firm. As indicated by Priede (2012), TQM can limit the aggregate cost of creation through "sole sourcing". The cost for this situation is lessened by constraining the quantity of providers utilized by the firm and furnishing them with important preparing and innovation. The productive working of an activity will then rely upon how well the providers get together with the desires for the association.

2.3.3 Challenges of TQM Practices

As indicated by Matlhape and Lessing (2002), Employees (especially site-based representatives) demonstrated some protection from the presentation of TQM for a large group of reasons, which included dread of the obscure, saw loss of control, individual vulnerability, "it might mean more" disorder, and an unwillingness to take "possession" and be resolved to change. Different boundaries that were recognized included: saw risk to foreman and task administrator parts; lack of engagement at the site level; absence of comprehension of what TQM was, especially on location the same number of apparent it to be synonymous with QA; topographically scattered locales; dread of occupation misfortunes; deficient preparing; plan not unmistakably characterized; representative incredulity; and protection from information accumulation (e.g. modify costs, non-conformances material waste, and so forth.).

The contracting organisations distinguished various exercises they had learnt from the presentation of a TQM program, which include: TQM ought to be actualized by line administrators; a quality change framework has a part in enhancing the confidence of representatives; there should be a connection between data innovation and quality frameworks; proceeded with duty to instruction and preparing; TQM should be characterized and coordinated with the organisation's business technique; and there should be finished responsibility from top administration. Management must drive the TQM program and gain the help from all workers by making their authority obvious.

Tey (2014) bring up that, a portion of the development issues, for example, vacillation of interest and custom work (non-enduring state) make challenges in TQM execution and TQM could just enable organisations to adapt to such changes. At the end of the day, while TQM could be an answer for the development business issues, a portion of the development business issues are themselves obstructions for TQM execution. Oakland (1995) distinguished variables that obstruct

the usage of TQM. These incorporate the prospect that its execution can be tedious, bureaucratic, formalistic, unbending and indifferent. Ugboro, Obeng, and Spann (2011) in their exploration they discovered that the irresolute execution of TQM is a noteworthy purpose behind its disappointment in many organizations.

As per Ugboro and Obeng, (2000), organisations are just ready to execute only those parts of TQM which are upheld by existing hierarchical culture. Their discoveries uncovered that workers did not feel as a major aspect of the basic leadership process and their capacity to make commitments to quality change were confined because of the restricted specialist conceded them to do their exercises. Smith, (2004) clarified that quality programs have fizzled on the grounds that they were projects of the month. As indicated by him, actualizing quality all through an organisation isn't the consequence of a formalized program yet requires a social change in the manner in which exercises is directed.

Vrtoduši (2015) on his own assessment, asserts that the appropriation of inconsistent quality approach by organisations results in the disappointment of TQM usage, he additionally focused on that the assignment of value authority by directors may prompt the advancement of TQM administrations that are insufficient like other utilitarian offices. As indicated by Wilkinson et al (1998) the absence of duty from a specific gathering inside the organisation can be a genuine boundary in management of value. Most particularly the non-duty by management to quality management is a noteworthy deterrent to the fruitful usage of TQM.

Yusuf et al. (2007) sees that there is a requirement for management to drive the belief system of TQM process with a specific end goal to urge representatives to take after and furthermore to demonstrate to them about administration's pledge to quality. Wang et al. (2010) noticed that TQM is fundamental for an organisation’s efficiency and adequacy however won't really give an

organisation upper hand over her rivals. TQM does not address key business issues like separation and situating methodologies. Zehir, Ertosun, Zehir, and Müceldilli (2012) noticed that the disappointment of TQM can be ascribed to the unseemly execution strategy embraced by the organizations utilized and not in view of the standards of TQM itself.

2.4 EMPIRICAL REVIEW

The paper by Abusa (2011) called attention to how development experts execute TQM and its apparatuses in their undertakings in the diverse stages (outline and development). From the outcomes and ends from each contextual investigation incorporated into this paper, it's plainly now that TQM isn't a craze and how much advantages that TQM can convey to your development business (Improve business quality, increment consumer loyalty, decrease cost, spare time and substantially more). The reason that the development business has arrived late to TQM is that the development experts ignorant of the TQM standards and systems. To convey these advantages to the development business, more endeavours must be made to spread the way of life of TQM among the development experts and TQM courses must be in the building under graduated projects.

The investigation by Noman, and Hasan (2012) goes for examining the importance and readiness of contracting firms with respect to execution of (TQM) to Pakistani development industry. After investigation and measurable arranging of information depended on broad industry reviews by means of polls and balanced meetings with key temporary workers of the current market. The present practices surmise the normal disposition of the contractual workers towards the significance of receiving TQM. The perspectives that were focused on, for example, quality in the organisation representative preparing, and hierarchical culture, appear to be somewhat calculable. Additionally joining forces is known by nearly everybody in the business yet they demonstrate a

low reaction in such manner. Lacking of having a compact and correct meaning of value was additionally watched. The divided idea of the business is a major obstacle in TQM application. Absence of training is likewise one reason why TQM would fall flat. Furthermore, debasement, carelessness and unreliability are additionally basic issues. Contractual workers are worried in receiving TQM reasoning as they have a near-sighted view and can't understand its long haul advantage. Executing TQM requires a noteworthy hierarchical change that would change the way of life, process, vital needs and conviction of an organisation. Aside from responsibility top management must instruct its representatives on the need of TQM so it will diminish the measure of work for workers in the event that they never again need to go to the client grumblings and deformity issues.

In the examination by Low and Jasmine (2004) laid out the accompanying fundamental structure for actualizing TQM in development firms to be specific: client input framework, constant change, energize cooperation, diminish number of providers, process management and change through efficiency consider, compelling correspondence framework, top administration, audit hierarchical culture, deliver preparing plans and build up checking process.

As indicated by Wanyonyi (2016) firms attempt TQM in view of a few variables which incorporate client centre nonstop change, cooperation and management duty. Client centre is identified with consumer loyalty subsequently basic factor that influence execution of an organisation. An investigation directed in Australia by Anoop et.al (2012) TQM used in an organisation increment the capacity and execution of the organisation. The execution can be estimated by monetary execution, operational execution, client maintenance, representative maintenance and nature of

items. Execution of an organisation can be broadly influenced natural and hierarchical elements. Utilization of TQM influences monetary execution either straightforwardly or by implication.

An examination led in Kenya by Wanderi (2015) uncovered that estimating execution is extremely basic to the achievement of any organisation. TQM has changed tasks of numerous organisations as troughs perceive major management practices, for example, initiative, basic leadership, vital arranging, client centre, and ceaseless change.

A Ghanaian report by Didik, Moses and Patdomo (2011) noticed that quality management is a superior strategy for management that energizes change in hierarchical execution. As indicated by Addae-Korankye (2013) the vast majority of the organisations in Ghana were receiving all out quality management practices to deliver better items and address client issues. Exact examinations gave prove that organizations that training all out quality management hones win significant quality honours. An incorporated total quality management framework decreases blunders and wastage of assets prompting powerful and proficient organization

An investigation led in Ghana by Attakora-amaniampong, Salakpi, and Bonye (2014) noticed that client centre in one the key standards of TQM. Accomplishment of an organisation is dictated by how well client needs are comprehended. Interior clients who are workers shape significant part of TQM execution group. TQM is a framework which guarantees quality in an organisation. Comprehensively much consideration has been given to client centre in neighbourliness, development and human services. Item centre is one of the methodologies on client centre.

An audit led by Shah and Pitroda (2018) on basic achievement variables of TQM execution in Higher Education Institutions demonstrates that the accomplishment of a foundation relies upon its quality management procedure on how it recognizes, arranges, breaks down, and responds to the adjustments in quality necessities. This is predictable with the discoveries of Sharp et al. (2000)

on their investigation on factors influencing fruitful usage of ISO 9001: 2000 and Sadikoglu and Olcay (2014) consider on factors that prompt effective execution of TQM that distinguished management procedure as one of the basic factors in actualizing quality frameworks. Baidoun (2003) additionally directed an observational examination on basic variables of TQM in Palestinian organizations and discovered that best management duty and inclusion shown by: advancement of clear organisation mission, advancement of value strategy and qualities, defining of practical quality objectives, legitimate anticipating quality management and making quality management structure makes quality mindfulness and enhance usage of value management frameworks. Moreover, quality management reasoning makes it simple to execute quality projects (Hughes, 2009).

2.5 CHAPTER SUMMARY

This chapter presented a review of literature in line with the objectives of the study. It therefore covered the principles of TQM, TQM practices, and the challenges of TQM success written about in various literature.

CHAPTER THREE

METHODOLOGY

3.1 INTRODUCTION

This chapter addresses the methodology which included the processes and techniques used in carrying out the study in order to answer the research questions that are outlined in chapter one of the study. The researcher approached this by looking at the research design, target population, the sampling technique and sample size, sources of data, data collection instrument to be used and method that will be used to analyse the data.

3.2 RESEARCH DESIGN

The research adopted a descriptive research design. The design is preferred for it is fact finding and investigative in the capacity of establishing the truth. According to Saunders, Lewis, and Thornhill (2009), the descriptive survey method can be used for descriptive, exploratory, or explanatory research. This method is best suited for studies that have individual people as the unit of analysis. Descriptive survey method involves the use of standardized questionnaires to collect data about people and their preferences, thoughts, and behaviours in a systematic manner. Survey research has several importance, its suited for remotely collecting data about a population who are that is too large to observe directly, most of time questionnaire surveys are preferred by some respondent, its economical in terms of researcher time, effort and cost than most of research design (Creswell, 2013). The survey research design adopted becomes imperative because of the population characteristics and a representative nature of the sample of the population for the study.

3.3 RESEARCH APPROACH

A quantitative research approach was adopted for the study. Quantitative research approach was used since the expected information from the field involved factual elements that would be presented using descriptive statistics.

3.4 POPULATION OF THE STUDY

The population for this study were the project personnel at the Ghana Ports and Harbour Authority (GPHA), Tema Port. The total number of project personnel at the port was about 70.. The population of the study comprises project managers, project supervisors, project team members and other key personnel deemed to possess information relevant for the study. This population will be selected based on the fact that they are the people related to, or responsible for activities of effective TQM for construction sites in Ghana, specifically Tema Port.

3.5 DETERMINATION OF SAMPLE SIZE

Krejcie and Morgan (1970) used the following formula:

$$s = X^2NP(1-P) \div d^2(N-1) + X^2P(1-P)$$

Where:

s = ideal sample size

X^2= table value of chi square 3.841

N = Population Size

P = Population proportion (assumed to be 0.50)

d= degree of accuracy expressed as a proportion

to determine the ideal sample size for various population sizes and tabulated the results.

This table was employed to determine the sample size. According to the Krejcie and Morgan (1970) table (see appendix 2) for ideal sample size determination, a population of 70 requires an

ideal sample size of 59. This sample size was therefore deemed sufficient enough to permit for precision, assurance and generalizability of the research findings.

3.6 SAMPLING TECHNIQUE

Purposive sampling technique was used to sample respondents. Purposive sampling is used in selecting the respondents because of the researcher interest in selecting those who would best answer the research questions by providing accurate information with respect to an effective TQM for construction sites in Ghana, specifically Tema Port since it will be in their line of duty to help achieve the research objectives. Purposive sampling could be very useful for situations where one needs to reach a targeted sample quickly and where sampling for proportionality is not the primary concern (Abdullah et al., 2015). In this case, purposive sampling will help to get subjects that possessed specific characteristics required in this study.

3.7 SOURCES OF DATA

Mainly primary data was employed for the study. Primary sources of data are first-hand information that the researcher finds from the study population. This primary data was gathered from project managers, project supervisors, project team members through well-structured data collection instruments.

3.8 DATA COLLECTION INSTRUMENT

The researcher developed a questionnaire which contained items based on the objectives of the study. The advantages of using questionnaires are cost-effectiveness, cheap to administer and easy to analyse. It is also a feasible way to reach our respondents and it saves time in terms of designing.

In relation to the study, questionnaire was used in this study because it is appropriate for the respondents and it facilitates the collection of large amounts of data in a relatively short period. It is also easier to quantify and treat statistically. For the purpose of this study, structured questionnaire designed by the researcher was used. A structured questionnaire is the type that has multiple answers provided and the respondents are expected to tick one or as many as are relevant or applicable. The questionnaires were structured as follows: Section A: Background Information, Section B: Principles or approaches to TQM, Section C: Elements or Practices of TQM, and Section D: Determine the challenges of TQM practices on construction site. Respondents rated their agreement on a likert scale of 1 to 5: (1) “Strongly Disagree” to (5) “Strongly Agree” to find out the opinions and their concerns on the subject matter.

3.9 PRETESTING

A pilot study of the questionnaire was undertaken using eight (8) employees of Tema Port to ascertain whether the concepts used would be well understood by respondents. The time taken to complete the questionnaire ranged from 10-15 minutes. The purpose was to test the research instrument, and to make all necessary amendments. The importance of this exercise was that the questions that needed clarity could be amended to get the right information. Another good thing about it was that time taken to finish the questionnaire and response rate was known and this helped the researcher in the field work as to when to visit the respondents in order not to interfere work hours.

3.10 DATA COLLECTION PROCEDURES

The distribution of questionnaire to the population sample was done by the researcher, and collected back from them when completed. Data was collected over a period of three (3) days. The researcher exercised care and ensured all questionnaires issued to the respondents were received. To ensure an effective return rate, follow up telephone calls were made to encourage the respondents to complete the questionnaires. This method of administration provided the researcher the advantage of understanding the details of the modalities employed at the Tema Port. Respondents asked to anonymously complete the instrument and completion of the survey took approximately 10-15 minutes.

3.11 DATA ANALYSIS

The questionnaires were cautiously edited by reviewing the responses given to check whether answers fit the questions and also check for unanswered questions. The responses gathered from respondents were tallied and tabulated according to the items on the various sections of the questionnaire. The data collected was processed statistically, using the SPSS (version 22). Representations like tables and graphs were used to ensure easy and quick interpretation. The items were coded using SPSS. Descriptive statistics indicating frequencies and percentages were used to present the result in a tabular form and graphical form.

The Relative Importance Index was employed to provide answers to the objectives of the study.

The formula for RII is given below

$$RII = \frac{\sum W}{A*N} \ (0 \leq \text{RII} \leq 1) \text{ where}$$

W – is the weight given to each factor by the respondents and is measured the product of the likert scale level and the number of respondents who selected it. The likert scale level ranges from 1 to

5, (where “1” is “strongly disagree” and “5” is “strongly agree”); A – is the highest weight (i.e. 5 in this case) and; N – is the total number of respondents. The RII values range from 0.2 to 1; and are interpreted as follows $0.2 \leq RII \leq 0.4$ is low; $0.4 < RII \leq 0.7$ is medium; and $0.7 < RII \leq 1$ is high.

3.12 ETHICAL CONSIDERATION

The researcher assured the respondents that the information obtained would be kept confidential and strictly for the research purpose. The respondents were informed that they were free to participate or withdraw from the study at their free will.

3.13 CHAPTER SUMMARY

This chapter presented the methods employed to achieve the objectives of the study. A descriptive research design with a quantitative approach was employed. The sample size determined by Krejcie and Morgan formula and questionnaires were used to gather the data from the selected sample. Data was analysed using Microsoft Excel and SPSS using the RII statistical technique.

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION OF RESULTS

4.1 INTRODUCTION

This chapter presents analysis of data to cover the objectives of the study. The main objective of this study was to ascertain the challenges of TQM implementation on construction sites in Ghana, using the Tema Port as a case study. The specific objectives were to establish the extent of application of TQM principles on construction sites at the port, to determine the extent of TQM practices; and then to ascertain the challenges faced in effective TQM implementation. It first analyses the response rate; presents a profile of the respondents, and then results of the analyses of data in line with the objectives.

4.2 RESPONSE RATE

The response rate (RR) is the ratio of the number of questionnaires returned to the number of questionnaires sent out (Mellahi and Harris, 2016). The higher the RR, the better the confidence in the representativeness of the data. While there is no consensus for an ideal response rate (Mellahi and Harris, 2016), the Journal of the American Medical Association clearly states that survey studies should 'have sufficient response rates (generally at least 60%). 59 questionnaires were sent out and 50 were received adequately responded. The response rate for this study, RR is as follows:

$$RR = \frac{Number\ of\ Questionnaires\ Returned}{Number\ of\ Questionnaires\ Sent\ Out}$$

$$RR = \frac{50}{59} = 84\%$$

An 84% response rate was achieved. Higher than 60%, these response rates increase the generalisation capacity of the findings of this study.

4.3 PROFILE OF RESPONDENTS

The respondents' profile was analysed in terms of gender, age group, highest educational qualification, position, and number of year with the organisation. Table 4.1 below shows a summary of the respondents' profile.

Table 0.1: Profile of Customer Respondents

	Variables	Frequency	Percent
i.	Gender of Respondent		
	Male	44	88%
	Female	6	12%
		50	*100%*
ii.	Educational Qualification		
	Diploma	12	24%
	Bachelors	20	40%
	Masters/Professional	18	36%
		50	*100%*
iii.	Position		
	Project Manager	22	44%
	Project Supervisor	18	36%
	Project Officer	10	20%
		50	*100%*
iv.	Number of years in position		
	1-5	22	44%
	6-10	28	56%
		50	*100%*

Source: (Field Data, 2018)

Section (i) of Table 4.1 shows the gender distribution of the customer respondents. 88% (44) were males and 12% (6) were females. This means that majority of the respondents were males; and this can be attributed to the fact that the construction industry is a male dominated industry.

Section (ii) covers the distribution of respondents by highest educational qualification. 24% (12) had attained up to a Diploma; 40% (20) had first degree bachelors; and 36% (18) had post-graduate masters and professional certificates. This means that majority of the respondents had at least a first degree bachelors. Section (iii) of the table shows the role of the respondents in the construction company. 44% (22 were managers, 36% (18) were supervisors, and 20% (10) were officers. This means that majority of the respondents were managers. Section (iv) shows the distribution of respondents by number of years working with their current organisation. 44% (22) have been with their current company for up to 5 years; and the remaining 56% (28) for more than 5 years. This means that majority of the respondents had been with the current construction company for more than 5 years.

4.4 OBJECTIVE 1: ASSESSMENT OF TQM PRINCIPLES

Respondents were required to indicate how strongly they agreed to the existence of principles of TQM as posited by Rumane (2013). The RII was used to rank the extent to which the principles were evident in the activities of the construction companies. This for Principle 1 for instance (Properly defined scope of work), the RII was determined as follows:

$$\frac{(12 \times 1) + (9 \times 2) + (6 \times 3) + (16 \times 4) + (7 \times 5)}{50 \times 5} = \frac{12 + 18 + 18 + 64 + 35}{250} = \frac{147}{250}$$

$$= 0.59$$

The overall RII is determined by the mean of the individual RIIs.

Table 0.2: Assessment of TQM Principles on Construction Sites

		1	2	3	4	5	Sample size=		50	Rank
		SD	**DA**	**NS**	**AG**	**SA**	**Total**	**Total Weight**	**RII**	
1	**TQM Principles**									
i	Properly defined scope of work	12	9	6	16	7	50	147	.59	4th
ii	Establishment of organizational leadership to achieve the specified quality goals	10	10	8	13	9	50	151	.60	3rd
iii	Application of continuous improvement at each level by owners, designers, and contractors	9	13	3	14	11	50	155	.62	1st
iv	Establishment of performance measures by owners, contractors and consultants	13	11	4	15	7	50	142	.57	5th
v.	Participation of all project team members in the quality improvement process	12	12	10	16	0	50	130	.52	6th
vi.	Existence of training and education plans for managers, engineers, supervisors, and office staff	11	10	6	11	12	50	153	.61	2nd

Source: (Field Data, 2018)

The results show that Principle 3 (Application of continuous improvement at each level by owners, designers, and contractors) recorded an RII of 0.62 (between 0.5 and 0.7), and ranked 1st. An RII of 0.62 implies a medium evidence of the principle. Similarly, Principle 6 (Existence of training and education plans for managers, engineers, supervisors, and office staff) recorded an RII of 0.61 and ranked 2nd; followed by principles 2 (Establishment of organizational leadership to achieve the specified quality goals); 1 (Properly defined scope of work), 4 (Establishment of performance measures by owners, contractors and consultants), and then 5 (Participation of all project team members in the quality improvement process) in that order. The overall RII for evidence of the existence of RII principles was 0.585 (medium). This means that generally TQM principles were not very evident in the activities of construction companies at the Tema Port.

According to Adusa-poku (2014), majority of construction firms in Ghana specifically Kumasi are oblivious of TQM principles and their application in the Construction Industry. She identified and analysed seven (7) critical principles in the implementation of TQM. Her analysis revealed that the ranking order in order of importance for the factors were Process Management, Continuous Improvement, Employees' Satisfaction/Empowerment, Supplier Chain Management, Customer Focus, Management /Leadership and Training. From her study it shows that customer service, the prime aim of TQM was not considered the most significant.

4.5 OBJECTIVE 2: ASSESSMENT OF TQM PRACTICES

Respondents were required to indicate how strongly they agreed to the existence of TQM practices. The RII was used to rank the extent to which the practices were evident in the activities of the construction companies. Their responses are with corresponding RII are presented in Table 4.3 below.

Table 0.3: Assessment of TQM Practices on Construction Sites

		1	2	3	4	5	Sample size=		50	Rank
		SD	**DA**	**NS**	**AG**	**SA**	**Total**	**Total Weight**	**RII**	
1	**TQM Practices**									
i	Top management commitment	30	10	8	2	0	50	82	.33	10th
ii	Supplier Quality Management	10	15	8	12	5	50	137	.55	1st
iii	Strategic quality management	16	12	15	4	3	50	116	.46	4th
iv	Design quality management	18	10	10	8	4	50	120	.48	2nd
ix	Information and Analysis	22	12	7	6	3	50	106	.42	8th
v.	Process management	17	13	10	5	5	50	118	.47	3rd
vi.	Quality Culture	19	12	10	7	2	50	111	.44	6th
vii.	Education and Training	20	13	3	10	4	50	115	.46	5th
viii	Empowerment and Involvement	22	15	4	4	5	50	105	.42	9th
x	Customer Satisfaction	16	20	6	3	5	50	111	.44	7th

Source: (Field Data, 2018)

The results show that Practice 2 (supplier quality management) recorded an RII of 0.55 (medium), followed by Practice 4 (Design and Quality) recorded RII 0.48 (low); and so on. Generally the RII for TQM practices was 0.45 (low). This means that observation of practices were low in the construction activities at the Tema Port.

4.6 OBJECTIVE 3: ASSESSMENT OF CHALLENGES

Respondents were required to indicate how strongly they agreed to the prevalence of challenges against effective TQM practices. The RII was used to rank the extent to which the challenges were prevalent. Their responses are with corresponding RII are presented in Table 4.4 below.

Table 0.4: Assessment of Effective TQM Implementation Challenges

		1	2	3	4	5	Sample size=		50	
		SD	**DA**	**NS**	**AG**	**SA**	**Total**	**Total Weight**	**RII**	**Rank**
	TQM Practices									
i	Inadequate workshops and trainings to drive TQM improvement processes	0	2	8	30	10	50	198	.79	3rd
ii	Lack of employee's commitment/understanding on TQM	0	12	9	15	19	55	206	.82	1st
iii	Lack of expertise/resources in TQM	0	0	17	16	17	50	200	.80	2nd
iv	Constraints impose by quality culture	0	8	14	18	10	50	180	.72	8th
ix	Improper channel of communication	0	9	7	22	12	50	187	.75	5th
v.	Quality certifications views as bureaucratic exercise	0	8	12	17	13	50	185	.74	6th
vi.	Lack of funding and resources	0	9	10	19	12	50	184	.74	7th
vii.	Poor documentation	0	8	5	24	13	50	192	.77	4th

Source: (Field Data, 2018)

The results show that Challenge 2 (Lack of employee's commitment/understanding on TQM) recorded an RII of 0.82 (high), and ranked 1st; followed by Challenge 3 (Lack of expertise/resources in TQM) recorded RII 0.80 (high); and so on. Generally the RII for Challenges against effective TQM implementations was 0.766 (high). This means that challenges against effective TQM implementation were high at the Tema Port. Lack of employee's commitment/understanding on TQM was the biggest challenge; followed by Lack of expertise/resources in TQM, Inadequate workshops and trainings to drive TQM improvement processes, Poor documentation, Improper channel of communication, Quality certifications views as bureaucratic exercise, Lack of funding and resources, Constraints imposed by quality culture. The constraints imposed by quality culture ranked the lowest, which means that TQM practices by themselves do not hinder progress of construction site activities.

Kojo(2014) identified several challenges faced in the implementation of Total Quality management (TQM) in the Ghanaian road sector . He grouped the challenges into six categories; Management issues, financial issues, Educational issues, Government issues, Technical issues and Human attitudinal issues. Though TQM implementation in the Ghanaian construction industry suffers significantly from all the challenges aforementioned, among them Educational issues had the topmost priority with technical issues taking the last spot

CHPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

5.1 INTRODUCTION

The main objective of the study was to ascertain the challenges of effective TQM practices on construction sites within the Tema Port. Specifically, the study sought to establish the extent of application of TQM principles on construction sites at the port, to determine the extent of TQM practices; and then to ascertain the challenges faced in effective TQM implementation. The Relative Importance Index techniques was applied to be able to rank the factors under each objective. This chapter presents the summary of findings, conclusions, and recommendations.

5.2 SUMMARY OF FINDINGS

The summary of findings are presented in line with the objectives of the study.

5.3 OBJECTIVE 1: ASSESSMENT OF TQM PRINCIPLES

The RII values range from 0.2 to 1; and are interpreted as follows $0.2 \leq RII \leq 0.4$ is low; $0.4 < RII \leq 0.7$ is medium; and $0.7 < RII \leq 1$ is high. With the overall RII for evidence of the existence of TQM principles being 0.585 (medium), it means that generally TQM principles were not very evident in the activities of construction companies at the Tema Port. The most evident TQM principle was “application of continuous improvement at each level by owners, designers, and contractors” with an RII of 0.62; and the least evident was “Participation of all project team members in the quality improvement process”.

5.4 OBJECTIVE 2: ASSESSMENT OF TQM PRACTICES

Generally the RII for TQM practices was 0.45 (low). This means that observation of practices were low in the construction activities at the Tema Port. The most observed practice was "supplier quality management" with an RII of 0.55; and the least observed was "top management commitment".

5.5 OBJECTIVE 3: ASSESSMENT OF CHALLENGES

Challenges against effective TQM implementation were high at the Tema Port. RII for Challenges against effective TQM implementations was 0.766 (high). Lack of employee's commitment/understanding on TQM was the biggest challenge; followed by Lack of expertise/resources in TQM, Inadequate workshops and trainings to drive TQM improvement processes, Poor documentation, Improper channel of communication, Quality certifications views as bureaucratic exercise, Lack of funding and resources, Constraints imposed by quality culture.

5.6 CONCLUSIONS

The evidence of TQM practices are still at nursery stage within the construction industry, specifically Tema Port. There is low evidence of the principles and observation of TQM practices within the activities on construction sites. The low level of practice can be attributed to the high level of challenges experienced in ensuring effective implementation of TQM practices. An examination of the challenges also show that employees (management and staff) have not been well-conscientised about the essence of observing TQM practices. The sensitisation should come from the top; since the commitment at the top is also low. The least challenge was constraints

imposed by practicing TQM; this means that observing TQM practices was not a tedious task or hindrance to work progress.

5.7 RECOMMENDATIONS

Based on the findings and conclusions above, the following recommendations are suggested for consideration:

Management of GPHA (specifically Tema Port), should be committed to the TQM concept and implementation. Without management commitment; the staff commitment would also be low.

Education and training on the concept of TQM should be taken seriously by the management of GPHA to ensure a high level of observation of the practices.

There should be a government initiative for policy formulation to ensure implementation of TQM practices not only in the construction industry but other industries as well. This will in turn have a significant effect on economic growth of the country.

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APPENDIX

RESEARCH QUESTIONNAIRE

TOPIC: CHALLENGES OF TOTAL QUALITY MANAGEMENT ON GHANAIAN CONSTRUCTION SITE: A CASE STUDY OF TEMA PORT

Dear Respondent,

This study is designed to develop an effective TQM framework for construction sites in Ghana, specifically the Tema Port. The usefulness and potential positive outcomes of the study will depend upon the honesty and care with which you answer the questions. Please read the instructions for each section carefully. Choose a response that gives the best indication of how you would typically think, feel and experience. You will require about 15 to 20 minutes completing the questionnaire. All information provided shall be treated strictly confidential.

ABEL AYAMGA AKURIGO

INSTRUCTION: Please Tick [√] in the appropriate box provided to indicate your answers or explain as appropriate**.**

SECTION A: DEMOGRAPHIC INFORMATION

1. Gender
   a. Male [ ]
   b. Female [ ]

2. Qualification (Highest level of formal education)
   a. Bachelors [ ]
   b. Masters [ ]
   c. PhD [ ]
   d. Other [ ]

3. Role
   a. Project Manager [ ]
   b. Project Supervisor [ ]
   c. Project Officer
   d. Other [Please specify] [ ]

4. Experience - Number of years respondent has been working with the organisation
   a. 1 – 5 [ ]
   b. 6 – 10 [ ]
   c. Over 10 [ ]

Section B – Assessment of TQM Principles

Please indicate your level of agreement with the existence of the following TQM principles on your construction site at the Tema Port.

Use the following as a guide in your response options.

1- Strongly Disagree (SD)
2- Disagree (D)
3- Not Sure (NS)
4- Agree (A)
5- Strongly Agree (SA)

	Principles of TQM	**SD**	**D**	**N**	**A**	**SA**
1.	Properly defined scope of work					
2.	Establishment of organizational leadership to achieve the specified quality goals					
3.	Application of continuous improvement at each level by owners, designers, and contractors					
4.	Establishment of performance measures by owners, contractors and consultants					
5.	Participation of all project team members in the quality improvement process					
6.	Existence of training and education plans for managers, engineers, supervisors, and office staff					

Section C: Assessment of TQM Practices

	Elements of TQM	**SD**	**D**	**N**	**A**	**SA**
1.	Top management commitment					
2.	Quality culture					
3.	Strategic quality management					
4.	Design quality management					
5.	Process management					

6.	Supplier quality management					
7	Education and Training					
8.	Empowerment and Involvement					
9.	Information and Analysis					
10.	Customer Satisfaction					

Section C: Determine the challenges of TQM practices on construction site

	Challenges					
A	**Management Challenges**	**SD**	**D**	**N**	**A**	**SA**
1.	Lack of Top Management Support And Commitment					
2.	Poor Project Definition					
3.	Delay in supply of materials					
4.	Unsuitable Organisational Structure					
5.	Weak Administration					
6.	Inadequate Preplanning					
7.	Lack of Client and Supplier Involvement					
8.	Absence of Long Term Planning					
9.	Lack of Customer Focus					
10.	Poor Communication					
11.	Lack of Information Sharing					
12.	Poor Planning					
13.	Poor Procurement Selection Strategies					
14.	Delay In Decision Making					
15.	Long Implementation Period					
B	**Financial Issues**	**SD**	**D**	**N**	**A**	**SA**
1.	Inadequate Project Funding					
2.	High Implementation Cost					
3.	Poor Professional Wages					

4.	Lack Of Incentives And Motivation					
5.	Risk Aversion					
6.	Corruption					
C	**Educational Issues**	**SD**	**D**	**N**	**A**	**SA**
1.	Lack of knowledge and understanding					
2.	High Level Illiteracy					
3.	Lack Of Training					
4.	Lack of Project Team Skills					
5.	Inadequate Exposure to Requirements for Quality implementation					
D	**Government and Macro related Challenges**	**SD**	**D**	**N**	**A**	**SA**
1.	Government Bureaucracy					
2.	Inconsistency In Policies					
3.	Poor infrastructural support					
4.	Materials Unavailability and Unsteady Price Commodities					
E	**Technical Challenges**	**SD**	**D**	**N**	**A**	**SA**
1.	Poor building designs					
2.	Poor measurement strategies					
3.	Lack of consensus on implementation Methodology					
4.	Supply chain uncertainties					
F	**Attitudinal Challenges**	**SD**	**D**	**N**	**A**	**SA**
1.	Lack of Team Spirit					
2.	Poor attitude to change					
3.	Internal Conflicts					

Thank You