CAUSES OF POOR-QUALITY PROJECTS: WAYS TO INCORPORATE TOTAL QUALITY MANAGEMENT IN THE CONSTRUCTION INDUSTRY IN GHANA

By

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MASTER OF SCIENCE

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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

The construction industry in Ghana is mainly privately led and is made up of foreign and local companies. The local indigenous Ghanaian owned companies are the ones facing the poor-quality delivery largely, while the foreign companies are financially established. The latter enjoys tax holidays, import duty exemption on raw material imported and also follow the basic project management principles to a large extent. However, the local construction companies are mostly small to medium size companies and do not have the capacity to undertake the large GOG projects on their own unless they pool their resources together. The construction industry is faced with varied competing problems which include inability to secure adequate working capital, poor workmanship and insufficient engineering capacity, low productivity and lack of managerial skills, lack of means and opportunities for providing the training. Clients and other project stakeholders today place much emphasis on attaining quality on their projects, within stipulated time and budget. Total Quality Management (TQM) is counted as an advanced system in the field of quality, making it needful for construction companies to implement this system in order to attain quality on their projects. It is against this background that these specific objectives were set to investigate the implementation of TQM by identifying quality management practices that improve stakeholder's satisfaction, its implementation benefits from stakeholders' perspectives in the Ghanaian construction industry. Analysis of the data revealed that the implementation of Total Quality Management had not taken full effect in Ghana, nonetheless the quality management practices identified that improve stakeholders' satisfaction comprise employing specialists to carry out key aspects of the project, ensuring the use of quality standards, offering a beneficial and safe working environment, ensuring the construction activities meet the required standards and employing on site testing procedures for materials. However, the implementation will require top management commitment, employee involvement and the organizations ability to adapt the TQM change.

Keywords: Causes, Construction Industry, Management, Projects, Quality, Total

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DEDICATION

This dissertation is dedicated to the Almighty God, the author and finisher of my life.

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CHAPTER ONE

INTRODUCTION

1.1 Introduction

This study researched reasons for poor quality project: Ways to incorporate Total Quality Management in the Construction Industry in Ghana. Time, cost overruns as well errors caused by professionals in the industry has over the year been a challenge to the industry. Consequently, the main stakeholders in the industry find it imperative to achieve high quality outcomes on their construction hence making Total Quality Management (TQM) a priority.

1.2 Background to the Research

The management of construction projects requires knowledge of modern management as well as understanding of the design process. Construction projects have specific set of objectives and constraints such as a required time frame for completion. There is a need to take a gander at the correct methods for conveying quality framework. Research attempted by the Building Research Establishment in the UK has demonstrated that somewhat over half of development flaws were caused by outline inadequacies, 10% result disappointment and 40% by poor workmanship. Thus, the technique for venture execution must consider these discoveries; particularly on the need to build up the right plan answer for fulfill customers' necessities. This procedure needs to bring together and saddle every dissimilar power

and inclinations, went for concentrating on the meaning of undertaking targets to customers.

Manufacturing sector is notable for well-planned quality systems, in comparison with the construction industry. This is due to the different nature of the two sectors. Production requires repeated procedures by which products are primarily placed in bulky groups. The application specifics for construction are changing due to the job to job repetition. This does not reveal that manufacturing management systems cannot suit the construction management systems. Promoting the philosophy of TQM, which is the total quality management helps to give more meaning to the construction management systems (US census, 1997). The construction sectors are made of two categories namely buildings such as shopping, hospitals, etc. and civil work that consist irrigation, transportation, and so forth (Gould, 2008).

Didibhuku and Mvubu (2008) many construction firms from developing countries are insufficient in capacity and cease to meet the demand. Ligny and Erkelens (2008) made it clear that, there have been criticism on inability to innovate. Adnan et al. (2006) also added that, majority of the construction firms do not stand to compete effectively because of the lack of experience and the small nature of most of them. This has made the foreign construction firms to dominate the developing countries, due to weak conditions on part of the organization, industry and the institutional levels (Ligny and Erkelens, 2008). Similarly, the nationwide activity of enabling the homegrown development Organization in the private part to embrace a significant part of people in general development work was one of the quick suggestive fixes by many creating nations to address the difficulties of limit building. Furthermore, the expanded enthusiasm for look into for limit building models of development businesses in creating nations as of late is a reaction to generally recognized

difficulties of tending to indications rather than main drivers. The outcomes of tending to side effects have driven some development businesses of forming nations into horrendous cycles of unwanted level of nature of administrations and items for the development business. Be that as it may, limit working of the development business requires techniques at individual, authoritative, mechanical and the state levels with a specific end goal to give quality administrations and items. In like manner, utilizing frameworks institutional worldview approach as a theoretical start, this examination presents a defense for a central improvement for development formative method in creating nations that distinguish levels that ought to be viewed as principal for limit working of development industry in Ghana. With a more-wealthy, instructed and quality-cognizant open, structures are never again concerned only with just blocks and mortar. Quality desires in the development business currently consist of the following:

- A pollution-free environment;
- Paints and plaster without premature cracks or algae growth;
- Buildings which are defect-free during the briefing, design, tender, construction, commissioning and maintenance stages;
- Good and practical design and layout which are functional and yet aesthetic;
- Value for money for both the customers and end-users;
- Roofs, toilets, windows and walls that do not leak;
- Buildings which are well maintained and free of the sick building syndrome;
- Tiles and concrete that remain in place and perform their functions reliably and safely; and
- Good workmanship by contractors and sub-contractors;

Issues with regards to quality in the development business were fundamentally considered as particular issues identified with the site, building structures, generation, financing and end-clients, among others. Be that as it may, if quality issues can be distinguished and settled so promptly all things considered, low quality gauges would have for some time been wiped out totally in the development business. All things considered, this isn't to recommend that the endeavors taken separately to determine the particular quality issues recognized are superfluous. The way that low quality norms still endure in the development business appears to propose that there is a considerably more major issue than mulled over or recognized up to this point. This basic issue is identified with the dubious interest for development or outstanding task at hand precariousness. Like all different business substances, development firms can just keep on existing on a customary and steady stream of ventures. While development request might be a critical factor influencing the conveyance of good quality models by firms, this connection is not really perceived by any means.

This isn't the slightest surprising since development request at the national level is attached intently to the financial execution of a nation which can't be affected promptly by any one individual or government office. Quality management involves the process of planning, organizing and control with the objective of attaining quality work at reasonable cost whilst ensuring customer approval and enhancing the company’s reputation. The most important factor for engaging management is to convey customer satisfaction strategies whiles improving the effectiveness of the business (Mazher et al., 2015). Total Quality Management is a development process

for firms encompassing the relationship with suppliers, customers and other interested parties.

1.3 Problem Statement

Ghana has over the decade enjoyed significant growth in her economy. This growth has resulted in increasing global interest and demand for building and civil engineering works. This makes it important for the construction industry to device an effective quality management practices to curtail the poor quality of works. Quality Management has not been fully implemented in Ghana hence the reason why it has become important for its implementation in Ghana.

1.4 Aim

The aim of the research was to explore how total quality management can be incorporated in the Ghanaian construction industry.

1.5 Objectives

The research objectives were:

1. To assess the reasons for poor quality construction in Ghana.
2. To motivate the usage of TQM in the construction industry in Ghana; and
3. Identify the role of TQM in the enhancement of quality performance.

1.6 Significance of Study

The study of TQM in the construction industry in Ghana will go a long way to provide essential knowledge and information that represent the management of Quality.

1.7 Research Scope

The scope of the study was restricted to construction industry players in Accra and Tema Metropolis because of the number of construction firms and practioners of the trade within that space.

1.8 Structure of the Research

This study contained five chapters including chapter one which explicated the background of study, the aim, and objectives. Chapter Two gave an exhaustive appraisal of writing on Total Quality Management inside the Construction Industry. Chapter Three presented research approach in identifying the population, sample frame and size and method of analyzing the data collected. Chapter Four analyzed the data collected. Chapter Five presented the conclusions and recommendations. It presented the conclusions of the study and recommendations that offers knowledge into Total Quality Management implementation within Ghanaian Construction firms and dealt with conclusion and recommendation on the analysis of data collected.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a literature review for the research. Relevant literature on the Causes of poor quality projects: Ways to incorporate Total Quality Management in the Ghanaian construction industry is discussed. This literature reviews Quality Management with emphasizes on Total Quality Management. The evolution, principles, implementation in the Construction industry and benefits of Total Quality Management from existing literature are considered in this chapter.

2.2 Concept of Quality

Parfitt and Sanvido (1993) explained quality in construction as required total features by a service or product to need satisfaction and fitness with regards to purpose. Quality is known to convincing the end-users to buy a particulars product or acquire a particular service. Being able to meet specification is a way of measuring quality (Wateridge, 1995). They explained further that, specifications set as guidelines given by the client or consultancy to the contractor to assist him in executing the project. Technical performance is highly considered in achieving the quality of a product in the construction industry. Being able to meet the technical specification as a contractor can also help to achieve quality. Quality deals with conforming to the requirements (Crosby, 1979). Burati et al. (1991) considered quality as conforming to the requirements that have been predetermined and also meeting the need satisfaction. A graphical interpretation is generally illustrated on figure 2.1.

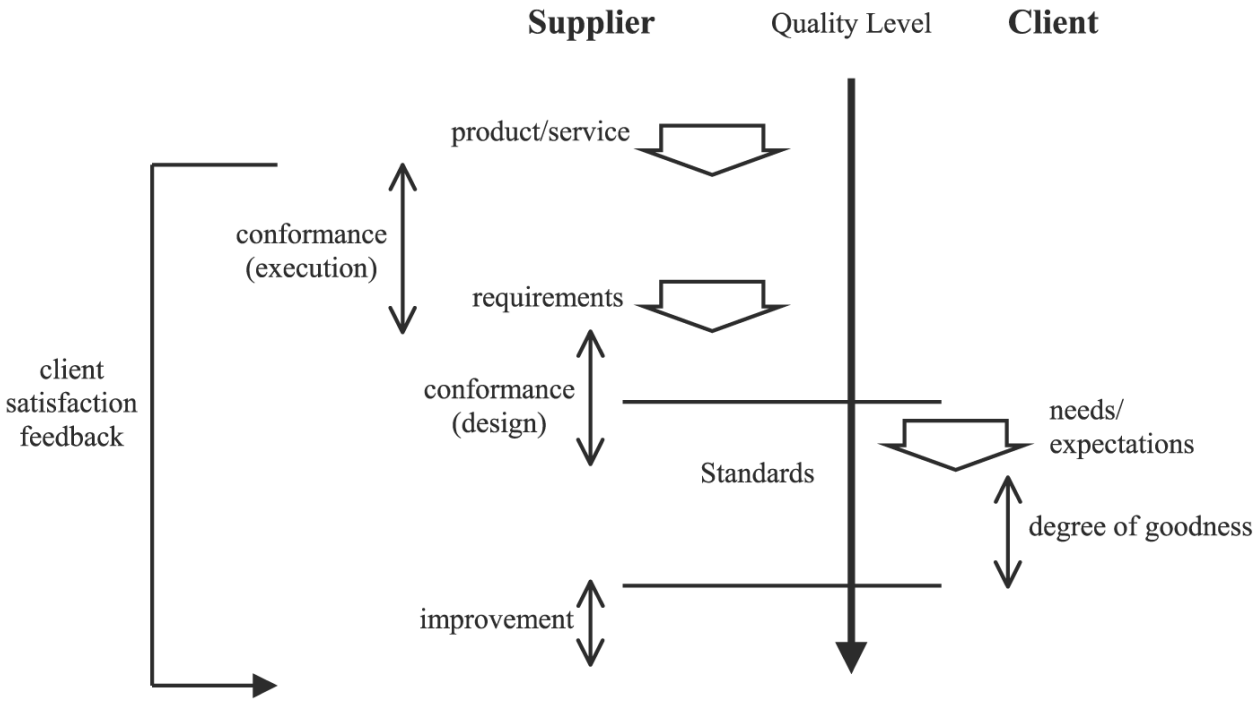


Fig 2.1: The Concept of Quality

2.3 Quality Management

Quality management includes the creation of approaches, establishment of aims, organization and executing the strategies; and monitoring schemes for scrutinizing response and selecting remedial actions. A firm's management of quality is of two sides:

a) Rewarding consumer's prospect; and

b) Distinction in the business's effectiveness (Dale et al., 1994)

Juran (1988) said the fundamental aim for managing quality is to help deal with problem of failure and wastage of services, process and products. Dale et al. (1994) supported that, there are four stages in managing quality: quality assurance, quality control, total quality management and quality inspection.

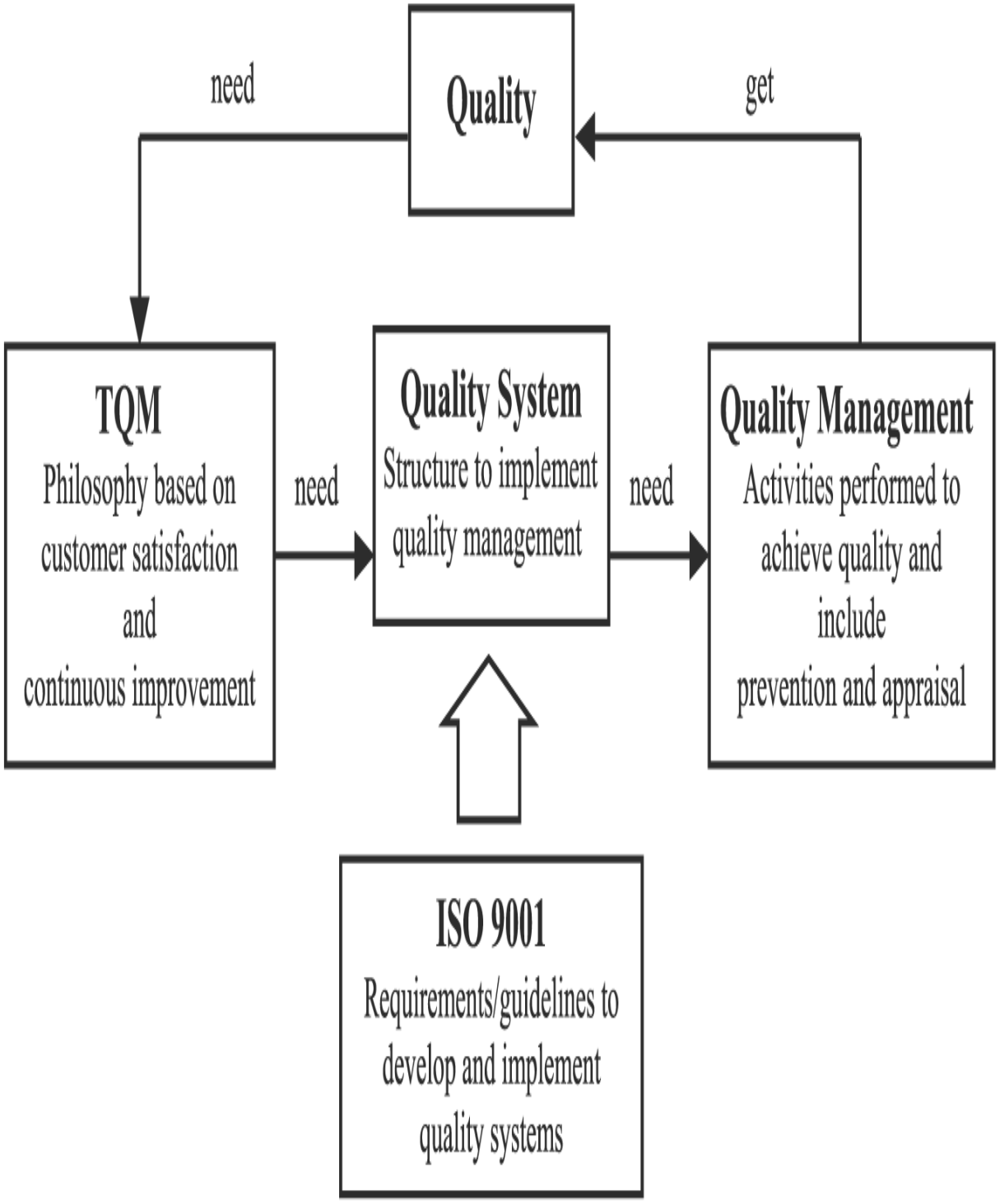
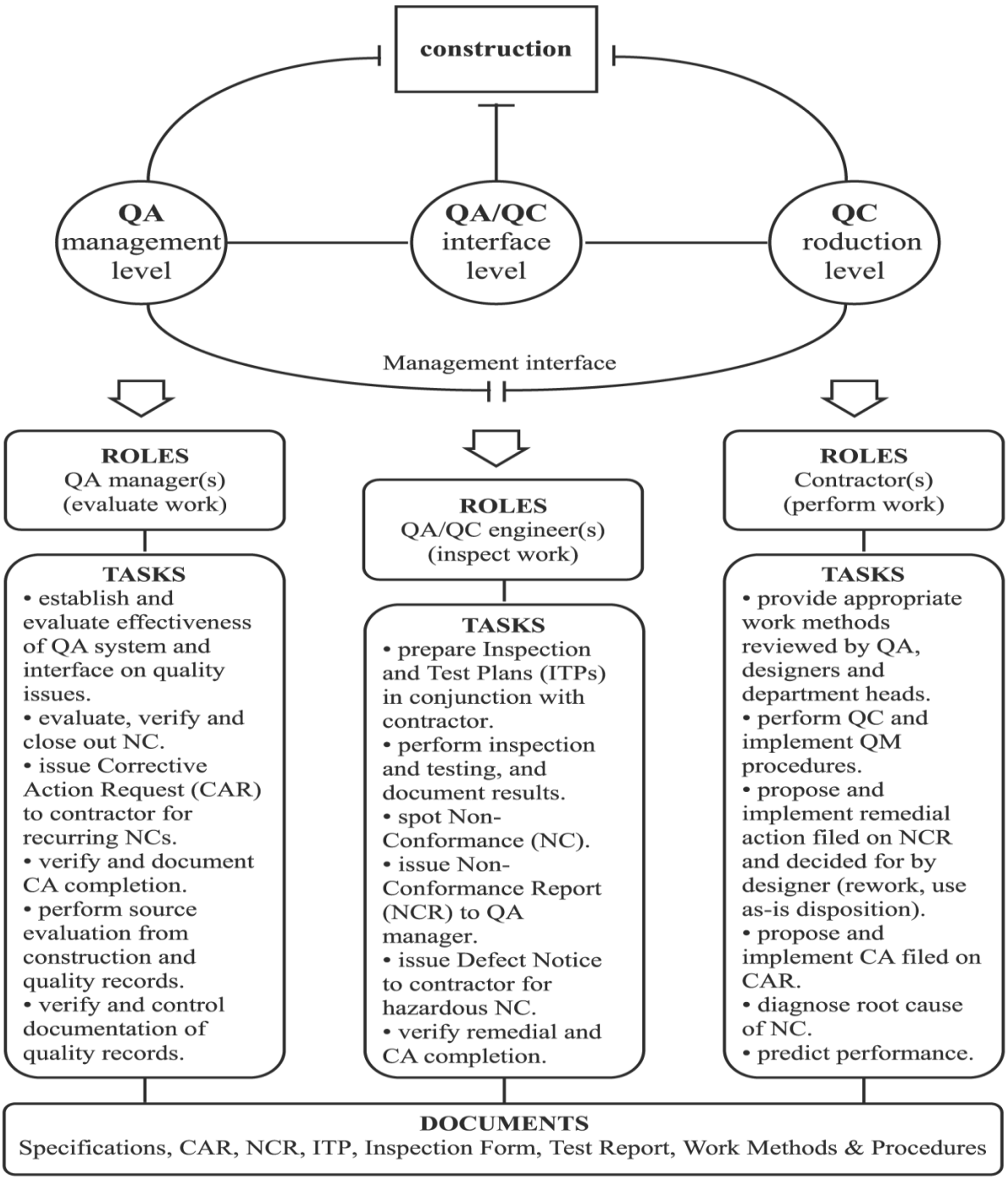


Fig 2.2 Quality Management



Key: NC: Nonconformance, NCR: Nonconformance Report, ITP: Inspection and Test Plan, CA: Corrective Action, CAR: Corrective Action Request, QM: Quality Management, QC: Quality Control, QA: Quality Assurance

Figure 2.3: Corrective Action Request

2.3.1 Quality Inspection (QI)

Quality Inspection is activities such as measuring, examining, testing, gauging one or more characteristics of a material, product or service and comparing these with

specified requirements and to determine conformity. Dale and Bunney (1999) described quality inspection as the "action that compared final product with detailed requirements to achieve conformity for each characteristic.

2.3.2 Quality Control (QC)

It is normally efficient after project completion. Juran (1988) defined quality control as "the regulatory process through which we measure that actual quality performance, compare it with standards, and act on the difference. Dale et al (1994), noted that solving of a problem after a non-conformance issue has been created is not an effective route towards eliminating the root cause of a problem.

2.3.3 Quality Assurance

Dale et al. (1994) explained quality assurance as a prevention-based system, capable of improving quality of product and services with regards to increasing productivity by emphasizing on services, design process and quality. It tends to put together all the needed functions and series of activities in the process of provision of adequate confidence in a product for the satisfaction of quality requirements. Tang et al. (2005) explained clearly that, quality assurance is relied on the principles of prevention is better that cure. Low and Teo (2004) supported by saying that, focusing on the right the first time and every time can help to achieve zero defect in performance. Low and Teo (2004) again discovered that there are differences in the satisfaction of customer needs and continual improvement.

2.4 Construction Stakeholders

An interest or share in an activity is described as a stake while an individual with a stake is described as a stakeholder (Chinyio & Olomolaiye, 2010). Freeman's (1984) definition is that "a stakeholder in an organization is any group or individual who can influence or is influenced by the accomplishment of the organization's objectives". Stakeholders in construction project comprises of the project owner, clients, project manager, project team such as consultants and contractors, subcontractors and suppliers, public groups, regulatory authorities, donors, the media, end users, and other groups with singular interests (Chinyio & Olomolaiye, 2010). Some participant are Ghana Highways Authority (GHA), Department of Urban Roads (DUR), Department of Feeder Roads (DFR), The Ministry of Water Resources, Works and Housing (MWRWH), Architectural and Engineering Services Limited (AESL), Public Works Department (PWD).

2.5 Sources of Funding

Construction projects in general are funded by the public and private sectors. In Ghana, the funding for the ministries comes from the following sources: Consolidated Fund, Road Fund Donor Fund, Ghana Education Trust fund (GETfund) etc.

2.6 Quality in Construction Industry

The expansion of this idea originally arose in the manufacturing industry. This gives the misleading impression that the Total Quality Management idea cannot be practical to any industry other than manufacturing subsequent to most writing reports that. Ali et al. (2014) observed several studies carried out by Kuprenas & Kenny (1998) and Kuprenas et al. (1996) and revealed that the application of Total Quality

Management procedures by small sized construction projects was quite a challenge and adoption of various tools such as Project Management, Partnership, Quality Assurance Plan, Quality Function Deployment and Jobsite Quality Planning to construction industry established varied outcomes. The most important goal of every organization is customer satisfaction and therefore the application of Total Quality Management principles even though might differ from one sector to another should not be affected. Most industry players in construction interchange Total Quality Management with Quality Assurance and Control since Quality Assurance standards such as ISO 9001 and 9002 is the application of Total Quality Management on construction projects (Jaafari, 2001).

2.7 Total Quality Management (TQM)

Total quality management has developed into a vital tactical instrument in the construction sector. It has become an essential tool for companies to expand their turnover and market share (Hellard, 1993). Therefore, the effect of Total Quality Management application in construction industries improves quality (Mazher et al., 2015).

2.7.1 Principles of Total Quality Management

Total quality management could serve as a management-led process to help all staff participate in the continual improvement of their duties the process of achieving customer satisfaction.

Total quality management goes beyond just management systems. It deals with practices, principles, procedures and processes for helping to achieve customer satisfaction (Love et al., 2004). The key principles of Total Quality Management

identified by Hashmi (2009) are Management Commitment, Employee Empowerment, Continuous Improvement and Customer Focus. Voon et al. (2014) identified the components of Total Quality Management for quality progression principles as highlighted below:

a. Leadership

Leaders in a Total Quality Management system see the firm as a system; support employee development; institute a multipoint communication among the employees, managers, and customers; and utilize information efficiently and effectively. In addition, leaders encourage employee participation in decision-making and empower the employees. Top management dedication and involvement in Total Quality Management practices are the most significant factors for the realization of Total Quality Management practices. Managers should establish more leadership than traditional management behaviors to enhance employees' awareness of quality activities in Total Quality Management implementation and practices (Criado and Mora, 2009) and (Goetsch and Davis, 2009). Leadership expands operational performance, inventory management performance, employee performance, innovation performance, social responsibility and customer results, financial performance and overall firm performance.

b. Knowledge and Process Management:

Successful knowledge management guarantees that employees obtain timely, consistent, stable, accurate, and necessary data and information as they need to do their job effectively and efficiently in the firm. Only in this way, the expected benefits from Total Quality Management practices can be achieved. Process management accentuates activities, as contrasting to results, through a set of practical

and developmental activities. It includes precautionary and practical approaches to quality management to reduce variations in the process and improve the quality of the product (Sadikoglu and Zehir, 2010). Knowledge and successful process management practices scrutinize data on quality to manage processes meritoriously. In this way, income rate of purchased products and records can be improved. Faults or inaccuracies in the processes can also be figured out and corrected on time. Furthermore, as the processes become prevention oriented, costs are reduced and profit of the firm increases.

c. Training

Total Quality Management firms should train all their employees to improve their competences in their tasks. Effective training in management and improvement in quality bring success for the firms. Employees' effective knowledge and learning capability will provide sustainability of quality management in the firm.

d. Supplier Quality Management

Contributions from suppliers establish the first phase of producing the products and/or services in a firm. High quality inputs provide high quality products and/or services. Therefore, the suppliers should adopt Total Quality Management and be involved in this process. Effective supply management practices assist the suppliers to implement quality management and deliver consistent and high quality products and/or services timely (Sadikoglu & Oclay, 2014).

e. Customer Focus

Total Quality Management firms emphasize on serving the external customers. They first should know the customers' outlooks and wants and then should offer the

products/services, accordingly. With the help of successful customer focus efforts, production can be arranged with respect to the customers' needs, expectations, and complaints. This reassures firms to produce high quality and reliable products/ services on time with improved efficiency and productivity. When customer expectations are met, their satisfaction will be increased, and the firm's sales and the market share will increase (Sadikoglu and Oclay, 2014).

2.8 Benefits of Total Quality Management Implementation in the Construction Industry

Surveys on the effects of Total Quality Management application by McIntyre and Kirschenman (2000) established that significant monetary advantages may be accomplished through the employment of Total Quality Management. Chase (1998) deduced in his study that, application of Total Quality Management enabled organizations to rapidly advance projects while intensifying productivity. Torbica and Stroh (1999) presumed that: 'interestingly an observational study has affirmed that execution of Total Quality Management is certainly related to customer satisfaction'. Liu (2003) perception on quality application in Hong Kong public housing projects indicated enhanced customer loyalty after the implementation of ISO 9000. Moreover, the normal number of housing projects imperfections put up by organizations with ISO 9000 affirmation was impressively not exactly the quantity of deformities in lodging ventures worked by organizations without ISO 9000 accreditation. The outcomes on quality management implementation demonstrate that all stakeholders can profit by it (Hoonakker et al., 2010).

Based on case study research in some Australian companies, Bardoel and Sohal (1999) described the advantages attained from implementing Total Quality as an

improved process control ensuing in uniformity from configuration through to conveyance; diminished development process duration, lessening in the amount of products destroyed in transportation and construction, decreased delivery to the site, increased performance, diminished aftermath of chemicals and change in client view of the organization. Ismail (2012) in his study on Total Quality Management cited Anderson et al.'s (1994) findings which identified its benefits as a means which enhances process administration towards constant change, and thus enhances customer satisfaction.

Ismail (2012) also cited the works of various researchers in the area of total quality management such as Arora (1996), Gunasekaran (1999), Huarng (1998), Salegna and Fazel (2000) and Sun (2000) who described the benefits of adopting Total Quality Management philosophy as a way to help reduce time, waste, costs, revise and enhance quality, performance and competitiveness, improve profitability and proficiency of quality systems and reduce customer complaints. Pheng and Teo (2004) proposed some benefits as reduction in quality costs, better worker work fulfillment since they don't have to take care of imperfections and customer objections, acknowledgment by customers, work completed effectively right from the beginning, subcontractors with appropriate quality administration frameworks, and nearer association with subcontractors and suppliers. Conversely, most of the key benefits of a Total Quality Management package have not been attained in construction, such as the improved consciousness and focus of all representatives on pleasing interior and outside clients. Administration targets, for example, consumer loyalty, meeting particulars, higher turnover, higher efficiency, zero deformities, percent expansion in deal, and percent diminish in expenses can be proficient by exemplifying Total Quality Management principles every facet of the organization,

and those goals turn into a characteristic result (Harrington et al., 2012).

2.9 Total Quality Management Practices That Improve Stakeholder Satisfaction

Adenikinju (2003) identified the quality management practices which cover the quality management foci of process, motivational and technical aspects of construction projects and influence stakeholder satisfaction. The technical attributes of Quality Management identified are:

1. **Quality training**: Warranting that all stakeholders are trained on quality (Akao, 2004);
2. **Benchmarking**: Employing beneficial systems from construction front-runners (Love et al., 2004);
3. **Continuous improvements**: Concentration on improving construction processes and maintaining continuous improvement (Akao, 2004);
4. **Long range thinking**: Utilizing planning and scheduling to plan future construction processes (Ahmed, 1995);
5. **Quality control**: Warranting that quality is maintained throughout the project duration (Akao, 2004);
6. **Health and Safety**: Ensuring a safe working environment by adhering to the necessary health and safety requirements and policies on site;
7. **Technical expertise**: Awarding specialist works in projects to the appropriate contractor (Leung et al., 2008);
8. **Quality standard implementation**: Guaranteeing the employment of quality standards for example ISO 9001, ISO 14000 to the construction project design and execution;
9. **Auditing:** Warranting close monitoring and control of projects throughout

the project duration. The practical characteristics of quality management necessitate the enhancement of expertise in implementation of quality management. This expertise is not limited to safeguard compliance to required international principles and requirements on the project (Obunwo, 2013). Stakeholder satisfaction from a process viewpoint in quality management included.

10. Process Improvements: Planned assessment of current construction processes to meet objectives and attain goals (Hoonaker et al., 2010);
11. Open culture: Smooth approach to information flow among the various stakeholders (Leung et al., 2008);
12. Meeting customers' requirements: Very much characterized and succinct comprehension of the clients' prerequisites and standards for fulfillment from such necessities (Hai et al., 2012);
13. Reducing Rework: Timely recognition and avoidance of mistakes with little dependence on ultimate inspection, and boosting step by step inspection (Ballard, 2008);
14. Process design: Confirming steadiness of construction activity over viable product outline. This decreases the experiences emerging from varieties inside the faculty in the reason for the construction project (Barrett, 2000);
15. Result measurement: Indicators to determine project progress and results of quality levels (Phillips et al., 2008);
16. Quality assurance: Activities including an assessment of the construction process, to make certain that the quality of construction is of the same kind as the designed quality (Phillips et al., 2008);
17. Post project review: Employing profitable management practices form earlier

projects undertaken;

18. Post implementation evaluation: Practical and professional appraisal of construction projects to establish if the project provided the client with value for money. The satisfaction of stakeholders from construction projects can be persuaded extremely by the quality of the process of construction. The methodology defined in the planning phase should be sustained and even improved throughout the project duration. Advice and appraisals are significant characteristics of the characteristics of quality management as they add to the information and better performance in construction projects subsequently. The motivational features of quality management that affect stakeholder satisfaction emphasize on evolving all expertise attitude and determination while executing projects (Leung et al., 2008). They include:

a. Employee empowerment: Decreased influence on employees externally, permitting them to show proficiency while conforming to project necessities (Leung et al., 2008);

b. Executive commitment: Management fully committed to the attainment of quality (Hoonaker et al., 2010);

c. Employee involvement: Establishing an empowering setting to allow employees contribute in planning and making decisions reestablishing their duty for quality of project (Zwick, 2004) and (Phillips et al., 2008);

d. Team work: Joint effort from all groups or teams to attain project specifications (Leung et al., 2008);

e. Team based problem solving: Exploiting experience from all involved resolve problems when they occur on site (Phillips et al., 2008) and (Hoonaker et al., 2010);

f. Increased supplier relationships: Establishing good supplier relationship and an

acceptable criterion for quality goods (Bemelmans, 2012); and

g. Motivation: Using recompenses and gratuities when operatives meet quality targets (Phillips et al., 2008).

2.10 Methods of Total Quality Management Implementation in Construction

It is resolved by several writings that it is essential for the construction trade to adopt the practices, principles and techniques used for Total Quality Management in manufacturing (Formoso and Revelo, 1999; Hoonakker et al., 2010) agrees: 'Total Quality Management systems is used widely in the capacities of industrial and manufacturing engineering to control and avoid imperfections in advance, at last sparing a colossal amount of money.

Formoso and Revelo's study in 1999 on Total Quality Management implementation elaborated three Brazilian building companies, which operated supportively through several stages of Total Quality Management application. The recommended technique depended on basic surely understood quality frameworks for problem recognition, exploration and solving, such as Pareto diagram, checklist, brainstorming and flowchart. The outcomes revealed challenges in implementing such methods in small-scaled building companies. Tam et al. in their study in 2000 in the Hong Kong Building industry came to the same conclusion.

In 1992, an authority responsible for housing in Hong Kong made the employment of the ISO 9000 quality system indispensable for contractors who desired to tender in housing development. They further established and presented an impartial quality tool: the

Performance Assessment Scoring Scheme (PASS). Seven years later, findings of the research by Tam et al. (2000) indicated that the degree of quality generally had not

enhanced and the anticipated continuous improvement in quality in construction had not been accomplished. The writers concluded, based on extra analysis of data, that the principal blockade to quality implementation is the principles of the various construction firms.

Bubshait (1999); Gamsby et al. (1996) presented mixed results in their study when they tried fitting together one Total Quality Management way to deal with other prevailing management framework, such as partnership, Jobsite Quality Planning (JQP), project management, Quality Function Deployment (QFD), Quality Assurance Plan (QAP), and/or the ISO 14000 and 9000 standards. The building and development industry have experienced much struggle in the implementation of Total Quality Management. One of the causes is 'the fleeting nature' of construction and development, the absence of institutionalization and the numerous gatherings (occupations, callings and associations) included. The customary way of the Construction Industry is another reason (Hoonakker et al., 2010).

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

Methodology is defined by Jankowicz (2002) as "the reason for employing a certain procedure in a given study". This study is a descriptive research based on quantitative analysis of data collected. Convenience sampling of construction stakeholders in Accra was used as the sampling method. Questionnaires were developed and administered to aid in collecting the necessary information.

It is conceivable to arrange diverse research strategy approaches into two principle classes relying upon how they are directed, quantitative research strategies and subjective research techniques. Qualitative method involves words whiles quantitative figures Merriam (1994). "The quantitative method was adopted to collect numerical data because it dependable Cassell and Symon" (1994). While organizing the technique, a non-revelation and privacy understanding was gone into with respondents and taking part associations in an offer to diminish such concerns and to energize reactions without lack of care and inclinations. The information gathered mirrored this conviction and along these lines thought about satisfactory with the end goal of this investigation.

3.2 Methodology

Methodology involves everything that has to do with procedures and methods of the research. The methods can be categorized into quantitative and qualitative. The research assumed a quantitative research method to collect the data required.

3.3 Research Approach and Design

A descriptive survey design was adopted. In this study, information was obtained through self-administered questionnaires disseminated by the researcher. The study was designed to explore

1. Reasons for poor quality construction in Ghana.
2. To motivate the usage of TQM in the construction industry in Ghana.
3. Identify the role of TQM in the enhancement of quality performance.

The internet was broadly used. Search engines such as EBSCO, JSTOR were crossed referenced to acquire large amount of literature.

3.4 Study Settings

It is imperative to choose the right location for the research. The wrong selection of the research location can destruct the findings Berg (2004). The researcher must be diligent in his selection. The research was centered in the Accra-Tema regions. The study setting was carefully selected not because they are two big Cities but also for the fact that most of the bigger construction firms are located there as well industry professionals.

3.5 Population

The population for the purpose of this research refers to the construction industry and the various supervising authorities including the professional in the Ghana. The population was (100) with ten (10) respondent from ten (10) construction companies.

3.5.1 Sample Size

The researcher's intention was not to study the entire population of the construction industry but rather considered factors such as the size of the industry, willingness to participate, local or foreign organization and whether it is properly registered. These were some of the factors that were considered before deciding on the sample size to use. The respondents sampled were eighty (80) due to the dissimilar nature of the issues under study. A number of twenty (30) civil engineers, (20) Quantity surveyors, (20) Architects and (10) contractors responded. Assuming a 95% confidence interval, the error level is 0.05. $N/ (1 + Ne^2)$.

3.5.2 Sampling Procedure

The random and snowball effect was used for the construction industry and their professionals and a purposive approach for the supervisory authority.

3.6 Data Collection

The easiness to administer and receive responses are factors to consider when gathering data. The primary and secondary data collections are the two ways of data collection.

3.6.1 Primary Data

Research information gathered by the researcher forms primary data (Sekaran, 2003). Primary data is obtained through questionnaires to ensure precision of the research. Dependability and legitimacy establish the measure once the research is ready.

3.6.2 Secondary Data

Secondary data is data collected by someone other than the user and comprises of the logical framework of the research.

3.7 Data Processing and Analysis

The closed-ended questions were analyzed using excel and tables. The data was first cleaned prior to the processing. The incorrect responses were extricated from the right ones during the data cleaning phase. The incorrect responses were corrected. The cleaned data was coded and entered into the computer using an appropriate software. Mistakes due to the data entry were corrected, and the tenth record was compared according to the questionnaire responses. Analysis was further done to draw meaning to the data collected.

3.8 Ethical Considerations

All the respondent who participated did so willingly without been forced. This was because the researcher wanted a precise and factual response. For credibility, the open-ended questionnaires were checked by the supervisor. References were acknowledged to avoid plagiarism.

3.9 Limitation of the Study

The study was faced with some challenges including the respondent's inability to complete the questionnaires and time constraints due to the time frame set for the project completion. The research was limited to Accra and Tema.

3.10 Summary

This section showed the methodological procedures that helped to achieve the objectives of the research. It again showed the respondent involved in given answers to the questions distributed.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Introduction

This chapter of the study deals with the presentation of the findings, analysis of data and discussions of the results.

4.2 Characteristics of the sample

This section of the analysis deals with the demographic variables of the respondents used in the study which included profession, tenure in that capacity, type of quality management system they operate, how long they had used the quality management system, their motivation for implementing such a system and their perception of quality. The questionnaire was structured from section A to D. Section A provided personal information of the respondent and the organization they represent as follows

- 45% were Middle Management staffs
- 31% were Site Supervisors
- 23% were Senior Management staffs
- 88% had worked over 3years
- 59% were local indigenous company
- 31% were foreign company
- 39% were ISO certified companies
- 55% were not ISO certified
- 6% were not sure
- 84% had some quality management system in place.
- 8% did not have any quality management system in place
- 8% were not sure

4.3 Method of Data Analysis

The analysis and discussions were done based on the research questions. Tables and chats were used by the researcher for analysis and discussions.

4.4 What are the major causes of poor quality construction in Ghana

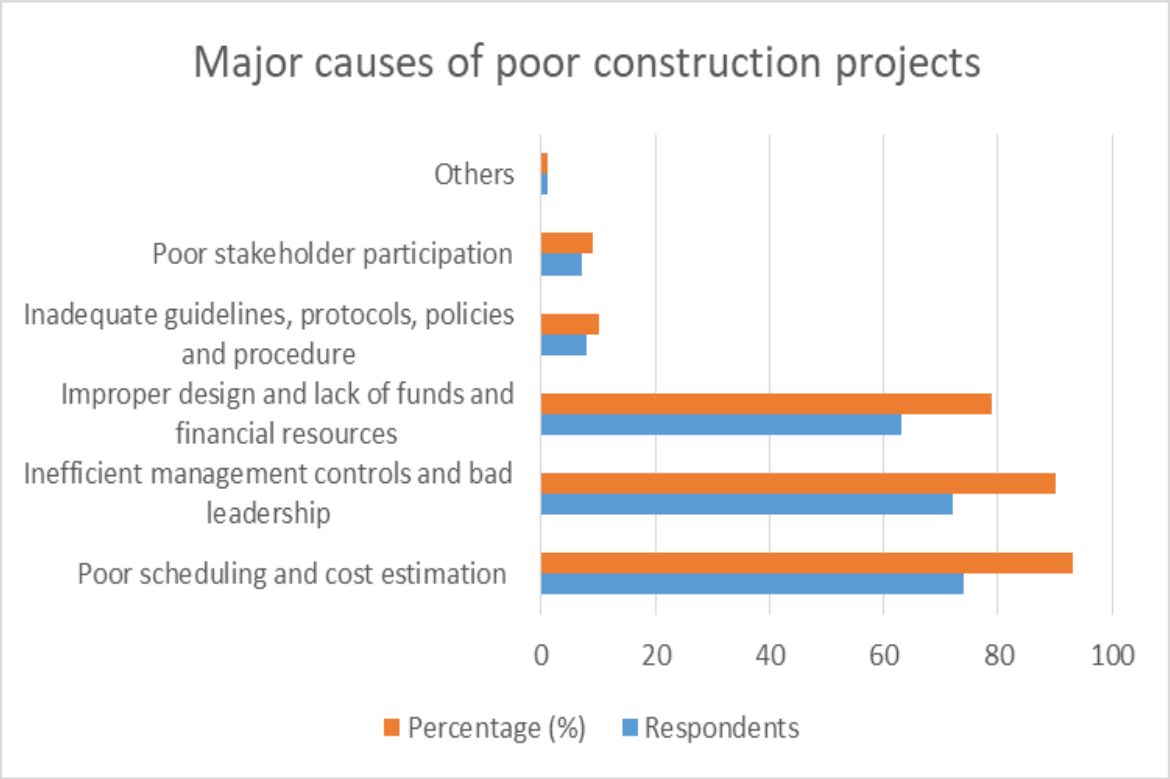


Fig 4.1 Major causes of poor construction projects in Ghana

4.4.1 Results and Discussions of research question 1

Table 4.1 also shows the causes of poor quality projects. The study revealed that 74 respondents representing 93% felt that the major cause of poor quality project is poor scheduling and cost estimation. 72 represented 90% believes inefficient management was the cause. 63 respondents

recorded 79%. According to data collected, 10% represent 8 respondents choose inadequate guidelines. 7 representing 9% indicated improper design. Majority of the respondents representing 91% agreed that quality is of the client whiles the remaining 9% put the blame at the doorstep of the technocrats. The analysis has shown that the construction industry must work hard to do away with these underlining factors.

4.5 Use of Project Management principles in the construction industry in Ghana.

Factors	Positive response (%)	Negative response (%)
Enhance organizational image	90	10
Improve quality performance and products	91	9
Demand by clients and customers	81	19
Improve customer satisfaction	84	16
Increase profitability	83	17
Ensure continues improvement in systems and products	85	15

Table 4.2 Reasons for the establishment and implementation of TQM and QMS

Source: Field Analysis July, 2018.

The results in Tab. 4.2 showed that many of the respondents support the idea of using project management principle in the construction industry. 96% of the respondent agreed that corruption and lack of proper supervision contributes to project failure in the industry while the other 4% thought otherwise. 65% of the respondent maintained the regulatory bodies do not contribute positively to quality and project success while 35% of the respondents opposed it.

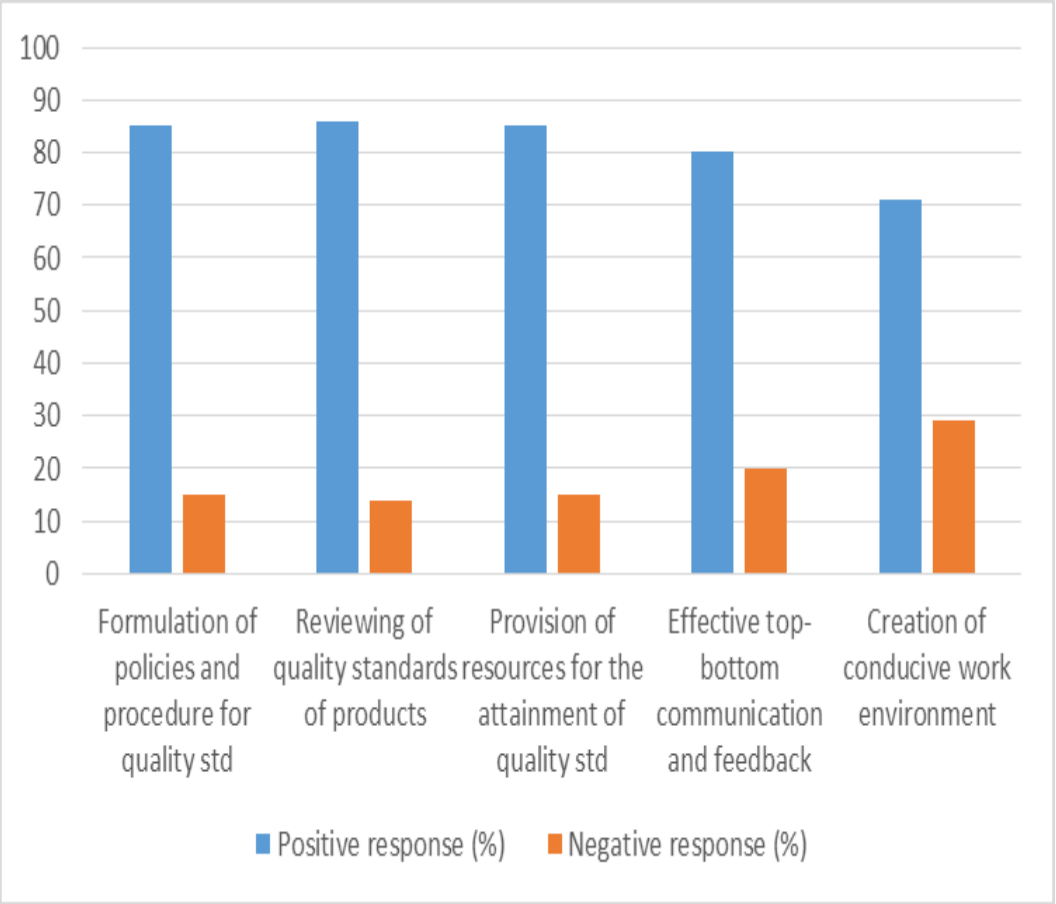


Fig 4.2b Senior Management role in the establishment and implementation of TQM and QMS

Table 4.2b pointed toward the importance of the Senior Management involvement in the implementation of TQM. Reviewing the quality standard of product had 86% positive responses whiles the creation of a conducive work environment had about 29% negative response.

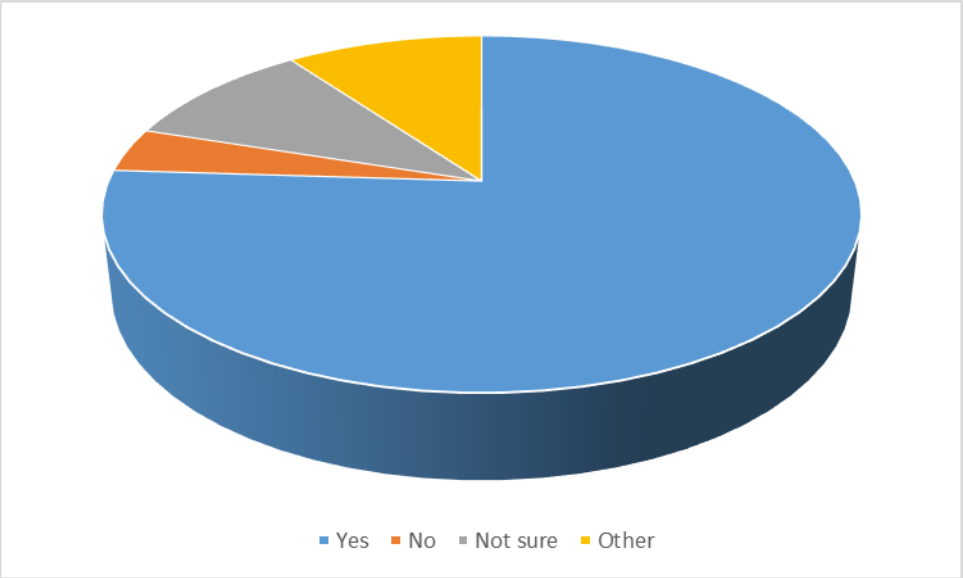


Fig 4.2c Project management skills in Ghana

The construction industry in Ghana according to the results possess 76% of project management skills mostly the foreign companies. The remaining 24% were the Ghanaian construction companies. 65% of the respondent maintained the regulatory bodies do not contribute positively to quality and project success while 35% of the respondents opposed it.

4.6 The role of TQM in the enhancement of quality performance

4.6.1 Results and Discussions of research question 3

Analysis of the data collected showed that Quality assurance and Quality Control were adopted as quality management systems in the Ghanaian construction industry. Few construction stakeholders practice the use of the ISO 9000 series and Total Quality Management as their management system for improving quality on their projects. 85% agreed that there is skill shortage and lack of innovative technology to implement TQM.

Implementation of Total Quality Management has not gained full ground as a system of managing quality management system in Ghanaian Construction firms. Problems associated with the implementation of TQM comprises of Lack of Management Commitment, Inability to change Organizational culture, Improper planning, Lack of continuous training and education, Incompatible organizational structure and isolated individuals and departments. 81% commended senior management for their commitment to the implementation of TQM. Ineffective measurement techniques and lack of access to data and results, paying inadequate attention to internal and external customers, inadequate use of empowerment and teamwork and failure to continually improvement are important factors as well. 85% of the respondent confirmed that construction quality performance in Ghana was average, 14% checked poor and just 1% was good. Bardoel and Sohal (1999) reported that "the benefits of Total Quality Management are a reduced construction duration; better control of processes resulting in consistency from design through to delivery; reduction in the quantity of goods damaged in transit and construction, reduced delivery time to the site, increased productivity and improvement in customer

perceptions of the company and decreased fallout of chemicals". Some benefits of Total Quality Management include improved quality, Employee participation Team work working relationships Customer Satisfaction Employee Satisfaction Productivity Communication Profitability Market share

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The study had three basic objectives relative to the application of Total Quality Management in the construction industry in Ghana. They were to look at the poor quality construction, identify quality management practices adopted by Ghanaian construction firms and recognizing the benefits of these quality management practices in construction industry in Ghana.

5.2 Review of objective

5.2.1 Objective 1 – Evaluate the Causes of Poor quality project

The study revealed that most poor quality projects are not only caused by corruption and greed by industry players and leaders but also for technical failure on the side of the professionals. Many of the respondents agreed that poor scheduling and cost estimation, inefficient management controls and bad leadership, improper design and lack of funds and financial resources and inadequate guidelines, protocols, policies and procedure are the major causes.

5.2.2 Objective 2 - Use of Project Management principles in the construction industry in Ghana

This object of the research revealed that the practice of project management principles in the construction industry in Ghana will greatly impact quality on the construction projects. These principles according to the findings will enhance organizational image, Improve quality performance and products and improve

customer satisfaction

5.2.3 Objective 3 - Identify the role of TQM in the enhancement of quality performance

The study confirmed that the implementation of Total Quality Management has not gained ground in Ghanaian construction firms. Quality improvement on projects has been by inspection of the works by consultants or supervisors and the issuing of corresponding instructions to correct defective works. The quality management practices were discussed in the light of them being part of the technical, process or motivational aspect of quality management implementation practices. In their order of importance after analyzing the data with the relative importance index, the motivational aspect that improve stakeholders satisfaction were top management continually demonstrating their commitment to quality, willingness to adapt continuous improvement, allowing employees' to demonstrate expertise while conforming to design requirements, execution of objective focused activities through the use of teams to improve both performance and job satisfaction, exploiting experience from team members to solve problem encountered, founding strong information exchange between stakeholders, setting quality acceptance criteria and using rewards and bonuses for meeting quality targets.

The benefits of employing quality management practices can only be attained if these are utilized on a project. Most respondents attested that quality management practices were important to their practice because there was reduction of waste and rework, reduction of client's complaints, savings on money, improvement of quality, competitiveness and performance and reduction in the quantity of goods damaged in

transit and construction when the employ in these practices.

5.3 Recommendations

The following recommendations require urgent attention;

- Management and employees should be frequently trained on the employment of Total Quality Management on their projects. This should also be transferred to their relations with subcontractors and suppliers to ensure a well trained workforce at all times;

- The various institutions in the Ghanaian Construction industry should emphasize and enforce the implementation of quality standards on construction projects by organizing training programs for construction firms; and

- Ghanaian construction companies should aim at achieving quality on their projects at all times.

5.4 Recommendation for Further Studies

- Future study may concentrate on the measurement of the different perceptions of each construction professional on Total Quality Management implementation; and

- In addition a research can be conducted to investigate the impact of Total Quality Management implementation in the Ghanaian Construction Industry.

5.5 Conclusions

The research was successful in identifying the quality management practices that improve stakeholder satisfaction, the quality management practices adopted by Ghanaian Construction firms and the benefits of these quality management practices in achieving stakeholder's satisfaction. This study has provided excellent and solid information on the quality management practices that improve stakeholder satisfaction that will benefit consultants, contractors and other construction stakeholder.

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APPENDIX

APPENDIX A

SURVEY QUESTIONNAIRE FOR RESEARCH ON CAUSES OF POOR PROJECTS: WAYS TO INCORPORATE TOTAL QUALITY MANAGEMENT.

This study is a part of a Thesis, in partial fulfillment for the award of Master of Science Project Management from Kwame Nkrumah University of Science and Technology, Kumasi

I appreciate the time that you take to respond to this survey.

1. To evaluate causes of poor quality construction in Ghana.
2. To encourage the use of Project Management principles in the construction industry in Ghana.
3. To illustrate how TQM can enhance quality performance in the construction industry in Ghana
4. To identify the critical factors underlying the successful implementation of construction projects in Ghana

Your response will be kept confidential and you will not be identified in any published reports.

Thank you. For any information, contact: Emmanuel Amankwah – Accra – Ghana. Telephone:+233-277-253726, Email Address: eamankwah23@yahoo.com/emmannuel.amankwah@ggfcghana.com

Keywords and their definitions:

QMS – Quality Management Systems are made up of the formal structure and procedures used for the attainment of a quality product in your organization which ultimately lead to the satisfaction of your organization's client

ISO 9000 certification – This is an internationally recognized certification giving to organizations or companies who comply with the Quality Management Standards as set out in ISO 9000:2001 QMS by the International Organization for Standardization with its headed in Geneva Switzerland

TQM as the management philosophy and company practices that aim to harness the human and material resources of an organization in the most effective way to achieve the objectives of the organization

Questions for Clients, contractors, engineers, project managers, quality officers and architects in the Road and Building sector in Ghana.

SECTION A: PERSONAL INFORMATION OF RESPONDANCE AND BACKGROUND OF THE ORGANIZATION

Your Name:

…….....

Organization:

…….

1.1. Where do you belong in the management structure of your organization? (choose one)

[ ] Senior management [ ] Middle management [ ] Site supervisor

1.2 No. of years in employment [ ]Less than 2 years [ ] 2-5 years

[ ] Above 5 years

1.3 How can you categorize your organization? [ ] A local indigenous Company [ ] A foreign Company registered in Ghana [ ] Foreign company not registered but practicing in Ghan [ ] A multinational company [ ] Other (please state}

……

1.4 The major constructional activity undertaken by your organization is [ ]Road construction works [ ] Building construction works [ ] Real estate development [ ]Bridges and other Civil Engineering services [ ] All of the above [ ]Others(please state)……

1.5 Who are your major Clients? [ ] Ghana government [ ] Private individuals

[ ] Both [ ] Other (please specify) …….……

1.6 What is your average annual volume of construction works per annum?

[ ] GH¢ less than 20million [ ] GH¢ 20-40 million [ ] Above GH¢ 40 million

1.7 What is your total permanent staff holding capacity?

[ ] Less than 40 [ ] 40-100 [ ] Above 100

1.8 Is your organization ISO 9000:2001 certified? (If no go to 2.10) [ ] Yes [ ] No [ ] Not sure

1.9 When did you last have an ISO 9000:2001 QMS review?

[ ] Within the last six months [ ] Beyond the last six months

1.10 Do you have any form of QMS in place apart from ISO 9000:2001 standards?

[ ] Yes [ ] No [ ] Not sure

Section B: This section answers the research question of the main causes of poor construction projects in Ghana

2.1 Quality in the construction industry is the totality of features and characteristics of a product or services that bear on its ability to satisfy stated or implied needs. [ ] Strongly disagree [ ] disagree [ ] Not sure [ ] Agree [ ] Strongly agree

2.2 Whose quality are we talking about? [ ] The Client / Customer [ ] The Companys' [ ] The CEO [ ] The Supervisory Authoritys' [ ] The Architechs'

2.3 Is stakeholder participation necessary in construction project quality? [ ] Very Important [ ] Not Very Important [ ] Somewhat Important [ ] Not At All Important [ ] Don't Know

2.4 There is a quality department with a qualified quality officer (Quality Control officer, Quality Assurance officer or Project Manager) in place (choose one) [ ] Strongly disagree [ ] disagree [ ] Not sure [ ] Agree [ ] Strongly agree

2.5 What are the **major** causes of poor construction projects in the Ghanaian construction industry? (Tick as many as you need) [ ] Poor scheduling and cost estimation [ ] Inefficient management controls and bad leadership [ ] Poor stakeholder participation [ ] Inadequate guidelines, protocols, policies and procedure [ ] Improper design and lack of funds and financial resources

2.6 Does your company undertake peer review of construction projects? [ ] Yes [ ] No

Section C: Answers in this section describe how the use of best practices of project management principles helps to ensure quality constructional works

3.1 On a scale of 1-5 (1 being the least; 5 the maximum) how would you rate the effect of the following factors in your organization's business operations?

a. Customer satisfaction …… (1-5)

b. Increased profitability ……. (1-5)

c. Improved products …….. (1-5)

d. Enhanced organization's image …… (1-5)

3.2 In your opinion, on a scale of 1-5 (1 being the least; 5 the maximum) how would you rate the factors below as a motivator for the establishment and implementation of QMS and TQM in your organization?

a. Enhance organizational image ……..(1-5)

b. Improve quality performance and product ……..…….. (1-5)

c. Demand by clients and customer …….(1-5)

d. Improve customer satisfaction …… (1-5)

e. Increase profitability ……..…….. (1-5)

f. Ensure continues improvement in systems and products …….. (1-5)

3.3 In your opinion on a scale of 1-5 (1 being least; 5 the maximum) how would you rate the involvement of your senior management in the establishment and implementation of TQM and QMS in your organization on the following factors?

a. Formulation of policies and procedures for the attainment of Quality Standards …… (1-5)

b. Reviewing of quality standards of products …… (1-5)

c. Provision of resources (human, machinery or equipment or tool and financial) for attainment of quality standards in processes and product …… (1-5)

d. Effective top-bottom communication on issues regarding quality policies, procedures, implementation as well as feedbacks on quality issues …… (1-5)

e. The Creation of a conducive work environment to ensure Quality standards …… (1-5)

3.4 In your opinion, does the Ghanaian construction industry generally appreciate basic project management principles in their projects? [ ] Yes [ ] No [ ] Not sure

3.5 Do the Ghanaian construction firms have project management skills? [ ] Yes [ ] No [ ] Other (please specify)……..

3.6 There is a quality department with a qualified quality officer (Quality Control, Quality Assurance officer or project manager) in place (choose one) [ ] Strongly disagree [ ] disagree [ ] Not sure [ ] Agree [ ] Strongly agree

3.7 Corruption and lack of monitoring and improper supervision of construction projects in Ghana contribute significantly to poor quality in the construction industry? [ ] Strongly disagree [ ] disagree [ ] Not sure [ ] Agree [ ] Strongly agree

3.8 Do the regulatory authorities contribute positively to project success in Ghana? [ ] Strongly disagree [ ] disagree [ ] Not sure [ ] Agree [ ] Strongly agree

3.9 On a scale of 1 – 5 (1 being least; 5 the maximum) rate the extent to which changes in decisions concerning project deliverables are communicated to you before the changes are effected.

1= [ ] 2 = [ ] 3= [ ] 4 = [ ] 5 = [ ]

Section D: illustrates how Total Quality Management (TQM) can enhance quality performance in the construction industry in Ghana

4.1 What implementation challenges is your organization facing on Quality Management Systems? (Choose as many options) [ ] lack of understanding of the policies and procedures by staff [ ] Lack of resources for implementing QMS [ ] Expensive to implement [ ] Too much paperwork [ ] Time consuming [ ] Lack of cooperation of field operatives in implementing procedures [ ] others, specify……

4.2 What systems do you use to monitor the quality of your projects?[ ] TQM (QMS) [ ] PMI [ ] Quality Management Plan [ ] ISO9000:2001 [ ] Others……

4.3 Do you have a quality management plan on your projects? [ ] Yes [ ] No

4.4 On the scale of 1 – 5, skill shortage and lack of innovative technology in the construction industry hinders the implementation of TQM

1= [ ] 2 = [ ] 3= [ ] 4 = [ ] 5 = [ ]

4.5 Is top management supportive of Total Quality Management and do the organization has a budget for quality management systems? [ ] Yes [ ] No [ ] Others (please specify)…….

4.6 How often is staff training conducted in your organization? [ ] bi-annually [ ] Yearly [ ] when recruited [ ] two yearly [ ] uncertain [ ] not done

4.7 Do you outsource some part of your construction project? [ ] Yes [ ] No

4.8 What is your rationale for outsourcing? [ ] Lack of experience and expertise [ ] lack of equipment and personnel [ ] cost savings [ ] others, specify……

4.9 On a scale of 1 – 5 (1 being not necessary and 5 being very necessary) is supply chain management in the construction industry necessary in the quality performance of projects? 1= [ ] 2 = [ ] 3= [ ] 4 = [ ] 5 = [ ]

4.10 On a scale of 1 – 5, (1 being strongly disagree and 5 strongly agree) the fragmented nature of the construction industry and lack of an authority regulating and monitoring it encourages poor quality works? 1= [ ] 2 = [ ] 3= [ ] 4 = [ ] 5 = [ ]

4.11 What is your general impression on quality performance in the construction industry in Ghana?

[ ] Good [ ] Average [ ] Poor

Thank you.