

UNIVERSITY OF KWAZULU-NATAL

**QUALITY MANAGEMENT IN THE CONSTRUCTION OF LOW-COST HOUSES
IN EASTERN CAPE PROVINCE OF SOUTH AFRICA**

By

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DECLARATION

I, the undersigned, Monwabisi Goodyear Phetshula, declare that the work contained in this dissertation is my own work and has not been submitted to any other academic institution for the award of an academic qualification.

Signed.....Date.....

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ABSTRACT

Several studies have revealed that the quality of construction projects in South Africa has long been of concern, as it has been found to be below par. This is evidenced in the reports of poor project performance, poorly implementation processes or worse still, projects delivered at unexpected costs to clients. Both the private and public-sector clients are dissatisfied with the quality of workmanship of the contractors around the country. The most critical issue is that rectification of this sub-standard construction work, especially on many of the low-cost housing projects throughout South Africa, has left the government with huge bills of billions of rands. The main objective of this study was to examine the challenges and benefits of quality management implementation in the construction of low-cost houses in the Amathole Region of the Eastern Cape Province, South Africa. Expert judgemental or purposive sampling method was used to select 75 construction industry professionals for the purposes of conducting this study. Data were collected through a self-administered questionnaire. The results revealed that the construction companies of low-cost houses in Amathole had challenges in managing quality, as evidenced by the projects contribution to the re-work costs that have racked in millions of rands. The current quality management operational systems are fraught with lack of proper communication, use of unskilled labour by the construction companies, as well as difficulties in process implementation. However, the results indicated that the construction companies' professionals did not find the deficient designs, lack of technical expertise and projects failure being challenging the management of quality at the Amathole low-cost housing projects. The current strategies employed by the construction companies of low-cost houses at Amathole were largely driven by project economy, project timelines and employee buy-in. The results also indicated that focus on these outcomes has resulted in less attention to strategic alignment, clear definition of projects and the overall scope, continuous training and proper planning, as the importance of these strategies was disregarded. The results also indicated that the quality management personnel were not adequately or well-resourced in terms of proper management systems, empowerment in terms of decision-making autonomy, however fairly resourced in terms of quality site visit time, site meetings and best practices benchmarking. The results indicated that overall, the quality management personnel were not well-resourced. To improve on the effectiveness of the current quality management strategies employed, the results indicated that the respondents significantly supported the adoption of ISO certification compliance in future as the perceived benefits of doing that were highly rated. The study recommended the adoption of ISO certification as a quality management system or overall

strategy to curb poor workmanship and defects and save the government rework costs that have cost billions of rands throughout the country.

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CHAPTER ONE: OVERVIEW OF THE STUDY

1.1 Introduction

This study examines the challenges or factors that affect quality management in the construction of low-cost houses in the Amathole Region of the Eastern Cape Province. The study also seeks to solicit for the perceptions of the construction industry professionals on the future adoption of International Organisation for Standardisation (ISO) certification as a quality management system by the low-cost houses construction companies, in order to improve the quality of the construction projects and minimise customer complaints and dissatisfaction. In view of that, this chapter provides the background of the study in terms of the motivation of the study, the focus of the study, the aim of the study, the problem statement, the research objectives and the research questions. The contribution of the study, a brief outline of the methodology employed in the study are also presented. Finally, the chapter presents an outline of the chapters that follow and the definition of key terms.

1.2 Motivation for the Study

According to Abdul-Rahman (2005: 23), quality management implementation is meant to ensure efforts to achieve the required levels of quality for products produced, projects and services rendered, which are well planned and organised. In the construction projects, such as the low-cost houses in the Amathole Region, quality management should mean the maintenance of quality construction projects and workmanship at the expected and required standards to obtain high customer satisfaction (Abdul-Rahman, 2005: 23).

Customer satisfaction is critical to the sustainable competitiveness and business survival of the construction companies (Tan & Abdul-Rahman, 2005: 47). Olatunji, Abimbola, and Nureni (2012: 99) argues that the concept of quality management as it is applied in the construction industry is all-inclusive, encompassing and embedded in the phenomenon itself. Concepts such as quality control, quality assurance, quality improvement, and quality standards remain entrenched in the phenomenon (Olatunji et al. 2012: 99). Olatunji et al. (2012: 99) further argue that the earliest forms of quality management practices in the construction industry can be traced back to the ancient Greece and Rome. Harris and McCaffer (2011: 123) premise that quality management practices include all the practices by the management to implement the

organisational quality policies. These practices include quality planning, quality control, quality assurance and quality improvement.

Literature is awash with concerns about poor quality and performance which is substandard within the construction industry in SA in general (Honnakker, Carayon & Loushine, 2010: 953). The CIDB's Construction Quality in South Africa: A Client Perspective (2010: 2), revealed that most of the clients within the public-sector were either neutral or unhappy with the quality on construction projects, of approximately 20% projects that were assessed in 2009. Whilst on the other hand, the same board, in conjunction with the Construction Industry Indicators, in 2008 reported, about 18% of those assessed projects showed high levels of inferior workmanship. These were considered inappropriate and the clients were unsatisfied or neutral with quality on 20% of the projects. Another survey carried out by Honnakker et al. (2010: 953) revealed that on 5% of projects the stakeholders expressed the same sentiments. Amongst these projects, approximately 12% had defects, and were considered inappropriate and it was noticeable that considerable decline in client satisfaction.

Quality management is a strategic management issue in business. Stakeholder focus and consideration is very critical to business success, especially high regard for customer satisfaction (Abd-Hamida & Brydeb, 2010: 237). These philosophical dimensions of marketing and strategic management generally guide the study. The customer is the king-satisfied customers are key to business survival, sustainability and growth. This research will benefit mainly the following stakeholders; the government, provincial governments, contractors, the construction engineering fraternity and the beneficiaries of the low-cost houses, as it would ensure improvement in quality management and the final housing product. In addition to stakeholder benefits, the study sought to extend the importance of quality work management on small-scale construction projects, as well in order to enhance the goodwill of the small-scale construction projects participating construction companies. In view of the above, the study has the following aims and objectives.

1.3 Aim of the study

The aim of the study is to evaluate the quality management practices of the low-cost house construction companies in the Amathole Region of the Eastern Cape Province, as well as to determine the challenges and factors that are affecting quality management in the construction of the low-cost houses. The study is also aimed at establishing the perceptions of the construction professionals on the possibility of the construction companies of low-cost houses adopting the ISO certification as a mechanism for improving the construction quality of low-cost houses in the future.

1.4 Focus of the study

The focus of the study is the Amathole region in the Eastern Cape Province of South Africa. There are currently 27 running construction projects, of which 21 are multi-year projects, which include, amongst others, Fort Beaufort Hillside; Bedford Nyara; Alice Ntselemazi/Hillcrest; Fort Beaufort Newtown and Elliot dale Rural-BNG. Projects for destitute are: Masincedane, Nkonkobe and Amatole Destitute, while the project for disasters is ADM Disaster 130. Table 1.1 below shows the Eastern Cape Province Human Settlement Budget for 2017-2018 extract from the Human Settlement Policy and Budget Speech tabled by MEC for Human Settlements- Ms Helen Sauls-August, at the Eastern Cape Provincial Legislature on the 15th of March 2017.

Table 1.1: Budget Allocation Split for 2017-18

Programme	Total allocation R'000	% of overall budget
Administration	148,466	5.64%
Housing Needs, Research and Planning	19,938	0.76%
Housing Development	2,449,379	93.08%
Housing Asset Management	13,615	0.52%
TOTAL	2,631,398	100%

Sources: Human Settlements Policy and Budget Speech 2017-2018-Eastern Cape Provincial Legislature

1.4 Problem Statement

There is serious concern that the construction projects' quality in South Africa has been in unacceptable standards, this has also been revealed in the reports compiled on poor project performance, inappropriately implemented processes, or worse still, projects being delivered at unreasonable and unacceptable cost to clients. The private and so as public-sector customers have shown dissatisfaction with end product delivered by contractors (Honnakker, 2010: 953). In rectifying cases of substandard work on many construction projects such as low-cost housing the SA government has to cough up billions of rands (Honnakker, 2010: 953). Yet there is a lot of empirical evidence that there are benefits accruing to construction companies when they regard the employment of quality management systems in their operations (Pheng & Hong, 2005: 59; Abd-Hamida & Brydeb, 2010: 237). When quality management is no longer considered optional but fundamental as part of ongoing improvement in construction sector, there are strong chances of improving project performance, reductions in project costs, continuous business opportunities and so as increased in revenues and profit margins (Pheng & Hong, 2005: 59; Abd-Hamida & Brydeb, 2010: 237).

Based on the problem discussion above, the study sought to achieve the stated objectives and answer the following research question and the subsequent sub-research questions:

What are the factors affecting quality management in the construction of low-cost houses in the Amathole region of the Eastern Cape Province, and what are the perceived benefits of ISO certification as a quality management system?

1.5 Research Sub-Questions

1. What quality management factors affect the construction of low-cost houses in Amathole region?
2. What quality management strategies are used in the construction of low-cost houses in the Amathole region?
3. How well resourced are the employees in the Amathole low-cost houses projects?
4. What strategies could be recommended to enhance quality management in the construction of low-cost houses in the Amathole region?

1.6 Research Objectives

This study sought to determine the factors or challenges affecting quality management in the construction of low-cost houses in the Amathole Region. The study also sought to solicit the construction industry professionals that are directly involved in these projects' perceptions of the benefits of ISO certification as a quality management system. The study has the following specific objectives:

1. To identify the factors affecting quality management in the construction of low-cost houses in the Amathole Region of the Eastern Cape Province.
2. To determine which Quality Management strategies are used by the construction companies of low-cost houses at Amathole region in the Eastern Cape Province.
3. To determine if the Quality Management personnel at the Amathole low-cost housing projects are well resourced.
4. To recommend strategies that could be used to enhance Quality Management in the construction of low-cost houses at Amathole Region in the Eastern Cape Province.
5. To determine the construction industry professionals involved in the Amathole low-cost houses projects 'perception of the benefits of ISO certification as a Quality Management system and strategy.

1.7 Contribution of the Study

This study contributes to body of knowledge in the field of construction to the extent of assisting the scholars and the management to understand the critical factors that affect quality management on construction projects, especially low-cost housing projects such as the Amathole region projects.

The study also sought to develop strategies of managing quality in the construction projects, especially the low-cost houses, and assist in the strategies to well-resource and empower the quality management personnel involved in these projects.

The study also sought to contribute to the debate on the possibility of developing in the future, a framework for roping construction companies involved in the construction of low-cost houses in the country into tapping into the benefits ISO certification as a quality management system.

1.8 Research Methodology

The purpose of the study is to determine the factors affecting quality management in the construction of low-cost houses in the Amathole region of the Eastern Cape Province, as well as the perceptions of the construction personnel regarding the benefits of ISO certification as a quality management system. The study employed a quantitative research methodology (Bryman & Bell, 2011: 247). Data were collected using the questionnaire. Seventy-five (75) questionnaires were distributed to the expert judgemental or purposively selected construction industry professionals who were directly involved in the Amathole low-cost housing project. Expert judgemental or expert purposive sampling is a form of purposive sampling used when the research requires one to capture knowledge rooted in a particular form of expertise, in order to be better informed (Bryman & bell, 2011: 247). The researcher found the sampling technique most appropriate for the study because of its nature, primarily influenced by the limited number of the people who have expertise in the area being researched. In this, instance the professionals in the construction industry directly involved in the Amatole low-cost housing project with a knowledge of quality management implementation in the construction industry. A total of 75 respondents were selected, comprising of 12 construction project managers; 10 building inspectors; 15 site agents; 15 site supervisors; 13 architects and 10 engineers. The population consisted of 95 professionals in the construction industry that are directly involved in the Amatole Region low-cost housing project. These comprised of 16 construction project managers; 14 building inspectors; 17 site agents; 17 site supervisors; 16 architects; and 15 engineers. Amathole is one of the Regions in the Eastern Cape Province of South Africa.

1.9 Definition of key terms

Construction management: - Construction management involves organising, scheduling and directing equipment, material and personnel in the performance of a construction contract.

Construction project management: - The management of construction projects requires knowledge of modern management, as well as an understanding of the design and construction processes. Construction projects have a specific set of objectives and constraints, such as a required period for completion. While the relevant technology, institutional arrangements or processes will differ, the management of such projects has much more in common with the management of similar types of projects in other specialty or technology domains such as aerospace, pharmaceutical and energy developments.

Construction information technology: - This is the adoption of new forms of technology to achieve the time, cost and quality goals of a construction project. During the construction phases and the lifecycle of a building, the construction industry depends on large amounts of information. It is important that the information provided to the construction site enable task control, data integration, material and resource control, as well as communication between the company and the suppliers.

Project Management: - Project management is the art of directing and coordinating human and material resources throughout the life of a project by using modern management techniques to achieve predetermined objectives of scope, cost, time, and quality and participation satisfaction.

Quality Management Systems: - A system by which an organization aims to reduce and eventually eliminate non-conformance to specifications, standards and customer expectations in the most cost-effective and efficient manner. This system defines how a company will achieve the creation and delivery of the product or the service they provide to their customers.

Total Quality Management: - Total Quality Management (TQM) can be summarized as a management system for a customer-focused organization that involves all the employees in continuous improvement. It uses strategy, data and effective communications to integrate the quality discipline into the culture and activities of the organization.

1.10 Dissertation outline

The dissertation is structured into six main chapters as follows.

Chapter One: This chapter introduced the study. It presents the background of the study, problem statement, objectives of the study, the formulated research questions, and the contribution of the study and the brief research methodology of the study.

Chapter Two: The chapter focuses on the theoretical aspects of the study in terms of literature review. The review discusses issues on quality management, traced the evolution of quality management that lead to the concept of Total Quality Management (TQM). The chapter reviews literature on the state SA's construction industry, as well as challenges and benefits of quality management.

Chapter Three: Chapter three presents the study`s methodology. In this chapter, the procedures that were used to collect the data are outlined. These steps include the selection of sampling method and statistical justification, the construction of the research instrument, pre-testing of the research instrument, measuring the reliability of the research instrument, the administration of the research instrument, study limitations and ethical issues.

Chapter Four: In this chapter, the results obtained from the questionnaires in the research study are presented. The questionnaire is the primary tool for data collection. Information obtained from respondents are analysed utilising SPSS package, version 24. The findings are presented as descriptive statistics through tables, pie charts and graphs.

Chapter Five: This chapter mainly deals with the discussion of the results of the study, interpretations and explanations. In this case, the research findings are discussed, interpreted and explained in conjunction with the presented literature review. The main reason for examining previous work on related or similar studies is for comparison purposes, to present the research contributions clearly to the stakeholders in the construction industry.

Chapter Six: In this chapter, the study is concluded and recommendations are presented. The chapter seeks to establish whether the research problem has been solved, discusses the implications of the study, recommendations to solve the research problem, as well as making recommendations for future studies.

1.11 Conclusion

This chapter is the introductory chapter and it sets out the tone of the study on the phenomenon being investigated, which is, the factors affecting quality management in the construction of low-cost houses in the Amathole Region. The chapter has thus covered the background of the study, the motivation for the study, the aim of the study, the focus of the study, the problem statement, the research objectives, the research questions, contribution of the study, the brief methodology employed in the study, definition of key terms and the outline of the chapters. The next chapter reviews the literature on quality management.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter presents the theoretical framework for the study. The chapter firstly describes the overview of quality management and its impact on business, followed by a discussion on Total Quality Management (TQM) concepts and definitions; the evolution of the Total Quality Management theory; accredited quality management systems; the cost of quality and quality control techniques; measuring customer needs and satisfaction; quality management implementation benefits, success factors and implementation challenges. The chapter also discusses the construction industry of South Africa; performance improvement in the construction industry in South Africa and why it is important; the role of quality management systems in the performance improvement of construction companies in South Africa; the importance of ISO 9000 or ISO 9001 standards certification; quality management challenges in the South African construction industry; defects in the construction industry in South Africa; the types of defects in the construction industry, and the causes of defects in the construction industry conclude the chapter.

2.2 Total Quality Management concepts and definitions

The concept of Total Quality Management has various meanings, depending on who is defining it, as well as the context in which it is employed. This means that there is no consensus definition on the concept. However, Total Quality Management will remain a necessity. In simple terms, the concept refers to the general integrated effort towards achieving competitive advantage through continuous improvement of every aspect of an organisation's activities. Below is a description of each and every word that makes up the concept:

Total -all relevant stakeholders of an organisation are responsible for the continuous improvement of the organisation, be they customers or suppliers).

Quality - customers, expressed and implied requirements are met fully.

Management -the full commitment of the executives (Ho, 2012: 367).

Quality is defined in several ways. The American National Standards Institute (ANSI) and the American Society for Quality (ASQ) define quality as “the totality of features and characteristics of a product or service that bears on its ability to satisfy given needs.” Some perceive it as something superior or excellent, while others regard it in terms of the product or service not having any defects. Whatever the definition, the reason for maintaining quality is to satisfy customer needs, often known as the fitness for use (Evans & Dean, 2013: 76). However, it has to be noted that the mere satisfaction of customer needs does not guarantee success in the highly competitive markets. This means that organisations ought to exceed customer expectations (Evans & Dean, 2013: 76).

Total Quality Management (TQM) entails a people-focused management system aimed at continuously increasing customer satisfaction at the lowest cost. It is a complete systems approach, as well as a central element of high-level strategy. It is applied across all department and functions, while involving all employees, from the top to the bottom, then backwards and forward. The main emphasis of TQM is learning and adaptation, for continuous change and organisational success (Evans & Dean, 2013: 76). In this view, Evans & Dean (2013: 76) argues that TQM entails the integration of entire organisational processes and functions, for the purpose of improving the quality of goods and services.

Deriving from Mulings (2010: 17), the Chartered Management Institute highlight TQM as involving managing and every member of the organisation being responsible for providing quality to the customer. In this view, each and every task is a process within a supply chain relationship. Each stage aims at defining and meeting the customer’s requirements, thereby maximising customer satisfaction, at lowest possible cost (Mulings, 2010: 17). As a process, Total Quality Management aims to improve an organisation’s efficiency and effectiveness. It places responsibility on the management and not on the employees (Ho, 2012: 367). The main tenet of Total Quality Management entails focussing on outcomes, to the processes that involve in producing them. The objective of TQM is improving processes, which is achieved by shifting the objectives through the collection and analysis of data, cause and effect diagrams, flow charts and so as tools that enable process improvement. Implementation as defined in the dictionary by Merriam Webster is an enabling effector to, as well as ensuring the definite fulfilment through actual measures. Whereas ‘Operational’ here refers to the circumstances and conditions which influence the employees. In the same way, ‘organisational’ looks at the planning, organisational-wide effort managed from top aimed at increasing the effectiveness and so as organisational health through interventions that are planned.

2.3 Quality management and its impact on business

It has only been for a couple of decades that some world economies had experienced the modern quality movement, meaning that other economies still has a long way before the quality movement is being implemented and fully functional (Maguad, 2011: 183). It would therefore probably take several decades, if not centuries for quality management discipline to develop and for the economies to digest the change (Maguad, 2011: 183). Nevertheless, Maguad (2011: 183) is confident that quality would remain an imperative for survival of organizations and the world at large. Furthermore (Maguad, 2011: 183) asserts that historians may well know the 21st century as the century of quality.

According to Sanders (2011: 126), the definition of quality depends on the point of view of the people defining it. Some view it as conformance to specification. Others view it as “performance to standards or value paid for the price. For construction firms, quality is nothing but the satisfaction of customers and fulfilling their requirements within a specified budget.

Quality is one of the important key performance indicators of a construction project, which may cause cost overrun and time delays. Quality control (QC) and quality assurance organizations are established only because of prescribed requirements (Barret, 2012: 26). In the construction sector, quality control can be looked upon as client satisfaction, relation with cost and enough time to obtain anticipated quality (Ashford, 2013: 435). A quality assurance system has been developed by an international standard organization (ISO) for improving quality and overcoming quality related problems. For quality, ISO 9001 series have been developed and can be applied to all type of organization (Willey, 2011: 118).

Cagnazzo, Taticchi and Fuiano (2010: 318) assert that adoption of quality management systems results in visible and perpetual benefits accruing to organisations through increased customer-satisfaction. Several authors say organisations that are quality certified are acknowledged and applauded by scholars and researchers alike, for recognising customer needs and requirements. They are also praised for having processes and/or activities that are aimed at increasing customer satisfaction, systems that avoid misunderstandings with regards to client instructions. In addition, they are applause for systems that review contracts and processes for complaints handling.

According to Prince (2013: 127), quality management systems have long-term impacts on companies that implement the systems. These are stated below:

- Productivity enhancements
- Cost reductions in material and labour
- Reduction in cycle times and improved delivery
- Production system improvements
- Improvements in product and service quality
- Maintaining an improvement culture

According to Ashford (2013: 461), quality is affected by shortages of materials, equipment's design changes, error in cost estimation and lack of funding. The author also argues that other factors affecting quality are deficiencies in scheduling, inappropriate planning and unclear evaluation standards. Willey (2011: 119) suggests that the significance of these factors depends on type of projects, working environment and local culture. Quality management has of late emanated as a necessary and indispensable component of strategic business practices (Willey, 2011: 119). The author reiterates that competitive markets demand efficient management, which cannot be envisaged without a functioning quality management system. Improved product quality that needs to remain consistently high, a focus on the customer and reduced operational cost by optimizing quality assurance programs are the salient ingredients for today's business excellence (Sullivan, 2011: 2013; Smallwood, 2012: 114; Sidumedi, 2011: 133). The authors further emphasise that in the global markets today, firms and organizations not implementing and integration quality management into their day-to-day business practices will as a consequence lose their competitive advantage.

Today, the predominantly used quality management systems in the business world dates to the 1950s, when so called quality gurus and peers like Deming and Juran, coined the first quality paradigm. The growth of quality management has closed ties with the automotive industry, as most of the quality approaches were applied earlier on in the sector and brought joint development to the world. Toyota found most of the quality principles, such as the Total Quality Management (TQM), Just-In-Time Management, or Lean Management, while Ford is viewed as a prominent example of quality principles pertaining to business performance.

Dahlgaard and Dahlgaard-Park (2012: 267) suggest that Total Quality Management is a rigid and less fixed quality framework compared to company culture. Companies must embark on quality principles and approaches that are consistent with the company environment. The emphasis should be on goal-oriented facets and whilst Total Quality Management is not prescriptive about how to reach the goals, its measure is customer satisfaction which is achieved by continuous improvements and that in turn requires active participation from all employees (Dahlgaard & Dahlgaard-Park, 2012: 267). The origin of Total Quality Management initiated from the pioneering work laid out by Deming and Juran, which was further advanced by quality peers such as Ishikawa, Taguchi, Crosby (Saravanan & Rao, 2014: 264), and Feigenbaum (2011: 137).

The 14 Points for Management by Deming represent a cornerstone for the evolution of quality management. Published only in the 2000s by Deming (2010: 131), however, the underlying ideas emerged as early as the 1950s from other authors' contributions in different ways, shaping many quality management advancements in most major quality approaches and serving as the basis for major quality movements and theories. The points represent a full-fledged quality philosophy, which comprehensively covers guidance and management strategies to be followed by senior leadership. Standing out among the points is the basic prerequisite for an understanding that quality is a purely long-term undertaking and requires appropriate commitment with sufficient resource. The perpetual pursuit for quality must be adjusted to incorporate the continually changing quality paradigms. Pre-eminent among these is a major focus on the continually evolving customer expectations, which tend to become more demanding and sophisticated.

According to Deming (2010: 131), quality must be incorporated into the design process by moving its focus to early stages of the production life cycle, thus, eliminating the need for mass inspections. This means operational cost reduction when shifting from a reactive to a proactive mode. Deming emphasizes the need for quality management to build quality into the product from right at the source. Quality at the source means that every single employee is responsible for quality in every moment. Dedicated quality departments should be made redundant by this quality approach, since they are decoupled most of the time from internal matters of the production process and will never be as efficient in determining deficiencies. Cost is an important factor in business competitiveness, but Deming points out that a management maxim focusing purely on cost reduction is too short sighted. In contrast, a more holistic view in which quality is the prime driver for improving customer satisfaction will eventually lead to more

sustainable long-term business conditions and competitive advantage. Applying this principle specifically to supplier-buyer relationships, a focus away from price competition alone, and a shift towards quality strategies fostering long-term supplier-buyer relationships, will result in reduced quality variability and significant quality gains or benefits (Deming, 2010: 131).

Implementing these quality strategies into effective operational practices comprises a focus on employee empowerment. Comprehensive on-the-job training programs, as well as the cultivation of a supportive environment allowing continuous learning, are both essential measures to assure workers will be capable of doing their jobs both effectively and efficiently. Simultaneously, quality improvement demands that leadership instils a sense of enthusiasm and an elevated motivation to all employees, in order to create a sense of coherence in pursuing a common quality goal. Feedback is essential in leadership management and will drive out destructive fears of change and enhance employee creativity, thus, supporting pro-activeness commitment (Deming, 2010: 131).

Employees must be given as much responsibility and autonomy over their tasks as possible. Fixed predefined work standards are counterproductive when maintaining quality status quos; because they do not reflect continuous improvement and therefore lack, a proper stimulus for employees to exceed beyond implemented benchmarks (Deming, 2010: 137). The ultimate goal in employee management is to furnish a working environment, which generates employee pride and commitment. During the product life cycle, a basic principle listed by Deming for quality improvement is open communication between the departments. This will lead to a product design in which focused intra-departmental teams are engaged in parallel, rather than with the inferior sequential departmental approach of product design in which only one department at a time is occupied with the product. Hollow slogans, putting pressure on the employees, estrange them from the common goal of the company, rather than aligning and motivating them. They are inconsistent with constructive feedback and do not convince employees to be willing to take responsibility. Further-more, they ignore that many quality problems arise from inefficient system implementations, rather from employee performance. Finally, one of the basic truths about management is that quality management must be a part of the daily work of each single employee (Deming, 2010: 137).

2.4 The evolution of the Total Quality Management theory

Quality management originated from multiple ideas or persons. It is a combination of ideas, hence, the various names and acronyms: (TQM), total quality management; (CQI), continuous quality improvement; (SQC), statistical quality control; (TQC), total quality control, etc. However, the diverse ideas include the underlying notion of productivity initiatives aimed at increasing profit through improving the quality of the product.

The origin of the concept of quality can be traced back to Frederick Taylor in the 1920s, who is regarded as the father of scientific management. The concept and processes of quality emerged when manufacturing moved into big plants from the single craftsman's workshop, between the 1920s and the 1950s. During this time, emphasis was on productivity, while quality was assessed at the end. With the growing industrial plants, it became more difficult to check post-production hence, the use of statistical methods was employed to control quality. This was named reliability engineering, as it shifted quality control towards integrating quality into the design and production of the product. These methods were pioneered by Taylor and were considered as part of classical management, as opposed to the quality management system. However, Deming and Juran also used statistical methods for quality assurance at Bell Telephone laboratories.

Following the World War II, the U.S manufacturers increased production, resulting in less quality control and they thought the customers would not demand quality. In Japan, the case was different. Following the World War II, the country had to rebuild its means of production, while at the same time, the manufacturers had to reverse the reputation that their products were of low quality. They began emphasising quality in the products. The country invested in quality management by visiting foreign countries to learn how they managed quality, as well as inviting foreign experts to speak to them about quality management. Deming and Juran were some of the foreign experts and they heavily influenced Japanese quality processes by promoting quality and design. The industrial system of Japan was revamped in more than twenty years. Amongst the strategies that were employed included involving high-level managers as leaders who were trained to manage quality. In addition to this, they also undertook continuous progress, enlisting the entire workforce, as well as using quality circles. By the early 1980s, the country's electronic and automobile products' quality became more superior to the U.S', which lost markets in their own country, as well as in the Western world. This prompted the U.S to search for the Japanese secret to quality.

The history of quality management indicates several stages of development, starting with quality control, which included highlighting the product specifications and inspecting it prior to leaving the plant. The second one is quality assurance, which included identifying the quality features and procedures for the quantitative evaluation and control. Following this stage is the actual total quality control, which is a total organisational effort. This affected the production processes, the profit, the interactions amongst the people of the organisation, as well as customer satisfaction. Total Quality Management is the fourth stage, which mainly focuses on the customer, while quality is an organization-wide effort (Nixon, 2008: 87). Figure 2.1 describes the evolution of quality management.

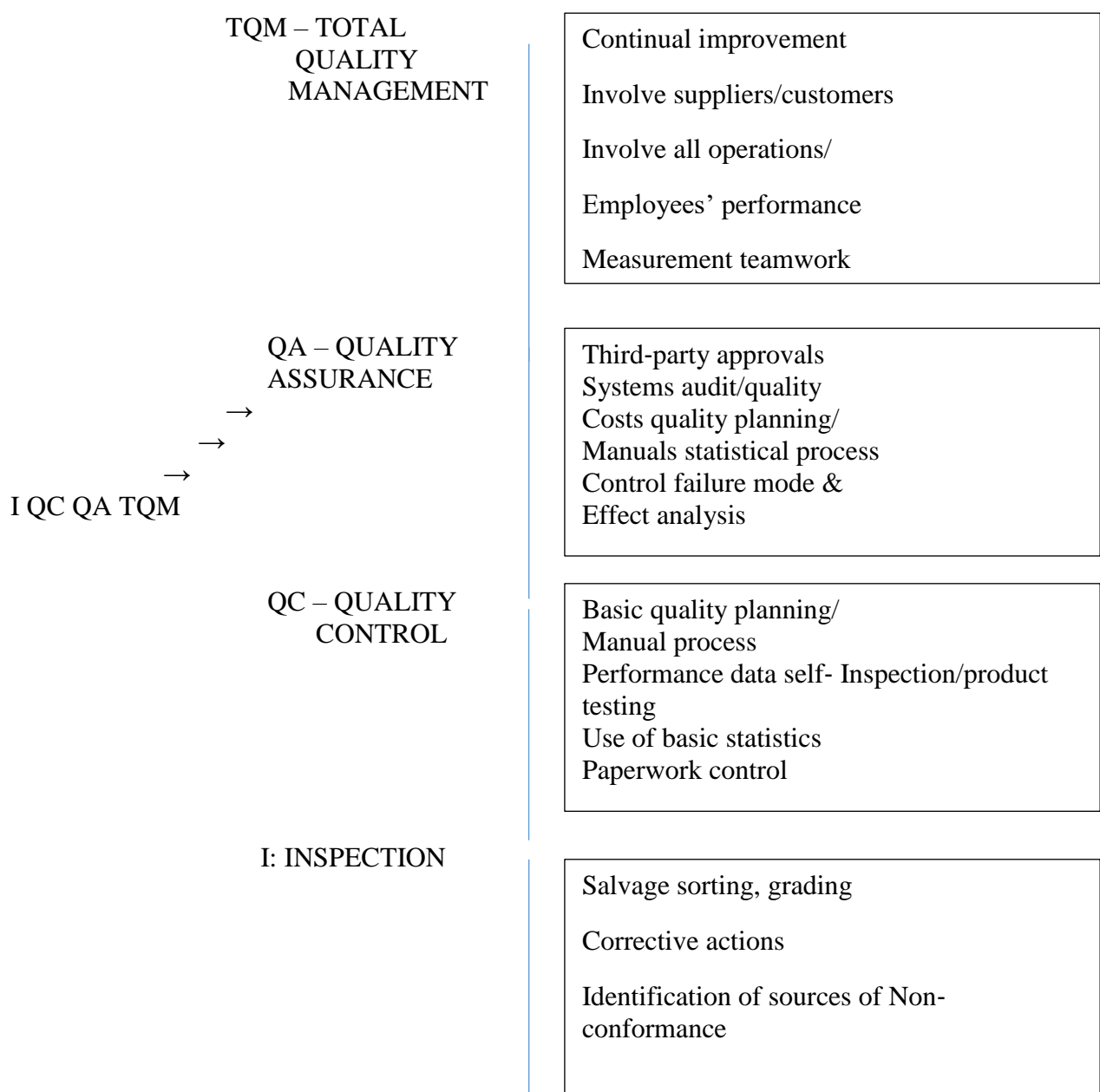


Figure 2.1: The four levels in the evolution of Quality Management

Source: Dale and Plunkett (2002:167)

2.5 Accredited Quality Management Systems (QMS)

According to Hoyle (2007: 839), all organizations have their ways of doing things, with some being in the mind of the leaders, while in others, it is put on paper. In most cases, organisations mix a bit of both. Before ISO 9000, the inadequate and inefficient systems enabled human beings to achieve objectives which transformed the society by 1987. They went on to improve these systems, making them more predictable, effective, and efficient, thereby optimising organisational performance. ISO 9000 required organisations to launch a quality system that ensured the product met the stipulated requirements. Quality systems are meant to provide support and the mechanism for effectiveness in terms of quality- related processes in an organisation. In other words, it is a systematic way of managing quality in an organization (Kolka, 2012: 677).

2.5.1 Benchmarking

Benchmarking enables organisations to gauge the extent of their performance, against their competitors. It also allows to understand how other organisations are achieving superior performance (Oakland, 2013: 174). Originating from Japan, benchmarking measures organisations' operations, services and products against those of their competitors. It is therefore a way in which priorities, targets which can result in competitive advantage, can be established. Benchmarking thus entails the continuing process of evaluating products, processes and services, against those of competitors and industry leaders. This would result in organisations adopting the best practices which would lead to superior performance by measuring performance, continuous implementation of change, as well as copying the best.

The link between benchmarking and TQM is crystal clear. The establishment of objectives on best practice should contribute towards meeting the requirements of the customer, both internally and externally (Oakland, 2013: 174). This involves every department examining itself against its counterparts in the competing organisations. It also entails scrutinising all elements of their activities. Benchmarking plays a very essential role in administration, as it frequently measures products and services against similar operations in competitors or industry

leaders. Thus, measurement and benchmarking are strategic approaches to get the best out of processes, people and programmes.

2.5.2 Continuous improvement

Total Quality Management implies improving every element of an organisation, be it the people, process and products (Bartol and Abhishek, 2012: 68). Thus, the improvement process should occur daily and it needs to be incorporated into other organisational initiatives, as well as business strategies. In this view, the organisation should establish a multi-disciplinary TQM steering committee, which should be chaired by the chief executive. In the same way, the appropriate infrastructure should also be established, to support the improvement process. It has to be noted that improving quality and productivity is an on-going cycle in TQM and can be done through measuring success and continuous improvement (Bartol and Abhishek, 2012: 68).

2.5.3 Cost of quality and quality control techniques

Cost of Quality (COQ) is the total costs incurred by an organisation in order to prevent poor quality (Subburaj, 2005: 123). The aim of quality is to maximise organisational profit and ensure that all stakeholders benefit. In this regard, quality should be achieved at the lowest cost. TQM aims to gradually reduce wasteful expenditure and eventually, the total elimination thereof. Thus, the cost of quality is an essential tool for TQM. This implies that the quality management system should be well documented, while at the same time providing direction and feedback, which should be internally audited regularly and effectively. The daily control and assurance activity should be separated from the improvement process. The responsible personnel should be dedicated to removing the main causes of wastage and errors. A system should be put in place, whereby staff members discuss the problems preventing them having an error-free environment and performance (Subburaj, 2005: 123). The different techniques, tools, packages and systems employed at different stages in different organisations for the development of TQM, should be recognised.

Dale (2013: 433) argues that if continuous improvement is to be increased and sustained, this has to be monitored regularly, checking which activities are doing well, which ones have

stagnated and what needs to be done to improve the situation. For this, self-assessment against recognised models is essential. The author further regards this as a comprehensive, systematic and regular review of an organization's activities and results referenced against a model of business excellence. The process of self-assessment allows organisations to discern their strengths, as well as those areas in which need improvement.

2.5.4 Measuring customer needs and satisfaction

Kumar (2016: 416) regards TQM as customer-oriented, while its main objective is to satisfy the customer. Satisfying customers entails producing quality goods and services at the lowest cost and meeting the customers' needs. Kumar further notes that the design of products and services should be based on the customers' needs. When organisations fail to provide value that meets the customers' needs, it results in customer dissatisfaction. On that note, managers ought to assess the quality of the product as an antecedent to customer value and satisfaction. The value perceived by the customer during the usage of the product should also be measured, as well as the satisfaction or dissatisfaction, which is the realised end state.

For Dale (2013: 433), customer satisfaction is a business issue, hence, all processes should work towards customer satisfaction. This implies that all the possible ways must be exhausted to determine the requirements of the customer, as well as to develop procedures and systems to evaluate compliance. Essentially, the complaints of the customer should be analysed, while feedback should also be provided to those who need it, especially the customers.

2.6 Quality Management implementation benefits

Quality Management (QM) has become a worldwide topic in the twenty-first century. Having its roots partly in the USA and partly in Japan, it was primarily adopted by some Japanese companies in the decades immediately after World War II. With the greater successes of Japanese companies during the 1980s, companies all over the world found that it was necessary to have good quality management practices in order to stay competitive (Dale, 2013: 433). Total quality management is an enhancement to the traditional way of doing business. It is a proven technique to guarantee survival in excellent competition. As a management approach, Quality Management (QM) revolves around quality, while it is influenced by the participation of all stakeholders and aiming towards long-term success.

This is achieved by satisfying the customer, as well as benefits to all stakeholders. In other words, quality management is a philosophy for managing an organization in a way which

enables it to meet stakeholders' needs and expectations efficiently and effectively, without compromising ethical values. Quality management has been widely implemented throughout the world. Many firms have arrived at the conclusion that effective quality management implementation can improve their competitive abilities and provide strategic advantages in the marketplace (Seneratne & Jayarathna, 2012: 108). Several studies have shown that the adoption of quality management practices can allow firms to compete globally (Yusuff, 2011: 367; West, Hirst, Richter & Shipton, 2010: 275; Camgoz-Akdag, 2013: 188; Chachadinha, 2011: 34). Several researchers also reported that quality management implementation has led to improvements in quality, productivity and competitiveness in only 20-30% of the firms that have implemented it (Benson, 2012: 37). According to a survey of manufacturing firms in Georgia, the benefits of quality management are improved quality, employee participation, and teamwork, working relationship, customer satisfaction, employee satisfaction, productivity, communication, profitability and market share (Dale et al. 2002: 87).

A study conducted by Rategan (2013: 43) indicated that a 90% improvement rate in employee relations, operating procedures, customer satisfaction and financial performance is achieved due to quality management implementation. However, Burrows (2009: 37) reported a 95% failure rate for initiated quality management implementation programs. Eskildson (2010: 77), Tornow and Wiley (2011: 79) reported that quality management implementation has uncertain or even negative effects on performance. Longenecker and Scazzero (2012: 398) also indicated that achieving high product quality and pursuing successful quality management implementation are highly dependent on top management support. However, Motwani, Mahmoun, and Rice (2013: 47) reported that there is no association between top management support for quality and the level of product quality achieved. Thus, conflicting research findings have been reported surrounding the effects of quality management implementation on overall business performance.

The commitment to quality management originates from the chief executive level in a business and is promoted in all human activities. The accomplishment of quality is thus achieved by personal involvement and accountability, devoted to a continuous improvement process, with measurable levels of performance by all concerned. It involves every department, function and process in a business and the active commitment of all employees to meeting customer needs. In this regard, the customers of each employee are separately and individually identified (Subburaj, 2005: 127). With quality management, the whole organization works together to guarantee and systematically improve product quality. The aim is to make product of perfect

quality – with zero defects (Waters, 2011: 104). Exploring quality management literature, it was revealed that most studies examined the factors affecting the implementation of quality management, as well as the effects of adopting them and their relationships. The factors include strategic quality planning, leadership, employee management and involvement, process management, customer focus, continuous improvement, supplier management, information and analysis, as well as knowledge and education (Evans & Dean, 2010: 77; Bartol & Abhishek, 2011: 98; Subburaj, 2005: 133; Oakland, 2013: 137; Steers & Porter, 2013: 231; Hoyle, 2007: 74; Wickramaratne, 2012: 65; Juran, 2010: 143; Kumar, 2016: 345; Deming, 2010: 248; Wang & Ahmed, 2010: 135; Chattopadhyay, 2013: 67; Van der Vegt & Bunderson, (2015: 536; Mathieu, Goodwin, Heffner, Salas & Cannon-Bowers, 2011: 279). From most of these scholars, it has been argued that improving quality helps in reducing costs, increasing productivity, market share, as well as customer satisfaction.

Oakland (2013:137) notes that errors are minimised when organisations focus on the continuous improvement of operating systems and processes. When errors are minimised or eliminated, it addresses the costs and delays involved. Again, if managers and employee become conscious of quality, it guarantees quality products or services to the consumers. This means that errors and delays should be minimised to save on costs.

According to Evans and Dean (2010: 77), customer service and demand timing are essential considerations of TQM, hence, organisations executing quality management should focus on the following: continuous improvement of products or services, elimination of defects, prevention of errors and regard the essence of the role of the shop floor employees. Focusing on these issues enable organisations to establish strong relationships with customers. Organisations that execute TQM also focus on the quality of exchanges between customers and the organisation, in order to determine the factors like to what extent do customers respond to product and service improvement, the reliability of the service or product delivery performance of the organisation and, the assurance given by shop floor employees to customers, pertaining to the quality of the service or product, as well as organisational competencies (ibid).

Mathieu et al. (2011: 279) highlight a positive link between quality management and tangible benefits. The former directly affects fiscal results, given that its implementation is well-planned and directed. It also calls for strong commitment to sustain continuous improvement, whose focus is the benefits for the end user, the customer. Ultimately, the objectives of quality

management systems include assisting organisations in their quest for fiscal health (Van der Vegt & Bunderson, 2015: 536).

Abhishek (2011: 98) employed the meta-analysis approach to assess the issues affecting quality management measurement reliability, as well as the relationship that exists between quality management practices and organizational performance. Their findings indicated no consensus on the relationship between the two. They also indicated that quality management practices are positively linked to internal and external performance. Specifically, top management support highly impacted on both performances. The quality management practices which mildly impacted on internal performance included strategic quality planning, benchmarking, customer focus, supplier quality, as well as employee training. Conversely, employee involvement highly impacted on internal performance (Abhishek, 2011: 98). Those quality management practices which mildly impacted on external performance included benchmarking and customer focus, while those which highly impacted on external performance included strategic quality planning, employee involvement and training, as well as supplier quality (Abhishek, 2011: 98). These findings are evident that quality management not only enables organisations to enhance their internal environment and effectiveness, but their external status as well.

Oakland (2013:137) indicated top management support and customer orientation as critical in the achievement of benefits like increased management control, greater customer satisfaction, cost cutting on maintenance of applications, enhanced productivity, improved product or service quality, optimisation of human resources, slashed time consumption on production, as well as flexibility in reaching out to consumers. It was also found that quality management practices like process management, customer satisfaction, employee empowerment and teamwork, quality goal setting and measurement quality tools training and suppliers' cooperation, can positively affect customer satisfaction, while the implementation of quality management principles is an effective way through which organisations can achieve competitive advantage (Oakland, 2013:137). Organisations can also improve their image, quality awareness and employees' satisfaction, through the adoption of quality management practices.

Some scholars argue that the challenge with quality management and business excellence does not lie in the models, but rather, in their implementation. In this view, the key challenge lies in integrating total quality into the daily work methods and management practices (Wang and Ahmed, 2010:135; Chattopadhyay, 2013: 67). Wang and Ahmed (2010:135) also suggested

that emotional involvement and strong internal motivation are essential for effective quality implementation. Similarly, Chattopadhyay (2013:67) pointed certain practices which encourage the quality philosophy and these include the participation of top management as a team, emphasising on quality-oriented training, adopting the quality philosophy, focusing on the customer and a policy of on-going improvement.

Quality management is the most effective model for such a vision. Quality management entails coordinating efforts aimed at increasing customer satisfaction, enhancing employee participation, encouraging an organisation atmosphere of on-going quality improvement, as well as reinforcing supplier partnerships (Pride, Hughes & Kapoor 2009: 836). Oakland (2013:137) further highlights quality management as an approach aimed at improving the effectiveness, competitiveness and flexibility of the entire organisation. It is thus a means of planning, organising and comprehending every activity, while it is also dependent on the individuals at each level.

Quality management requires the maintenance of quality by organisations in all their aspects. This therefore calls for the need to do right the first time, while wastes and defects should be eliminated from organisational activities. Dale et al. (2002: 87) noted that some characteristics cannot be easily changed, for instance, lifelong behaviour, customs, as well as practices and prejudices of an organization. A commitment to quality means that organisations should strive to enhance the quality of their products or services. When implementing organisational change, there has to be genuine reasons and it is the duty of the manager to facilitate the change process. Organisations are competing at a national and global level, meaning that for them to survive and grow in this fierce competitive arena, excellence is imperative. Bartol and Abhishek (2011: 98) noted that quality becomes an essential remedy to the organisational objectives and eventually, competitive advantage, because all the strategies aimed at achieving competitive advantage revolve around quality considerations.

Developed in a manufacturing environment, quality management is also evident in service and administrative industries. The concept of quality management dates back as far as the early 1920s when it was used in product quality control. In these days, the concept has shifted from focusing on products alone but refers to all aspects of an organisation. Referring to quality management, Deming highlights the following as important: doing it right the first time, so as to eliminate re-working costs, listening and learning from customers and employees, making

continuous improvement every day, building teamwork, mutual respect and trust (Marc, Herman, Karlien & Robert, 2016: 127). Sullivan (2012: 349) explains quality management as any effort to achieve and sustain a high quality product by conforming to standards and meeting customer satisfaction. Much research has been conducted in the area of quality management systems. Elwary and Shabayama (2014: 99) believe that firms or organisations experience benefits of higher customer satisfaction, better quality output, and increased market share after adoption and implementation of quality management. Elwary and Shabayama (2014: 99) suggest that a quality management system has the single purpose of improving the performance of the organisation.

2.7 Quality Management implementation success factors

Most companies are trying to satisfy their customers' needs and expectations. This can only be achieved through improvement in product quality, increased customer satisfaction and continuous improvement towards world class organizations. These challenges urged companies around the globe to change their old traditional quality system and implement new quality approaches to deliver high quality goods and services. Companies that can deliver quality are the ones that will be able to compete on the globalization era (Eugenia, 2009: 112). Quality improvement has become a considerable force throughout the world. Although methods to improve and manage quality are numerous, it can be said that quality management is a critical determinant in the success of manufacturing organizations.

In most highly industrialized countries of the world: The United States, Japan and the European Union, the implementation of total quality management has become a common practice and a preferred approach for improving quality (Krasachol, Willey & Tannock, and 2013: 192). Critical success factors can be defined as the limited number of areas in which results, if they are satisfactory, will ensure successful competitive performance for the organization, they are the critical key area where 'things must go right' for the business to flourish. If results in these areas are not adequate, the organization's efforts for the period will be less than defined (Rockart, 2010: 154). If the results in these areas are not satisfactory, performance of an organization will fall short of expectations. With concern of critical success factors, there is no universal critical success factor research method. Scholars and researchers used various critical success factor methods such as a priority list of critical success factors based on literature sources, interviews, analysis of related organizational activities, mailed questionnaires, a

combination of interviews and with subsequent questionnaires (Auruškevičienė, Šalciuvienė, & Trifanovas, 2010: 144).

Meanwhile, Black and Porter (2011:43) place emphasis on Baldrige Award criteria, revealing ten critical factors for quality management. These factors are: supplier partnership, people and customer management, customer satisfaction orientation, external interface management, communication of improvement information, strategic quality management, operational quality planning, quality improvement measurement systems, teamwork structure for improvement and corporate quality culture. Krasachol, Willey & Tannock (2013:192) developed a reliable instrument to measure quality management practice. This instrument, based on 8 critical factors which are: the role of divisional top management and quality policy, the role of quality department, training, product/service design, supplier quality management, process management operating quality, data and reporting, as well as employee relations.

Krasachol, Willey and Tannock (2013:192) expanded the practices even further and identified 12 factors that are critical for the implementation of quality management derived mainly from the literature, these factors are: top management commitment, customer focus, supplier quality management, design quality management, benchmarking, use of statistical process control, internal quality information, employee empowerment, employee involvement, employee training, product quality, and supplier performance. Krasachol et al (2013: 192) surveyed 370 Greek companies and found that leadership, process management, service design, human resource management, customer focus, education and training, as well as supplier quality management, are critical success factors in quality management implementation. Although there are many studies in quality management literature (Krasachol, Willey & Tannock, and 2013: 192; Rockart, 2010: 154; Marc, Herman, Karlien & Robert, 2016: 127; Black and Porter (2011:43; Eugenia, 2009: 112; Elwary and Shabayama, 2014: 99) these authors recommend that further concern should be made for the evaluation of critical success factor of quality management, the results of their adoption and the type and extent of their relationships.

Many organisations realise the need to deviate from an autocratic kind of management style, which follows formal rules and procedures, while narrowing work demarcations (Dale et al. (2002: 98). In many organisations where total quality has successfully influenced change, the top management does not emphasise formal systems and structures, but they form process management teams to deal with real business organisational challenges. The way to succeed in this area involves aligning employees of the organisation, their roles and responsibilities, with

the organisational processes. Quality management entails applying several activities with perfect synergy. Figure 2.2 illustrates the elements of quality management.

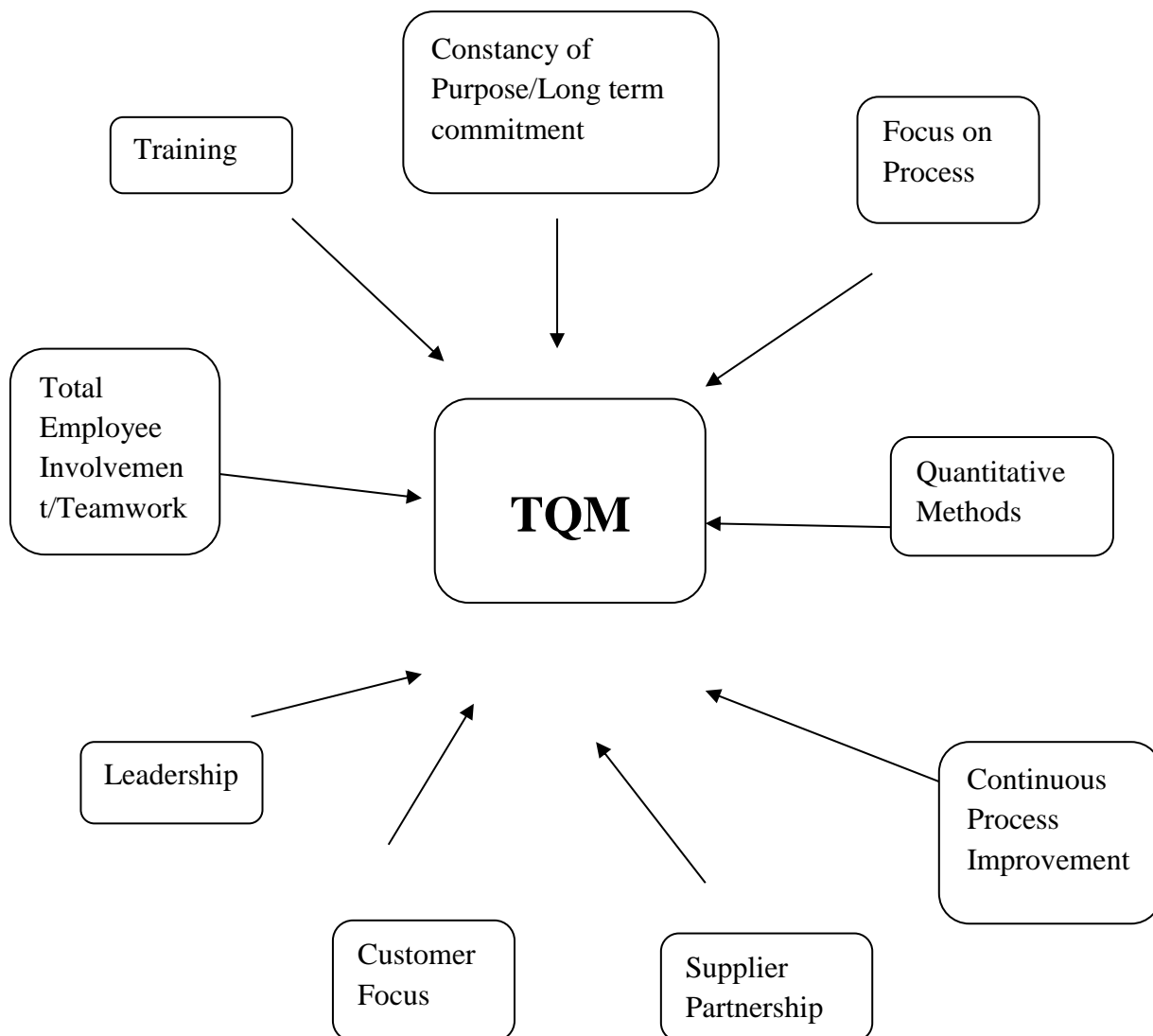


Figure 1.2: Implementation Process Cycle

Source: Subburaj (2005:123)

This institutionalisation of quality presents several challenges. Strategy implementation is essential, as organisations aim to position themselves against excellent models and competitive organisations. The lack of an integrated approach implies that quality will always remain an add on, resulting in little improvement (Dale et al. (2002: 87). Continuous improvement calls

for on-going management of the drivers of improvement. The high failure rate of many quality management activities has been a result of the lack of a clear link to consumers, lack of time and resources, as well as ingrained attitudes (Van der Vegt & Bunderson, 2015: 536). It has also been noted that many initiatives fail because the chief executives do not commit themselves to actively support, participate and lead the process of improvement, as well as the related culture change that is necessary for the successful implementation of quality management (Pride, Hughes & Kapoor 2009: 836; Dale et al. 2002: 87). Nonetheless, continuous improvement can be stimulated and sustained through self-evaluation (Wang & Ahmed, 2010: 135; Chattopadhyay, 2013: 67; Van der Vegt & Bunderson, 2015: 536). In addition, strong leadership, customer focus, empowerment involvement, accurate and timely information, are crucial (Krasachol et al. 2013: 192).

From the above, it is indicative that staff attitude can negatively influence the implementation process, while teams and individuals are critical to the improvement process. The more committed people are to quality, the better the results (Krasachol et al. 2013: 192). Employee cooperation and commitment, and not just compliance, are critical in this regard. Cultural issues and staff attitude towards quality management initiatives, as well as the fear of being responsible for errors, can be the main problems (Aday, 2011: 103; Ahmed, S. and Hassan, M. (2013: 818). Hence, top management should desist from the blaming culture, as it discourages the employees to drive the improvement process.

High levels of trust and confidence should exist between superiors and their subordinates, while teamwork and cooperation should be emphasised every day (Al Falah, Zairi, & Ahmed, 2015: 432; Aday et al. 2011:103). If employees share a common vision, the implementation of any strategy is likely to be effective. Thus, employee development is critical in achieving a quality-focused organisation. This means that employees need to be trained, while at the same time they should have positive attitudes towards their work (Alhajeri, 2008: 429). Employees ought to possess the skills and knowledge necessary for contributing to the execution of the quality policy. They should also be equipped to deal with the demands of quality and excellence, while at the same time being motivated and trained to work towards improving quality (Alhajeri, 2008: 429).

2.8 Quality Management implementation challenges

A study conducted by Bayo-Moriones, Bello-Pintado and Merino-Díaz de Cerio (2016: 1049) showed that in Western European countries, for instance, France, Italy, England and Norway the way firms implement their quality management practices is very complicated and has a long process. The analysis carried out shows that the level of quality management implementation in telecommunication institutions is even worse. According to Dale et al. (2002:87) the following were the problems noted in the implementation of quality management: the industries do not have even a single conception of quality; there is no clear vision, mission and concrete quality policy for the institutions; the leaders of the institutions do not understand the modern concept of quality and obligation to it; firms have poor observation, care and control of quality of industrial practice; there is lack of time and resources and most enterprises prefer short-term goals to the long-term ones; the process of achieving total quality management is complicated, involving all members of the organization and, organisations require enough time to change employees' traditional standpoint to the concept of quality.

Another research found that there are some problems pertaining to the application of quality management programmes in some Saudi public sector agencies. The most apparent problem is the limited implementation. The other main problem results from the change in leadership in all organizations, which reflects on their commitment to quality management programmes implementation. These problems appear to be related to weak understanding of the quality management and its implementation goal in most of the organizations. Moreover, the training on quality management does not seem to be efficient, it is conducted mostly in-house, where there is no experience to offer, not to mention the fact that the complexity of quality management training programmes and the lack of post training consultations were factors that hindered the efforts of these organizations in their implementations of quality management. A survey of branch managers in the UK banks considered lack of resources, short-term goals, internal environment and communication, as major barriers to quality management implementation (Al Falah, Zairi, & Ahmed, 2015: 432).

2.9 Construction industry in South Africa

According to Honnakker et al. (2010: 953) the past decade has seen the construction industry in South Africa being criticised for poor performance and productivity, as compared to other industries in the country. The Construction Industry Development Board's (2010: 2) study,

Construction Quality in South Africa: A Client Perspective, indicated that the public in general and customers in the construction industry were dissatisfied with the quality of construction. This was indicated by about 20% of all the construction projects surveyed in 2009. They also revealed that for the year 2008, around 18% of the projects surveyed in that year had levels of defects which were regarded as inappropriate.

On the other hand, the Movement for Innovation (2010), in a survey conducted, found that construction industry clients wanted their houses delivered on time, on budget, free from defects, efficiently, right the first time, safely and by profitable companies, in as much as regular clients expected to see continuous improvement from the construction teams to achieve year on year reductions in project cost and reductions in project time. As Seneratne and Jayarathna (2012: 101) express it, the construction industry needs to move towards higher quality by upgrading the quality of their services. The authors further suggest that organisations in other industries in the country turned to quality management as a reliable management tool in the competitive market environment that leads to higher organisational performance (Seneratne & Jayarathna, 2012: 101). They further allude that with the changing construction environment and reported cases of high levels of dissatisfaction by clients, it is necessary that studies be conducted on the importance of quality management. Quality management has been attributed to turning around the trajectory of not only single companies, but that of the industries as a whole. The authors reiterate that failure to conduct these studies poses a risk to the construction businesses in that it would be difficult to rectify poor quality and defects on projects. It would be difficult to also eliminate cost overruns, improve client satisfaction and increase turnover and profitability. As a result, it makes the construction industry a less attractive investment solution for potential investors. In order to ensure compliance to quality management, the Construction Industry Development Board (2011: 41) suggests that industry regulatory bodies and the government lobby for strengthened requirements for the appointment of professional services and contractors, based on the quality compliance criteria.

The Construction Industry Development Board (2012: 76); Statistics South Africa (2013: 134); United Nations Industrial Development Organisation (UNIDO) (2012: 345), and Ofori (2011: 14), suggest that the construction industry plays a critical role in the South African economy, as compared to many other industries. It is a significant contributor to the economic growth of South Africa and produces building and civil engineers. Literature also emphasises that the industry determines the extent to which investment efforts in a resource-rich country are translated into investment outcomes. UNIDO (2012: 345) lament that the construction industry

is not a single industry, but rather a complex cluster of industries, including banks, materials and equipment, inputs manufacturers, contracting organisations, etc.

The construction industry's important role in the socio-economic development of any nation needs not be over-emphasised. It makes a significant contribution to the national economy as a whole, it creates employment opportunities for the nation's citizens, plays a role in the development and transfer of technology. It creates many opportunities for firms and it contributes directly to improving the quality of life of the consumers (Ofori, 2011:14; Giang and Pheng, 2011: 13).

2.9.1 Performance improvement in the South African construction industry

The Construction Industry Board (2010) reported that the South African construction companies' survival depends on repeat and referral work from clients, which is linked to the construction companies' performance in past projects. The instrument also reported that contractors need to offer value for money to their clients. This is because existing clients award contracts based on the previous performance of the contractor. According to Gharakhani et al. (2013: 48), improving the quality with which a company delivers its products or services is crucial for competing in the global market. The South African construction industry is now a highly dynamic sector, with industry structures and product characteristics changing at a rapid pace (Seneratne & Jayarathna, 2012:112). With the changing and dynamic economic environment, managers of construction companies and projects in South Africa need to keep abreast of emerging construction management philosophies and strategies for sustainable competitive advantage, keep up with the demands of the industry and their clients (Seneratne & Jayarathna, 2012:112). Hoonakker et al. (2010: 953) suggest that many of the management practices in the construction industry are being challenged; the industry's clients know what they want and are moving forward. Clients' demands regularly improve service quality in the construction industry, faster delivery and more innovative building designs and architecture.

2.9.2 The role of quality management systems in the performance improvement of construction companies

A study by Delgado-Hernandez and Aspin (2016: 937) on Quality Management Case Studies in the UK Construction Industry observed that companies that have quality management systems in place win repeat business from satisfied and retained clients, increase their market share and improve their customer satisfaction and retention levels. According to Cagnazzo et al. (2010: 315), there is strong evidence that ISO 9000 or 9001 certification leads to improved performance of the construction companies, improved management and operational processes that result in less wastage of time and material inputs increased productivity levels and cost reduction. Din, Abd-Hamid, and Bryde (2011: 1047) suggest that quality management systems are not limited to influencing production-based processes only, but influence the improvement of financial policies and procedures, influences risk management practices and information management, among other things. It is evident from literature (Cagnazzo et al. 2010:319; Chachadinha, 2011: 37; Coffey, Willar & Trigunarsyah, 2011: 38; Seneratne & Jayarathna, 2012: 117) that compliance to ISO 9000 or 9001 is associated with increases in financial performance that would bring about benefits not only to companies themselves, but also to stakeholders as whole. Ghodbane (2014: 118) argues that quality management systems help companies to optimise their operations and increase sales revenues, improve quality of their products, thus resulting in cost savings and customer satisfaction.

To improve the performance of the construction companies and project costs reduction, Cagnazzo et al. (2010:319) emphasise that there is a need for construction companies to measure quality costs. These are the costs associated with failure to arise from both internal and external sources. Internal poor-quality costs would increase the company's operational costs, such as rework and material wastages. External poor-quality costs would result in loss of profits through contractual claims, defects rectification (re-work) and the potential loss of future business (Jafari & Love, 2013: 1247). Literature suggests that quality management systems provide a framework for measuring quality costs. ISO 9000 or 9001 certified quality management systems could provide solutions for several issues and challenges that bedevil the construction industry; they constitute good opportunity for restructuring and modernising the operations of the construction companies, as well as offering opportunities for change from traditional ways (status core) that have been accepted without due diligence (Chachadinha, 2011: 38).

2.10 Importance of ISO 9000 or ISO 9001 Standards Certification

The revision of ISO 9000 in December 2002 to become 9000: 2008 saw it belonging to the ISO 9000 family and hence, the concept of process model emerged. The process model highlights that organisations should define their activities and draw a process model for them, while understanding how the processes link with each other. In addition, they should decide who owns the processes, monitor and improve the quality systems through using internal audits and assessing customer satisfaction.

According to Sidumedi (2011: 113), the dominant South African construction companies have recognized the benefits accrued from certified quality management systems, thus and have pursued and been awarded ISO 9000, some ISO 9001 certification. In his study, Sidumedi observes that inspections were the dominant measure of addressing quality problems. While Gharakhani et al. (2013: 49) reiterate that in order for the construction companies to achieve quality on their construction projects, they must do more than just conducting inspections. Inspections are a limited control measure as they fail to address the root causes of the problems. Gharakhani et al. (2013: 49) further highlights that the inspection stage or era is too late; construction companies should instead aim on reducing defects during the production and try to eliminate these mass inspections by structured quality management systems.

According to Cagnazzo et al. (2010: 319) and Ghodbane (2014: 118), ISO 9000 or 9001 certification increases the companies' revenues, as companies are able venture into new markets, increase their potential to get new contract projects and enhance their ability to enter international markets. At the same time, Din et al. (2011: 1047) note that the benefits and advantages of certified quality management systems outweigh the challenges and the investment outlay, as ISO 9000 or 9001 certification enhances the levels of company performance in their projects, as compared to those that are not certified.

The results of a study by Chachadinha (2011: 135), on quality implementation in public housing projects, revealed that there is increased customer satisfaction after ISO 9000 or 9001 implementation. In addition, the average number of defects in housing projects constructed by companies with ISO 9000 or 9001 certification were significantly lower than those of the construction companies that were not ISO 9000 or 9001 certified. When Ghodbane (2014: 118) studied the impact of ISO 9000 certification on the financial performance of listed companies in three American economic sectors, over a period of 10 years (1988-1997), they discovered that certified quality management systems are worthy implementing. The authors concluded

that certification leads to improved financial performance by companies that had a comparable level of economic performance before implementing ISO certification programs.

In Malaysia, for example, the new regulations required that the Grade G7 contractors, that is, the highest grade, be certified with the ISO 9000 quality management systems as compulsory conditions for registration by January 1, 2009 (Din et al. 2011: 1047; Coffey et al. 2011: 116). Failure to comply with the new regulation resulted in construction companies being downgraded and this adversely impacted on their ability to do business. Such stance by the government helped to improve quality in the construction industry by compelling the construction companies to adopt quality management systems. However, Malaysia is not alone in this practice, countries such as Australia, Hong Kong and Singapore have also imposed stringent regulations for their construction industries to comply with ISO 9000 or ISO 9001 certification, in order to qualify for bidding for public sector projects. The general trend globally is to now move towards certification and those companies that operate globally, if they neglect getting a certified quality management system, they do not qualify to tender for lucrative construction projects and jobs. In other words, they would not be meeting the required standards.

2.11 Quality management challenges in the South African construction industry

According to Joubert, Cruywagen, and Basson (2015: 37) the South African construction industry has a reputation of neglecting the use of quality management systems and as a result, it suffers negative image in terms of achieving quality. The authors also emphasise that South African construction companies cannot afford to postpone the institution of adequate systems any longer. Zunguzane, Smallwood and Emuze (2012: 29) suggest that quality is a fundamental and critical issue in the construction industry, such that non-compliance to such in the construction industry can result in the failure of construction projects and higher client dissatisfaction. Quality in the construction projects is a major concern to clients and customers, as a result, anything less than that might cause client dissatisfaction (Auchterlounie, 2010: 248). Hanson, Mbachu and Nkado (2013: 196) concur that client dissatisfaction poses a serious risk and threat to the South African construction industry's sustainability. According to Auchterlounie (2010: 248) quality is the barometer that defines and makes the difference between success and failure in the construction industry in South Africa. Love and Edwards

(2014: 268) in describing the causes of defects in the South African housing departments, reiterate that construction companies that implement quality management systems experience significant reduction in defects that would require rework and enjoy competitive superiority among their competitors.

2.12 Defects in the South African construction industry

Georgiou (2010: 378) argues that defects or defective work occurs when the standard and quality of workmanship and materials, as specified in the contract, are deficient or neglected. The author further explains that defects in the construction industry can be classified into two main categories, which are patent and latent defects. According to Douglas and Ransom (2010: 116) defects are a breach of the terms and conditions of the contract by contractors and may occur in any part of a construction project and at any stage of a construction project. Defects are shortfalls in performance occurring at any time in the life of the product, project, or building in which they occur (Douglas & Ransom, 2010: 116). Ilozor, Okoroh, Egbu and Archicentre. (2014: 333) stress that in considering issues within the defect domain, it is critical and very important to define what constitutes faults or defects. However, the building regulations and British standards do not differentiate or draw a line between faults and failures. They define these as follows:

Fault- is a departure from design specifications and requirements where these were not themselves at fault in the first place.

Defect or failure- is a limitation or shortfall in the performance, occurring at any time in the life of the project, product or dwelling in which it occurs (Mills, Love & Williams, 2014: 15). A clear line can be drawn in this case, between a failure and a defect, with a failure being the departure from good practice and good procedures, which may or may not have been corrected before hand over of the project or building. A defect, on the other hand, constitutes a shortfall in performance, which manifests itself later once the building is operational (Mills et al., 2014: 15). Georgiou (2010: 378) argues that defects can be classified as being minor or major, where minor defects are those that arise from poor workmanship or defective materials used in the project. They do not render the building unsafe for habitation, or unusable for the originally intended purposes. It only becomes a concern when the building is unsafe, uninhabitable, or unusable for the originally intended purpose, that the defect is classified as a major defect.

Ojo (2010: 477) suggests that defective construction workmanship can be defined as works that fall short of complying with the express descriptions and requirements of the contract. The

author further notes that the majority of the modern buildings and civil structures are of complex architecture. They involve the use of a great variety of engineering methodologies and processes and as a result, most construction projects may face the possibility of defects, which renders them not fitting their originally intended purposes. In other words, defective construction would contribute to both final costs and costs of maintenance of the project and can be astronomical. Zietsman (2011: 111) concludes that defective construction includes activities such as compaction not done to specifications. This may lead to ground movement and eventual failure of the foundations of the building projects and as a result, might lead to the complete failure of the structure (Zietsman, 2008: 111).

According to Rhodes and Smallwood (2012: 13), defects can be detected by the use of the following methods ranging from observation, inspection, checking work and testing samples. The authors thus suggest some warning signs of possible defects in houses, such as:

- Deep cracks in the foundation or basement walls: This may be a sign that the foundation was laid on a poorly compacted base or poorly graded soil;
- Sagging floors or leaning walls: A shifting foundation or structural problems (with support beams) could be the problem;
- Windows and doors that never sit well in frames or close properly: This problem could be due to beams and joints not being correctly sized or assembled;
- Cracks in interior walls: Wide cracks could signal a foundation problem. Generally, fine cracks are cosmetic due to normal ageing.

Literature suggest that structural defects resulting in building cracks are common types of building defects. It is also noted that different kinds of cracks were a common structural quality defect in houses within the Ngqushwa Local Municipality (South Africa) (CIDB, 2011a). Ahzahar, Karim, Hassan and Eman (2011: 252) argues that structural defects resulting in cracks are a common type of building defect. This assertion was also confirmed by a case study undertaken by Rhodes University's Public Service Accountability Monitor (PSAM, 2012: 116). The results of a study in England and Wales also confirmed that the most common type of defects in houses were the cracking of walls (Baiche, Walliman & Ogden, 2016: 289). Another survey conducted by Fauzi, Yusof and Abidin (2011: 495) in Malaysia also identified cracking walls and floors as the most common type of defect in houses, amongst other defects such as water damage with warning signs including mould, rot, peeling paint, staining,

corrosion, swelling or discoloration of interior walls of the buildings. Some of the possible causes are proffered as improperly installed roofing, lack of waterproofing barriers or done incorrectly, no drainage space behind brick wall, poorly installed windows and doors (Rhodes & Smallwood, 2012: 12; Consumers Union, 2014: 28; Ahzahar et al. 2011: 252; Zietsman, 2011: 110; FindLaw, 2011: 113; CIDB, 2011b).

2.13 Types of defects in the construction industry

According to Manning (2015: 346), all types of defects can typically be grouped into the following four major categories: design deficiencies, material deficiencies, construction deficiencies and subsurface deficiencies. Findlaw (2011: 113) in support of Manning describes the major categories of defects as follows:

- Design deficiencies: buildings and systems (designed by professionals such as engineers, architects, etc.) are not always guaranteed as perfect work; they can result in defects. Typically, design deficiencies relate to construction outside the specified code. A typical design defect can be a roof that is leaking, poor drainage and inadequate structural support.
- Material deficiencies: Inferior building materials usage can cause serious problems such as window leaks or malfunctioning windows, even when properly installed.
- Construction deficiencies: Poor workmanship can lead to defects such as plumbing leaks.
- Subsurface deficiencies: Some houses are built on hills and other areas where it may be difficult to have strong and stable foundation. Defective foundations may result in cracking foundations and floor slabs, as well as other damages to the buildings. Improper settling to the ground may be caused by subsurface conditions that are not properly compacted or prepared and may cause problems such as the shifting of the structure (e.g. a house).

2.14 Causes of defects in the Construction Industry

According to Stephenson, Morrey, Vacher and Ahmed. (2012: 398) causes of defects fall into the following listed basic categories:

- Design errors;
- Workmanship errors;

- Procedural errors;
- Abuse or misuse of the building.
- Natural phenomena such as storms, resulting in damage from floods, exceptionally high winds, lightning, earthquakes;
- Faulty materials; and
- Failure to maintain properly

The authors also mention that although defects might be caused by natural phenomena such as storms, resulting in damage from floods, exceptionally high winds, lightning, earthquakes, failure to maintain properly and abuse or misuse of the building, they are all not the direct responsibility of the designers, or building constructors. It is important to recognise and be aware of these types of problems, as they also provide causes of possible defects (Stephenson et al., 2012: 398). Rhodes and Smallwood (2012:12) put forward the fact that the causes of defects can be related to design, construction, procurement and prevailing environmental conditions. The authors also attribute the origin of defects to inadequate management and technical skills. Manning (2015: 346) suggests that building defects or failures may be experienced as result of a variety of factors, including poor design, failure of the material, poor construction, and lack of maintenance.

2.15 Conclusion

This chapter dealt with literature review on quality management implementation in business and industry in general. Literature covered this phenomenon under study from a global or international studies perspective. The researcher reviewed the literature on quality management; the evolution of quality management that leads to the concept of Total Quality Management (TQM). The chapter also covered literature on quality management in the South African construction industry. The literature outlined the challenges of implementing quality in the construction industry and the benefits that accrue as a result of the implementation of quality in the construction industry. The chapter also covered literature on the importance of standards certification, such as ISO 9000 and ISO 9001 certification. The next chapter describes the research methodology employed in the study.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

Chapter 3 deals with the research methodology of the study. According to Shaughnessy and Zechmeister (2011: 87), scientists attempt to gain new knowledge by making careful observations and using systematic, controlled and methodical approaches. The methodological approaches used in this study are those that are generally used in social survey research and are of a descriptive nature. This is because the study sought to find out what challenges or factors affect quality management in the construction of low-cost houses in the Amathole Region, as well as the benefits of quality management implementation. The chapter discusses and motivates the methodological approaches and issues connected to the study.

Research methodology can be defined as a systematic way to solve a problem, or as the science of studying how a specific study is supposed to be carried out. As an example, a researcher may be required to know the most suitable method for the chosen study, the order of accuracy of the results obtained from a method and the efficacy or accuracy of the method. These three aspects make up what we may constitute a research methodology. The following authors also cover more on research methodology (Bryman and Bell, 2007: 123; 2011: 345). In this chapter, the procedures that were used to collect the data are discussed. These procedures include the selection of the sampling method and statistical justification, construction of the research instrument, pretesting of the research instrument, measuring the reliability of the research instrument, administration of the research instrument, study limitations and ethical issues.

3.2 Objectives of the Study

This study sought to determine the factors or challenges that affect Quality Management in the construction of low-cost houses at Amathole Region in the Eastern Cape Province. The study also sought to solicit for the construction industry professionals that are directly involved in this project's perceptions of the benefits of ISO certification as a Quality Management system, and more specifically:

- To identify factors that affect Quality Management in the construction of low-cost houses at Amathole Region in the Eastern Cape Province.
- To determine which Quality Management strategies are used in the construction of low-cost houses at Amathole Region in the Eastern Cape Province.

- To determine if employees are well resourced at the Amathole low-cost housing projects in the Eastern Cape Province.
- To recommend strategies that could be used to enhance Quality Management in the construction of low-cost houses at Amathole Region in the Eastern Cape Province.

3.3 Research Questions

What are the factors affecting Quality Management in the construction of low-cost houses at Amathole Region in the Eastern Cape Province, and the perceived benefits of ISO certification as a Quality Management system?

3.3.1 Research Sub-Questions

- What Quality Management factors affect the construction of low-cost houses at Amathole Region in the Eastern Cape Province?
- What Quality Management strategies are used in the construction of low-cost houses at Amathole Region in the Eastern Cape Province?
- How well resourced are employees at the Amathole low-cost houses projects in the Eastern Cape Province?
- What strategies could be recommended to enhance Quality Management in the construction of low-cost houses at Amathole Region in the Eastern Cape Province?

3.4 Location of the study

The location of the study was the Amathole Region, in the Eastern Cape Province of South Africa. There are currently 27 running construction projects, of which 21 are multi-year projects, which include, amongst others, Fort Beaufort Hillside; Bedford Nyara; Alice Nzalamazi/Hillcrest; Fort Beaufort Newtown and Elliotdale Rural-BNG. At the time of conducting the study, there were five construction companies on site.

3.5 Research design

The preferred choice of the research design was the case study analysis. It was based on an in-depth investigation of a single individual, group, or event (Zikmund, 2011: 213). The case study is a bounded system, that is, it has boundaries and therefore the researcher is better positioned to study the subject matter and being guided by the scope of the case under study.

According to Zikmund (2011: 213), the case study gives a holistic picture of the subject. It helps preserve the wholeness, unity and integrity of the case (Zikmund, 2011: 213). Case study methods may involve even an in-depth, longitudinal (over a long period) examination of a single instance or event or a case. Case study analysis is useful in understanding certain problems and in applying solutions to current problems, based on the past problem-solving experiences. Their major disadvantage is that since the case study is based on only one case, generalisation is not easy (Zikmund, 2011: 213). However, quality management applies to all industries and the principles that come up from the study can be applied to any industry. The case study however, remained the preferred research design for this study. Bryman and Bell (2011: 342) describe research design as a plan of research activities to be taken, which determines the source and type of information to be selected based on the research questions, which try to determine relationships among variables.

According to Neuman (2010: 47), case studies are appropriate when the researcher studies few objects in depth, when the study is based on how and why questions, as well as when the research is based on contemporary events. This research is therefore limited to a single case study in order to gain as much information as possible in the short time available, which strengthened the choice of strategy chosen. The single case study is also appropriate because the matter being investigated is unique, since the study was aimed at determining the challenges and benefits of quality management in the construction of low-cost houses in the Amathole region. There are also a number of limitations cited on a case study as a research design. Case studies have been criticised by some as lacking scientific rigour and reliability and that they do not address the issues of generalizability (Neuman, 2010: 47). Despite this, the case study is found to be relevant to provide such detailed information on the area of studying the challenges and benefits of quality management in the construction of low-cost houses in the Amatole Region.

3.5.1 Research Methods

The study employed the quantitative research methodology (Bryman & Bell, 2011: 345). Lubbe (2013: 24) suggests that it is a misunderstanding to claim that the case study method of research is by nature qualitative. In fact, case studies can be highly quantitative. Wherever possible, purely descriptive data should be converted into quantitative data and then statistical techniques applied. In addition, it is possible to conduct a survey within a case study situation

and to use quantitative techniques in the analysis of the collected data. Furthermore, it is worth noting that qualitative data is today quantitative tomorrow. Quantitative and qualitative techniques are not conflicting, but are rather complementary through triangulation. There will, however, always be qualitative data that cannot be quantified. Although some situations may appear to be similar, they are in fact unique and statistical comparisons and correlations may actually lead to false assumptions and possibly to wrong conclusions. With regard to quantitative and qualitative research, it is important to remember that even in the physical sciences, there are several disciplines (such as geology, botany and zoology) that are primarily non-quantitative (Lubbe, 2013: 32). According to Bryman and Bell (2011: 345), when applied to the present context, triangulation implies that the results of an investigation employing a method associated with one research strategy are cross-checked against the results of using a method associated with the other research strategy.

3.5.2 Research Approaches

According to Leedy (2009: 89), the two methodological research approaches within social sciences are quantitative and qualitative approaches. The selection between the two should be based on the purpose and research questions of the study (Leedy, 2009: 89).

3.5.3 Quantitative approach

Quantitative research involves measurement and expression in terms of quantity or amount. It helps with precise measurement, knowing trends or changes overtime. Trends are compared. It is structured and formal. The researcher is objective and possesses a high degree of control. Little information from each object can be collected, but on the other hand, many objects are studied, which makes it possible to draw conclusions (Locke, 2013: 46).

3.5.4 Qualitative approach

Qualitative research, on the other hand, is concerned with phenomena relating to or involving quality or kind. It is important for discovering the underlying motives and desires of human behaviour, for example, using in-depth interviews for the purpose of gathering information. Its main purpose is to receive a better understanding of the problem studied. The approach makes it hard to generalise and has a low degree of formalisation, in addition to being characterised by closeness between the source and the researcher (Locke, 2013: 76). Based on the discussion above and the purpose and research questions, the approach chosen for this study was the

quantitative approach. The data collected were trended. Trends are easy to understand for comparison's sake.

3.6 Population and sample of the study

3.6.1 Population

Table 3.1 below shows the distribution of the population of the study.

Table 3.1: Study population distribution

Constructor	Construction Project Managers	Building Inspectors	Site Agents	Site Supervisor	Architects	Engineers	Total
CHS Developments	3	2	3	4	3	5	20
Ikhaya Developments	2	2	3	3	4	2	16
Maveli Construction	4	3	4	4	3	2	20
Gaza Construction	5	4	3	2	3	4	21
Don Civils	2	3	4	4	3	2	18
Total	16	14	17	17	16	15	95

The population consisted of 95 professionals in the construction industry that are directly involved in the Amatole Region low-cost housing project. These comprised 16 construction

project managers; 14 building inspectors; 17 site agents; 17 site supervisors; 16 architects and 15 engineers.

Table 2.2: Respondent`s Profession

	Profession	Frequency	% of Frequency	% Cumulative
1	Architects	16	16.84	16.84
2	Building Inspectors	14	14.74	31.58
3	Construction Project Managers	16	16.84	48.42
4	Engineers	15	15.78	64.20
5	Site Agents	17	17.90	82.10
6	Site Supervisors	17	17.90	100
	Total	95	100	

Table 3.2 shows the population and the various professional bodies of the respondents. It can be seen that the architects represented 16.84% of the respondents, the building inspectors represented 14.74%, the construction project managers represented 16.84% and the engineers, site agents, and site supervisors represented 15.78%, 17.90% and 17.90% respectively. This shows and indicates that the construction professionals involved in construction of the low-cost houses in the Amathole region were duly represented.

3.6.2 Sampling

The researcher employed expert judgemental or purposive sampling to select the respondents for the study. This is a form of purposive sampling used when research requires one to capture knowledge rooted in a particular form of expertise, in order to be better informed. The researcher found the sampling technique most appropriate for the study because of its nature, primarily influenced by the limited number of the people who have expertise in the area being researched. In this, instance the professionals in the construction industry directly involved in

the Amatole low-cost housing project with a knowledge of quality management implementation in the construction industry. A total of 75 respondents were selected, comprising 12 construction project managers; 10 building inspectors; 15 site agents; 15 site supervisors; 13 architects and 10 engineers.

3.7 Research instruments

3.7.1 Questionnaire

The study used a questionnaire as the data collection research instrument. The instrument was made up of 45 item questions and divided into sections A to F. Section A covered the demographic characteristics of the respondents, section B- the factors that constitute effective quality management, section C- the implementation of quality management, section D- the impediments to successful implementation of quality management, section E-perceived improvements or benefits of adopting ISO certification as a quality management system.

3.8 Validation of the research instrument

A mini pilot study was conducted at Alfred Nzo region in the Eastern Cape Province. The questionnaire was tested on 11 construction industry professionals. These were not part of the main study. The necessary adjustments and changes to the questionnaire were made, based on the feedback received from the pilot study participants.

3.9 Reliability test

The pilot study data were subjected to a reliability test of the instrument. The Cronbach's alpha coefficient was found to be 0.779, which indicated that the research instrument was reliable for use in the conduct of the main study.

3.10 Questionnaire administration

The researcher administered 75 questionnaires that were hand delivered on site in the Amathole area, while others were some delivered to the offices of the selected construction industry professionals. The respondents were given three weeks to complete the questionnaire, with those who needed more time allowed the time they needed to complete the questionnaires.

Personal administration of the questionnaire allowed the researcher to attend to queries and was able to make clarifications on some of the questions at the point of collection of the questionnaires. Out of the 75 questionnaires sent out, 43 were returned, giving a response rate of 58%.

3.11 Limitations of the study

With resources permitting, the study could have covered the rest of the regions in the Eastern Province of South Africa. Unfortunately, this was not possible because of the resource constraints and as a result, only 75 construction industry professionals were used as respondents in the study.

3.12 Ethical considerations

It is university policy that in carrying out research, students or researchers obtain permission in the form of an ethical clearance letter, to conduct a study. As a result, before this study could be done, permission was sought from the relevant officials. This was meant to also protect the autonomy of respondents and to prevent social stigmatisation and secondary victimisation of respondents. In order to meet and abide with the University's ethical policies, data collection was not supposed to include the following:

- Any form of deception
- Access to confidential information without prior consent of the participants
- Participants being exposed to stressful questions that are upsetting and unpleasant procedures that may be harmful to the participants.
- Participants being required to commit an act which might diminish their self-respect or cause them to experience shame, embarrassment, or regret
- The use of stimuli, tasks or procedures which may be experienced as stressful, noxious, or unpleasant

All the potential participants were given an informed consent form for their acknowledgement. The informed consent form is attached as Appendix 1. The consent form spelt out that participation in the study would be voluntary and not compulsory. In other words, the potential participant had a choice not to participate in the study or might decide to withdraw from participation at any point, with no penalty. The participants were made to understand that

participation would be free, that is, there would be no monetary reward for participating in the study. The consent forms clearly spelt out that confidentiality and anonymity would be upheld according to the University's policy.

3.13 Data Analysis

Quantitative data obtained from the questionnaires was analysed using SPSS package, version 24.0. The descriptive statistical results were presented through the use of graphs, cross tabulations and other figures relevant for the presentation of quantitative data that was collected.

3.14 Conclusion

The chapter described the research design and methodology employed in the study. The study used the questionnaire, personally administered to 75 construction industry professionals, and only 43 were returned. The questionnaire was pretested to make sure that it was not ambiguous. The analysis of the collected data was done using the SPSS software package. The researcher believes that the applicable methods used for this study were reliable and valid for the collection of relevant data. The next chapter is the presentation of the results of the study.

CHAPTER FOUR: PRESENTATION OF RESULTS

4.1 Introduction

Chapter 4 presents the results of the study obtained from the questionnaire. The researcher adopted the questionnaire as the primary tool used to collect data from the targeted 75 construction industry professionals directly involved in the construction of low-cost houses in the Amathole region. The data collected from the respondents were analysed using SPSS package, version 24. The results are presented in descriptive statistics form with tables and also inferential statistics were done with respect to research question 4, in addition to the descriptive statistics.

4.2 The Sample

A total of 75 questionnaires were administered to the selected construction industry professionals at the Amathole Region low-cost houses project. The questionnaires were hand delivered by the researcher and those respondents who needed extra time to complete the questionnaires were allowed to do so. A total of 43 questionnaires were collected back from the respondents by the researcher. This represented a 58 % response rate. The researcher felt the response rate was adequate for the finalisation of the study.

4.3 The Research Instrument

The questionnaire consisted of 37 questions distributed as follows; Section A: 5 Demographic characteristics of the respondents' questions. Section B: 7 questions of Quality Management Challenges; 8 questions on Quality Management Strategies; 7 questions on resourcing of Quality Management personnel, and 10 questions on the perceptions on the benefits of ISO certification as a Quality Management System.

4.4 Reliability of the Instrument

It is an objective practice in research to subject the research instrument to reliability test. This should happen during the construction of a virgin research instrument. One way or method of verifying the reliability of the instrument is to measure the same subjects several times. In this case, the instrument becomes reliable if the results obtained after measuring the same subjects several times are the same. The other way of measuring the reliability of the questionnaire is

to perform the Cronbach`s alpha test, of which a reliability coefficient of 0.70 or more is considered acceptable. Table 4.1 below shows the overall Cronbach`s alpha coefficient of the instrument used in the study.

Table 3.1: Cronbach`s Alpha Coefficient

Reliability Statistics	
Cronbach's Alpha	N of Items
.779	32

The overall reliability coefficient obtained for the study`s research instrument exceeded the acceptable lower limit. The overall alpha coefficient of 0.779 indicates a fairly high degree of reliability that can be placed on the instrument of the study.

4.5 Demographic characteristics of the respondents

The demographics of the respondents covered the preferred language, the race, gender, age group and level of education. The information provided offered some insights into the composition and distribution of the respondents, with respect to the language they preferred, their races, gender, age and their levels of education.

4.5.1 Preferred language

Figure 4.1 (pie chart) and Table 4.2 (bar graph) show the composition of the respondents in terms of language preference, with 53.49% of the respondents indicating that they preferred other languages other than English and isiZulu. However, their preferences of the other languages did not affect the manner in which they responded to the questionnaire that was constructed in the English language. The preference for the other languages was followed by the preference for the English language, with 37.21% of the respondents preferring English language to isiZulu, about 9.30% of the respondents preferring the isiZulu language. Language did not really matter at all in this study, because the respondents were professionals who acquired their professional qualifications in construction in the English language.

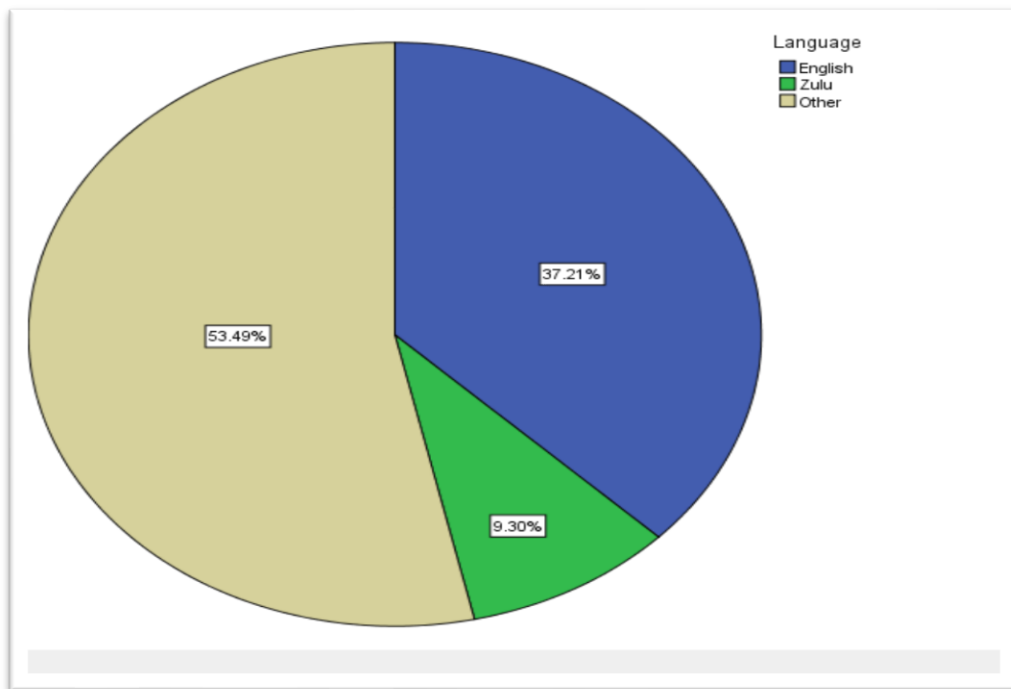


Figure 4.1: Respondents' preferred language

Table 4.2 shows the demographic characteristic of preferred language, as represented in the form a bar chart. The bar graph compliments the statistical results as represented in the pie chart above.

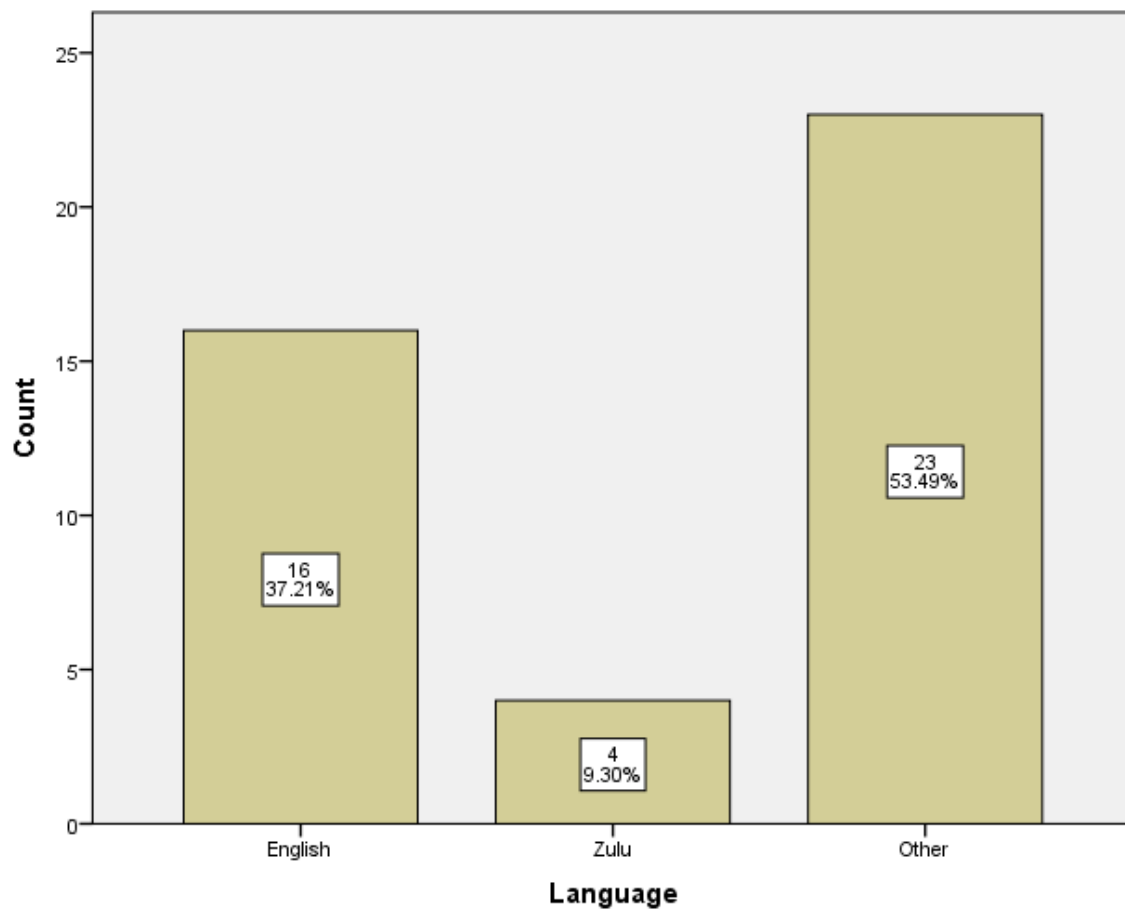


Figure 4.2: Respondents' preferred language

4.5.2 Race of the respondents

Most of the respondents were Black professionals as shown in Figure 4.2 (pie chart) and Table 4.3 (bar graph), and they constituted 88.37%, followed by the Coloureds who comprised 6.98.0%. The White professionals were least represented, at only 4.65%. What was most encouraging was seeing the Black professionals dominating this industry. South Africa is moving in the right direction towards addressing the ills of the Apartheid. Black South Africans were the most previously disadvantaged citizens of this country. More and more black professionals in South Africa are venturing into the construction industry.

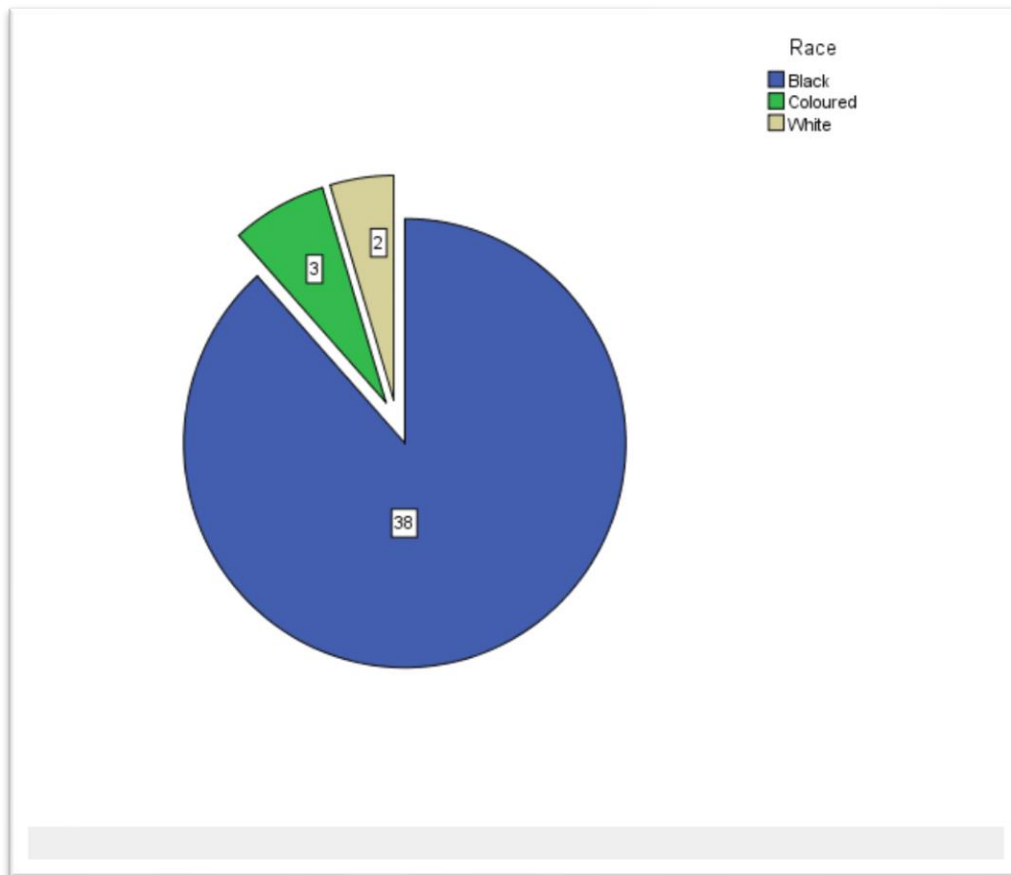


Figure 2.3: Respondents' race

Figure 4.3 compliments the pie chart representation of the respondents' composition of their race. As it can be seen in the bar graph, Blacks were 38 in their number, which translates into 88.37% representation, followed by 3 Coloureds who constituted 6.98%, as been highlighted above.

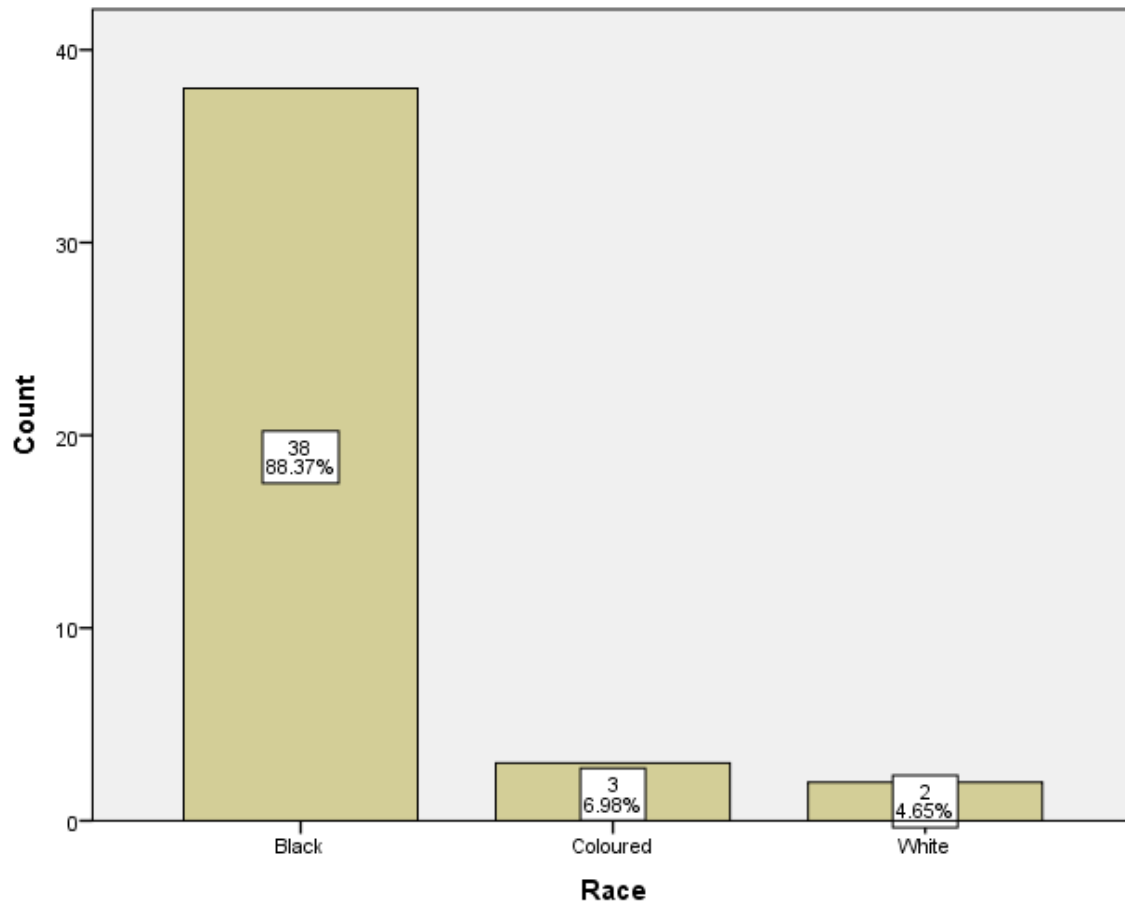


Figure 4.4: Respondents' race

4.5.3 Respondents' gender

Figure 4.3 (pie chart) and Table 4.4 (bar graph) indicate that there were more male respondents than females. Twenty-eight (28) males represented 61.5% and the 15 females represented 34.9% of the total respondents. The construction industry is still dominated by the male gender in South Africa. However, this phenomenon is not only synonymous with South Africa. It is a common picture, especially in developing countries. There is a need to encourage women to come on board in their numbers, especially in the professional side of the construction industry. South Africa's labour laws and professional development does not discriminate against gender. Every citizen has equal opportunities and rights to acquire and become a member of any profession of their choice.

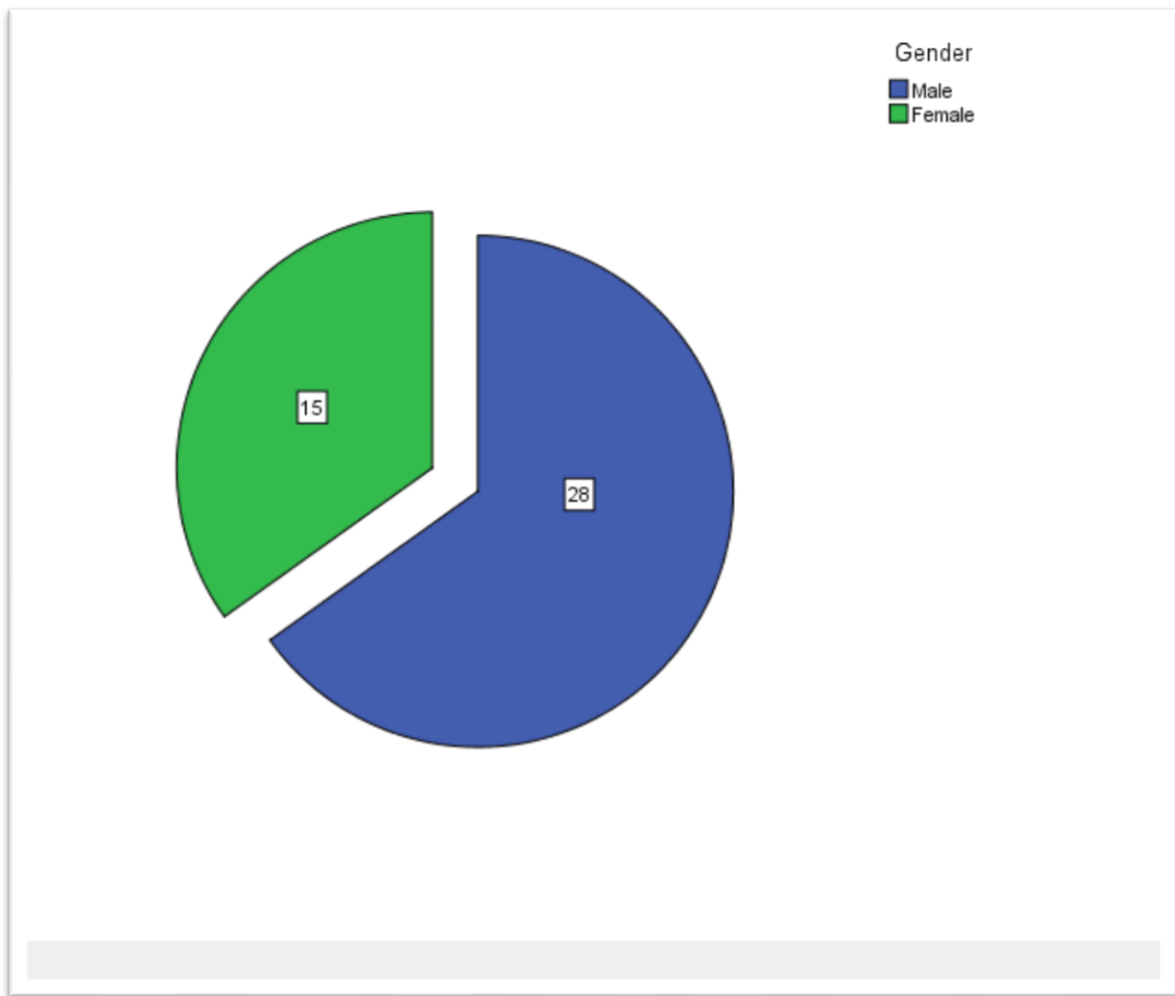


Figure 4.3: Respondents' gender distribution

The bar graph below compliments the pie chart representation of the respondents' gender.

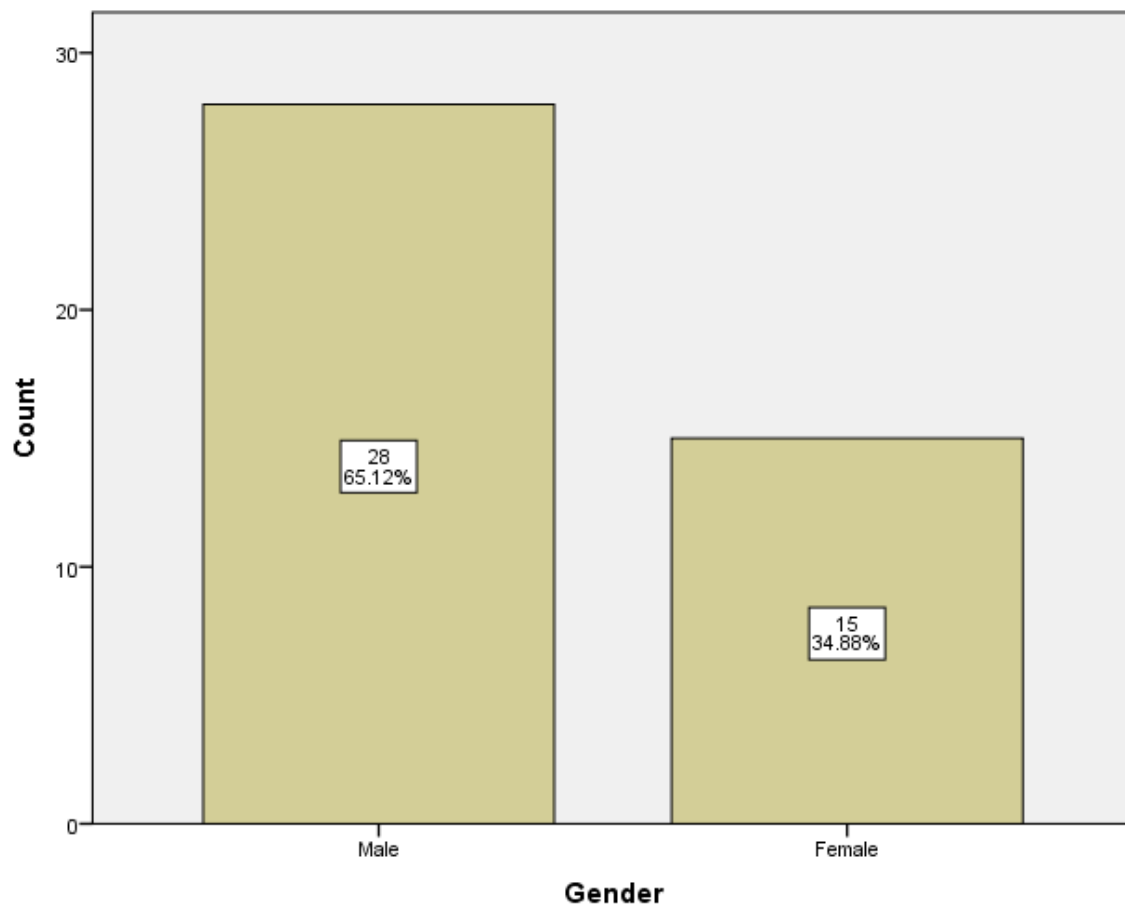


Figure 4.6: Gender distribution

4.5.4 The age composition of the respondents

There were 17 respondents who were between 36 and 40 years of age, followed by 12 in the above 40 years of age category, 11 in the ages between 25 and 35 years. There were only 3 participants in the 24 and less years of age category, as shown in Table 4.5 (bar graph) and Figure 4.4 (pie chart). Such scenario was expected. It takes several years to acquire professional qualifications and the kind of experience that the profession goes with. It is not surprising to note that most of the respondents were in the age categories 36 to 40 and above. These were mature and experienced construction industry professionals. This made them competent enough to answer the questionnaire. As a result, the researcher was satisfied with the responses and information that were gathered from these respondents. These results are not surprising. It takes a number of years to become a construction industry professional. The bar graph below shows the composition of the respondents in terms of age group.

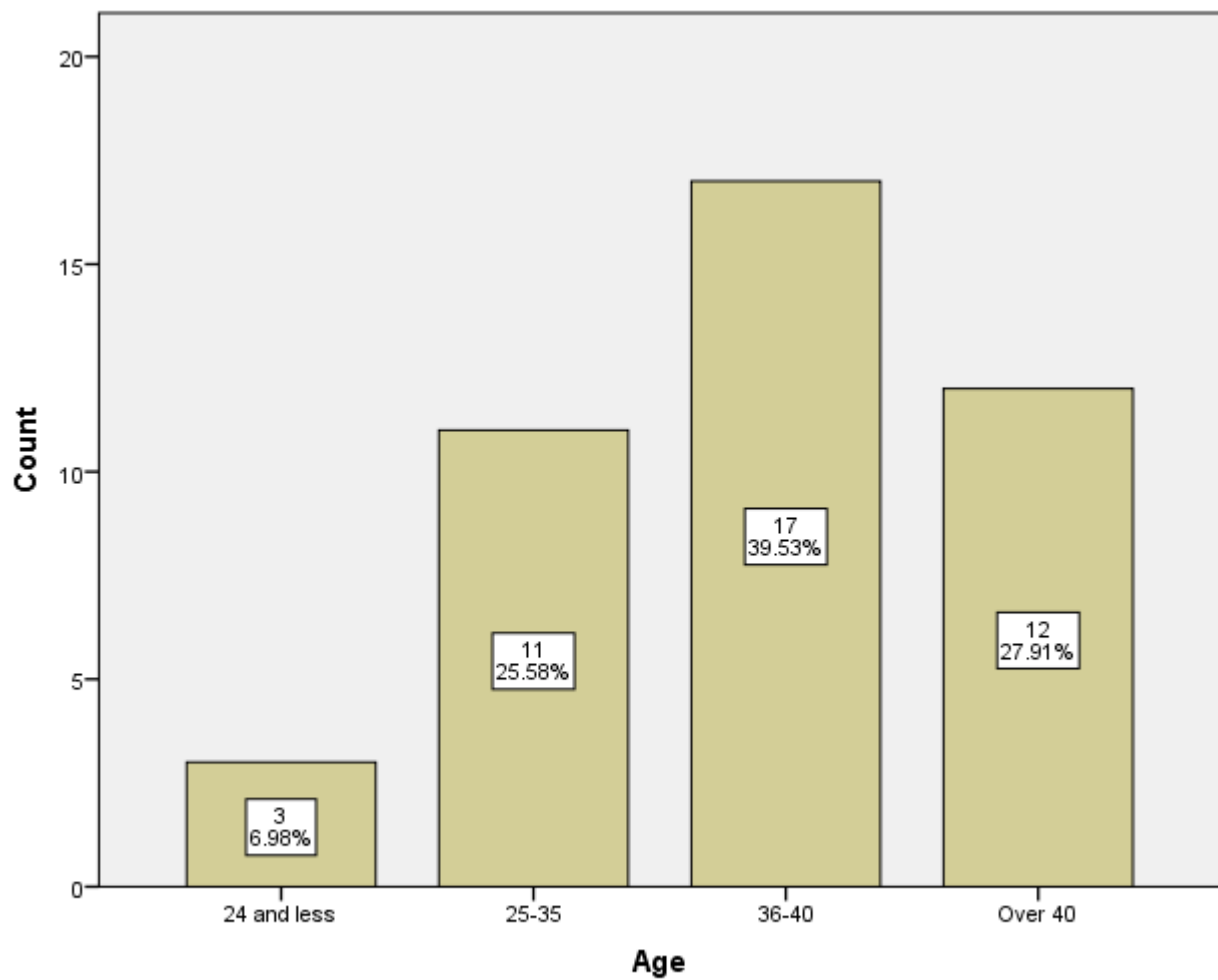


Figure 4.7: Respondents' age groups

The pie chart below compliments the representation of the respondents' composition of age groups in the form of a bar graph in Table 4.5 above. The seventeen respondents falling within the age groups of 36 to 40 represented 39.53% of the respondents, followed by 27.91% of the respondents in the age group above 40 years, 25.58% of the respondents in the age group 25 to 35 years. Just 6.98% represented respondents in the age group 24 years and below.

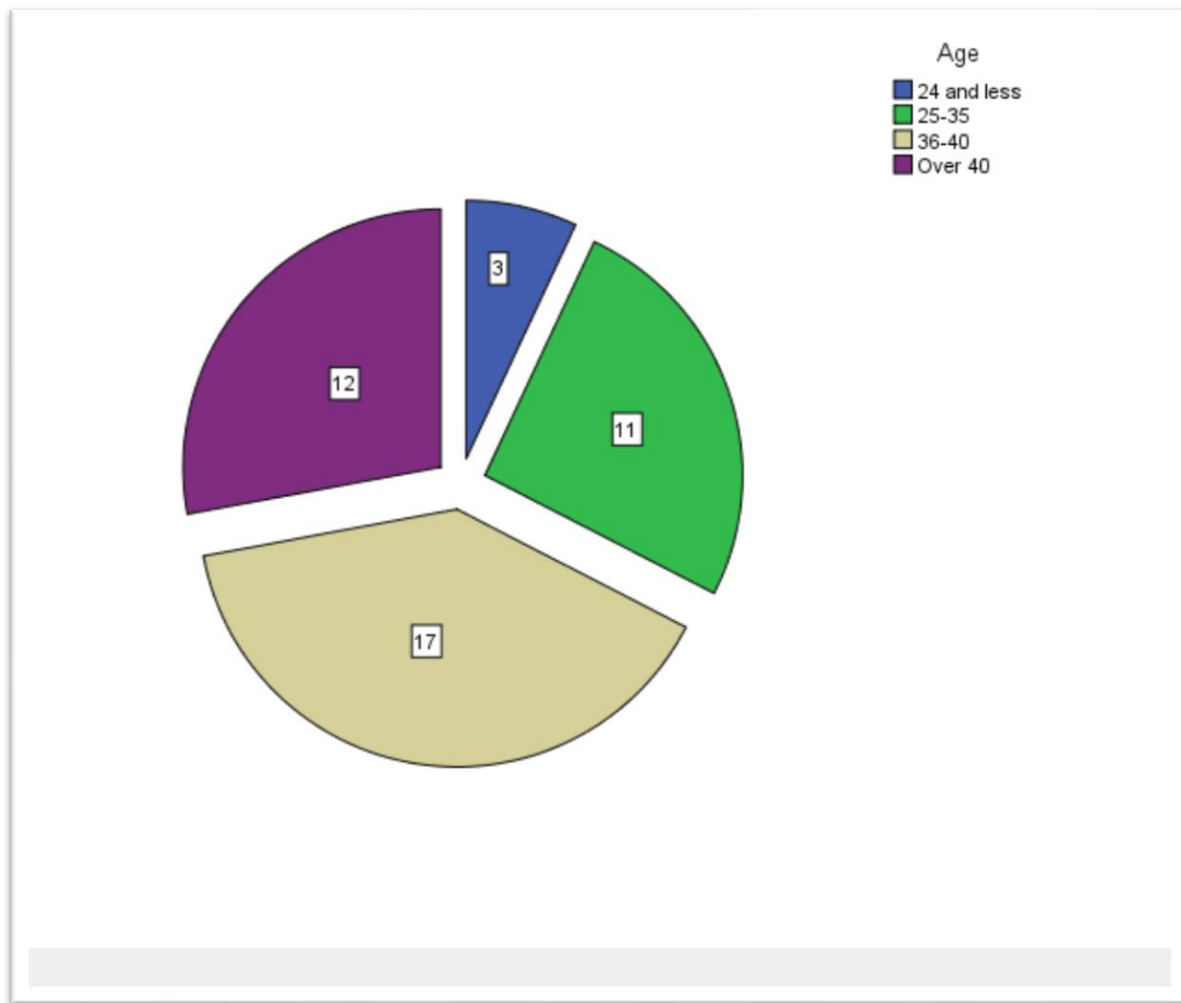


Figure 4.8: Age distribution of the respondents

4.5.5 Respondents` level of education

Figure 4.5 (pie chart) and table 4.6 (bar graph) indicate that the respondents were very competent to answer the questionnaire. Nineteen (19) had a diploma qualification and 17 had a first degree. These are the qualifications for the construction industry professions. Four had a certificate and 3 had a higher degree. In other words, all the respondents were literate, in possession of some level of qualification in the construction industry. The researcher strongly believed that the views of the respondents on the quality management issues in the construction of the low houses in the Amathole region reflected and represented what was transpiring regarding quality management of the construction projects. In other words, the researcher believed the respondents' views on the quality management challenges were informed by their

levels of qualification in the construction industry profession, and the responses were given a well thought process. The education level variable is important as it reveals important information about the phenomenon under study. All the respondents had some level of education, with the majority of them having a diploma or a degree, that is, 44.19% and 39.53% respectively.

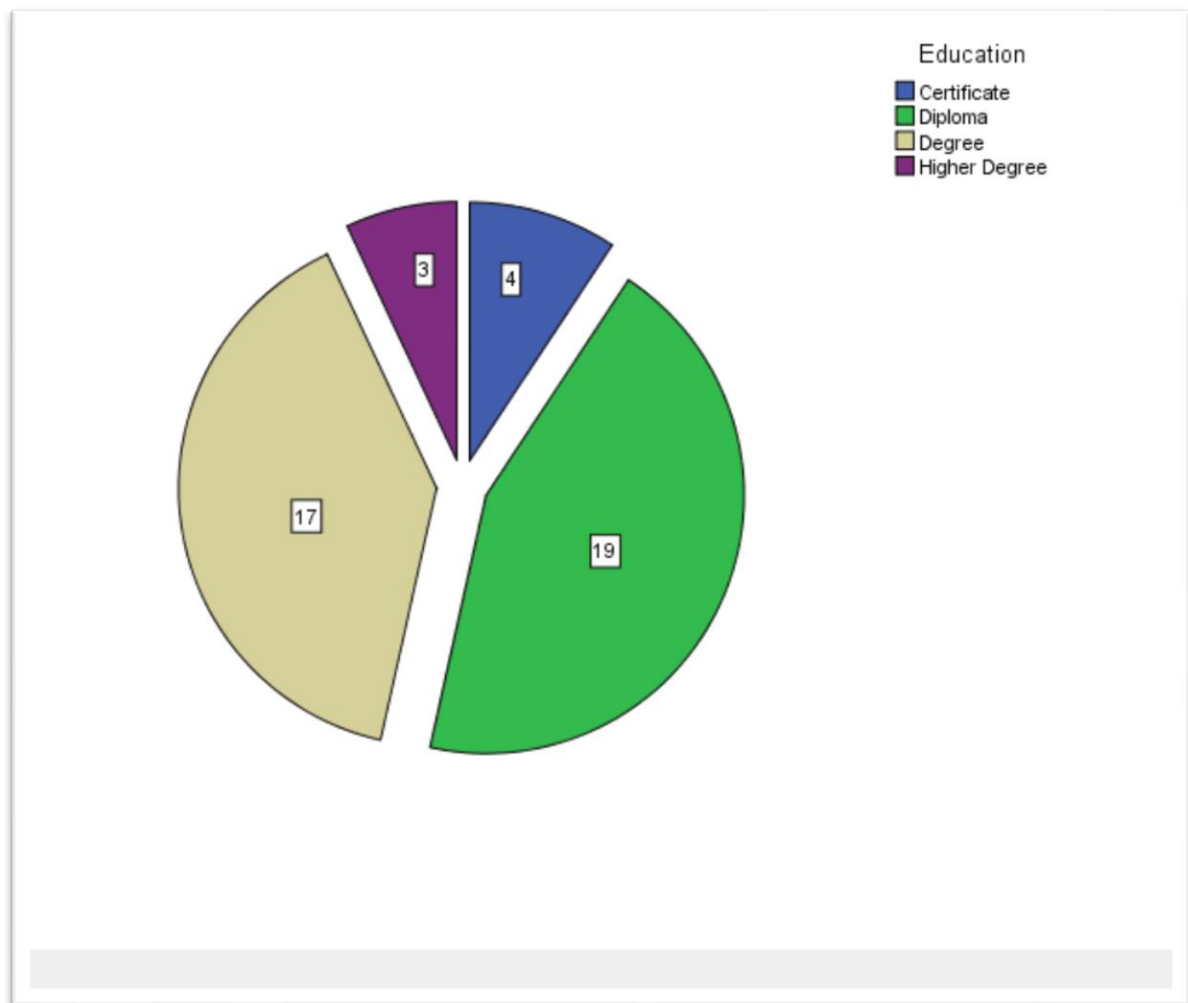


Figure 4.9: Education levels of the respondents

Table 4.6 below compliments the statistical demographics of the respondents, with respect to their education levels as represented in Figure 4.5 above. The nineteen diploma holders represented 44.19% of the respondents, followed by 39.53% of the respondents with first degree. Those respondents with higher degrees were represented by 6.98% of the respondents, slightly less than the certificate holders at 9.30% of the total respondents.

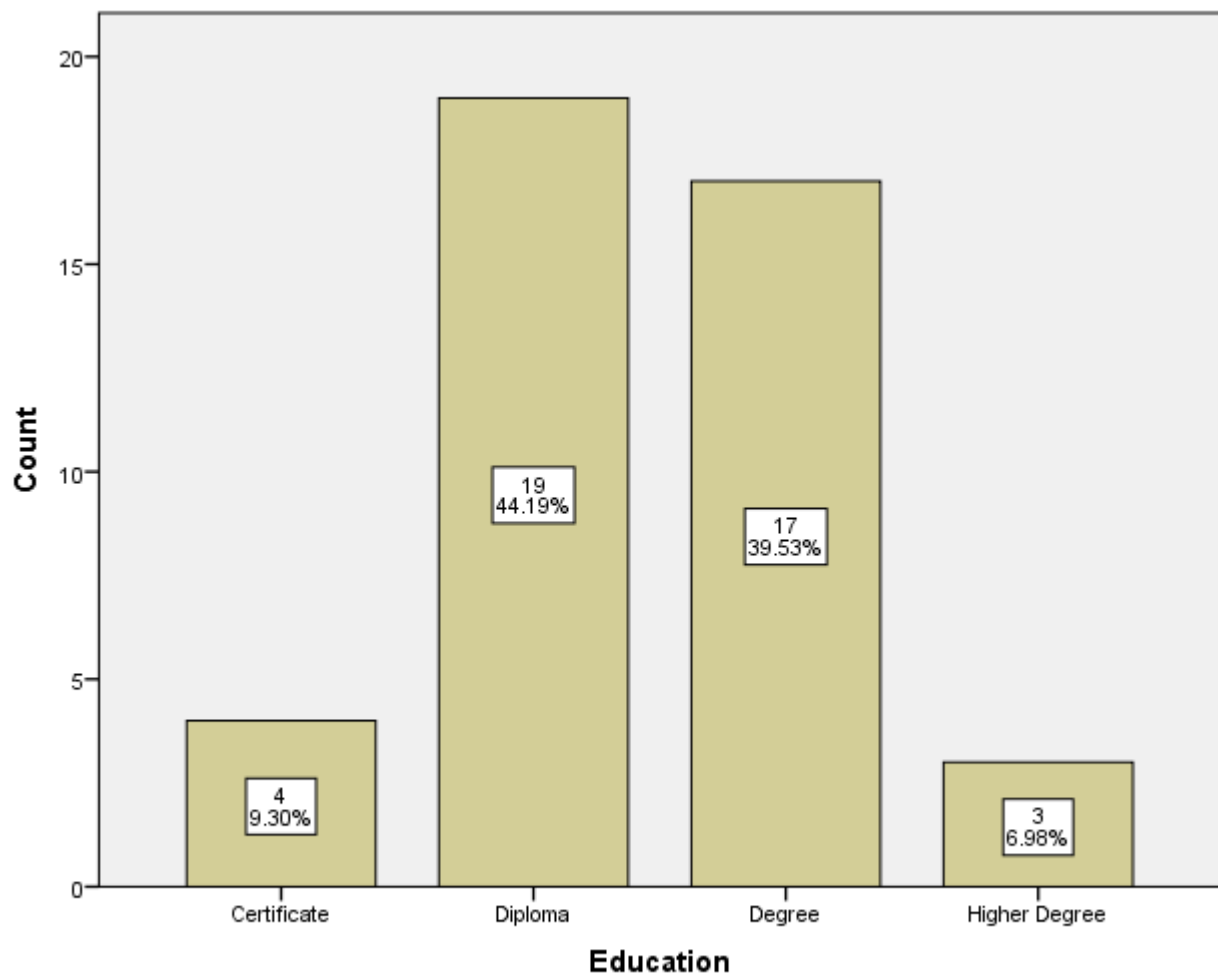


Figure 4.10: Respondents' education levels

4.6 Responses to the item variables

4.6.1 Quality management challenges

Research Question 1: What Quality Management factors affect the construction of low-cost houses in the Amathole Region?

The descriptive statistical responses towards this question are presented in table 4.2 below.

Table 4.2: Descriptive statistics on Quality Management challenges

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Use of unskilled labour	43	1	5	3.21	1.036
Rework costing millions	43	2	5	4.19	1.006
Deficient designs	43	1	5	2.26	1.329
Lack of communication	43	1	5	3.49	.910
Lack of technical competence	43	1	5	2.91	1.130
Process implementation	43	1	5	3.21	.888
Projects failure	43	1	5	2.40	1.218
Quality Management Challenges Ave	43	14.00	31.00	21.6512	4.68475
Valid N (listwise)	43				

A quick glance shows that quality management has been significantly rated as a challenge in the construction of low-cost houses in the Amathole region. The overall quality management challenges average has a mean of 21.6512 and a standard deviation of 4.68475. Full discussion is done in Chapter 5. Contributing the most to the overall quality management challenges is the issue of the cost of re-doing the work as result of defects and this has cost the government millions of Rands. This is indicated by the mean of 4.19 and the standard deviation of 1.006. This is followed by the lack of communication, with a mean of 3.49 and corresponding standard deviation of 0.910. Next is the use of unskilled labour and process implementation with the means and corresponding standard deviations of 3.21 (1.036) and 3.21 (0.888) respectively. These results are further corroborated in the frequency descriptions in the tables 4.3; 4.4; 4.5; and 4.6 below.

Table 4.3: Frequency ratings of rework costing millions

Rework costing millions					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	5	11.6	11.6	11.6
	3	3	7.0	7.0	18.6
	4	14	32.6	32.6	51.2
	5	21	48.8	48.8	100.0
	Total	43	100.0	100.0	

From table 4.3 above, 32.6% of the respondents agreed, while 48.8% strongly agreed that quality management has been a challenge in the construction of the low-cost houses, with rework costing the government millions of Rands. This translate into a total of 81.4% of the respondents agreeing that there had been construction defects that cost millions of Rands to rectify.

Table 4.4: Frequency ratings of lack of communication

Lack of communication					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	2.3	2.3	2.3
	2	4	9.3	9.3	11.6
	3	16	37.2	37.2	48.8
	4	17	39.5	39.5	88.4
	5	5	11.6	11.6	100.0

	Total	43	100.0	100.0	
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Lack of proper communication was rated the second challenge to quality management, with 39.5% of the respondents agreeing and 11.6% strongly agreeing, notwithstanding the 37.2% that was neutral. A total of 51.1% of the respondents agreed that lack of communication had been a challenge affecting quality management in the Amathole Region low-cost houses project.

Table 4.5: Frequency ratings of use of unskilled labour

Use of unskilled labour					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	3	7.0	7.0	7.0
	2	6	14.0	14.0	20.9
	3	17	39.5	39.5	60.5
	4	13	30.2	30.2	90.7
	5	4	9.3	9.3	100.0
	Total	43	100.0	100.0	

Table 4.5 above indicates that 30.2% and 9.3% of the respondents agreed and strongly agreed, respectively, giving a total of 39.5%, that the use of unskilled labour by the construction companies affects the quality of the construction of the low-cost houses in Amathole. However, 60.5% of the respondents was either neutral or disagreed.

Table 4.6: Frequency ratings of process implementation

Process implementation					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	2.3	2.3	2.3
	2	8	18.6	18.6	20.9
	3	17	39.5	39.5	60.5
	4	15	34.9	34.9	95.3
	5	2	4.7	4.7	100.0
	Total	43	100.0	100.0	

Process implementation was the least rated quality management challenge, with 34.9% of the respondents agreeing and 4.7% strongly agreeing, while a total of 60.4% of the respondents was either neutral or disagreed. Apparently, this rating was equal to the proportion of the respondents that were neutral.

4.6.2 Quality Management Strategies

Research Question 2: What quality management strategies are used in the construction of low-cost houses in the Amathole Region?

The descriptive statistical responses towards this question are presented in Table 4.7 below.

Table 4.7: Descriptive statistics on Quality Management strategies

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Proper planning	43	1	5	3.12	.905
Clear definition of projects	43	2	5	3.35	.973
Strategic alignment	43	2	5	3.63	.757
Overall scope defined	43	2	5	3.30	.860
Projects timelines	43	2	5	4.14	.743
Project economy	43	2	5	4.19	.699
Employee buy-in	43	1	5	4.09	.921
Continuous training	43	1	5	3.26	1.136
Quality Management Strategies Ave	43	21.00	37.00	29.0698	3.52809
Valid N (listwise)	43				

The overall mean for quality management strategies ratings is 29.06998 with a corresponding standard deviation of 3.52809. The respondents rated all the quality management strategic issues significant and being used in the construction of low quality houses in the Amathole region. Project economy, that is, doing a construction project such as the Amathole low houses at the lowest possible cost, followed by projects timelines, that is, completing the projects within the planned and budgeted time. To probably achieve that the respondents suggested that employee buy-in is critical. These are followed by strategic alignment, clear definition of projects, overall scope defined, continuous training and then proper planning. The results are corroborated in the frequency tables 4.8; 4.9; 4.10; 4.11; 4.12; 4.13; 4.14 and 4.15 below.

Table 4.8: Frequency ratings of project economy

Project economy					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	1	2.3	2.3	2.3
	3	4	9.3	9.3	11.6
	4	24	55.8	55.8	67.4
	5	14	32.6	32.6	100.0
	Total	43	100.0	100.0	

Working towards completing the Amathole low-cost houses project within the budgeted costs was rated the most valued strategic issue, with 55.8% of the respondents agreeing and 32.6% strongly agreeing in affirmation of the strategy being employed for the Amathole low-cost housing project, translating into a total of 88.4% of the respondents agreeing.

Table 4.9: Frequency ratings of project timelines

Projects timelines					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	1	2.3	2.3	2.3
	3	6	14.0	14.0	16.3
	4	22	51.2	51.2	67.4
	5	14	32.6	32.6	100.0
	Total	43	100.0	100.0	

Completing the project within the planned time was rated the second important strategic issue, with 51.2% and 32.6% respondents agreeing and strongly agreeing, respectively translating into a total of 83.8% of the respondents agreeing.

Table 4.10: Frequency ratings of employee buy-in

Employee buy-in					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	2.3	2.3	2.3
	2	1	2.3	2.3	4.7
	3	7	16.3	16.3	20.9
	4	18	41.9	41.9	62.8
	5	16	37.2	37.2	100.0
	Total	43	100.0	100.0	

Employee buy-in in quality management was rated as one of the strategies used, by a total of 79.1% of the respondents, 41.9% of the respondents agreeing and 37.2% strongly agreeing. Employee buy-in was strongly rated.

Table 4.11: Frequency ratings of strategic alignment

Strategic alignment					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	3	7.0	7.0	7.0
	3	14	32.6	32.6	39.5
	4	22	51.2	51.2	90.7
	5	4	9.3	9.3	100.0
	Total	43	100.0	100.0	

Strategy alignment of projects to quality achievement was rated strongly by 51.2% of the respondents who agreed and 9.3% strongly agreeing to the use of the strategy in the Amathole Region project. This translates into a total of 60.5% of the respondents who agreed.

Table 4.12: Frequency ratings of clear definition of projects

Clear definition of projects					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	10	23.3	23.3	23.3
	3	13	30.2	30.2	53.5
	4	15	34.9	34.9	88.4
	5	5	11.6	11.6	100.0
	Total	43	100.0	100.0	

Clear definition of project plans was fairly rated as an important strategic issue by 34.9% and 11.6% of the respondents, who agreed and strongly agreed, respectively, thereby translating into a total of 46.5%. A total of 53.5% was however, in disagreement or neutral.

Table 4.13: Frequency ratings of overall scope defined

Overall scope defined					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	9	20.9	20.9	20.9
	3	14	32.6	32.6	53.5
	4	18	41.9	41.9	95.3
	5	2	4.7	4.7	100.0
	Total	43	100.0	100.0	

Overall project scope definition was marginally rated, as it is seemingly not commonly used in the quality management systems of the low-cost houses construction companies in the Amathole Region project. Forty-one-point nine (41.9%) percent of the respondents agreed, while 4.7% strongly agreed. A total of 53.4% disagreed or was neutral.

Table 4.14: Frequency ratings of continuous training

Continuous training					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	3	7.0	7.0	7.0
	2	9	20.9	20.9	27.9
	3	10	23.3	23.3	51.2
	4	16	37.2	37.2	88.4
	5	5	11.6	11.6	100.0
	Total	43	100.0	100.0	

Continuous training was rated second from last by a mere 37.2% and 1.6% of the respondents agreeing and strongly agreeing, respectively. A total of 51.2% of the respondents was either neutral or disagreed.

Table 4.15: frequency ratings of proper planning

Proper planning					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	3	7.0	7.0	7.0
	2	5	11.6	11.6	18.6
	3	20	46.5	46.5	65.1
	4	14	32.6	32.6	97.7
	5	1	2.3	2.3	100.0
	Total	43	100.0	100.0	

Proper planning was rated the least used strategy in the Amathole low-cost housing project, with 32.6% and 2.3% of the respondents agreeing and strongly agreeing, respectively. A total of 65.1% disagreed or was neutral.

4.6.3 Resourcing of Quality Management personnel

Research Question 3: How well resourced are the quality management personnel in the Amathole low-cost houses projects?

The descriptive statistical responses towards this question are presented in table 4.16 below.

Table 4.16: Descriptive statistics on resourcing of quality management personnel

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Executive management support	43	2	5	3.37	.926
Conducive management environment	43	2	5	3.40	.849
Best practices	43	2	5	3.53	.631
Management systems	43	2	5	3.42	.823
Quality site management	43	1	5	3.58	1.006
Management empowerment	43	1	5	3.26	1.002
Stakeholder meetings	43	2	5	3.51	.856
Quality Management Personnel Resourcing Ave	43	17.00	32.00	24.0698	3.84457
Valid N (listwise)	43				

The overall mean for the resourcing of the quality management personnel ratings is 24.0698, with the corresponding standard deviation of 3.84457. The respondents rated all the quality management personnel resourcing strategic issues significant, at varying degree levels and being experienced in the Amathole Region low-cost housing project. The respondents' rated sufficient time devoted to quality site management as the number one resource they are afforded by the executive management, with a mean of 3.58 and corresponding standard deviation of 1.006. Second in the perking order was the bench marking for best practices that the quality management personnel are allowed by the executive management to engage in. This is evidenced by a mean of 3.53 and corresponding standard deviation of 0.631. This was followed by regular stakeholder meetings that the quality management personnel can have, with a mean of 3.51 and a standard deviation of 0.856. Management systems support was rated

with a mean of 3.42 and standard deviation of 0.823. The respondents suggested that there was conducive management environment, evidenced by a mean of 3.40 and corresponding standard deviation of 0.849, with requisite executive management support rated with a mean of 3.37 and standard deviation of 0.926. The least rated was management empowerment, with a mean of 3.26 and corresponding standard deviation of 1.002. These results are corroborated in the frequency tables below.

Table 4.17: Frequency ratings of quality site management

Quality site management					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	2	4.7	4.7	4.7
	2	3	7.0	7.0	11.6
	3	13	30.2	30.2	41.9
	4	18	41.9	41.9	83.7
	5	7	16.3	16.3	100.0
	Total	43	100.0	100.0	

The respondents suggested that the quality management personnel are allowed ample time for quality site management, with 41.9% of the respondents agreeing and 16.3% strongly agreeing. This translated into a total of 58.2% of the respondents agreeing.

Table 4.18: Frequency ratings of best practices

Best practices					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	2	4.7	4.7	4.7
	3	17	39.5	39.5	44.2
	4	23	53.5	53.5	97.7
	5	1	2.3	2.3	100.0
	Total	43	100.0	100.0	

A total of 55.8% respondents, that is, 53.5% agreeing and 2.3% strongly agreeing, agreed that quality management personnel were given a leeway by the executive management to benchmark for best quality management practices.

Table 4.19: Frequency ratings of stakeholder meetings

Stakeholder meetings					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	6	14.0	14.0	14.0
	3	13	30.2	30.2	44.2
	4	20	46.5	46.5	90.7
	5	4	9.3	9.3	100.0
	Total	43	100.0	100.0	

Quality management personnel engaged in stakeholder meetings, according to 46.5% of the respondents who agreed and 9.3% strongly agreed, giving a total of 55.8% of the respondents in support of the assertion that quality management personnel can conduct stakeholder meetings to a significant extent.

Table 4.20: Frequency ratings of management systems

Management systems					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	6	14.0	14.0	14.0
	3	16	37.2	37.2	51.2
	4	18	41.9	41.9	93.0
	5	3	7.0	7.0	100.0
	Total	43	100.0	100.0	

A total of 48.9% that is, less than 50% agreed that there were management systems put in place for the quality management personnel to utilise for the purposes of ensuring quality management in the Amathole region low-cost housing projects.

Table 4.21: Frequency ratings of conducive management environment

Conducive management environment					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	7	16.3	16.3	16.3
	3	15	34.9	34.9	51.2
	4	18	41.9	41.9	93.0
	5	3	7.0	7.0	100.0
	Total	43	100.0	100.0	

The presence of a conducive management environment was also rated the same as the availability of the management systems, with 41.9% respondents agreeing and 7.0% strongly agreeing, however with a total of 48.9%, being less than 50%. A total of 51.2% was neutral or disagreed.

Table 4.22: Frequency ratings of executive management support

Executive management support					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	8	18.6	18.6	18.6
	3	16	37.2	37.2	55.8
	4	14	32.6	32.6	88.4
	5	5	11.6	11.6	100.0
	Total	43	100.0	100.0	

Executive management support was rated by a total of 44.2% of the respondents, even much lesser than 50%. Most of the respondents felt there was no executive management support, with a total of 55.8% of the respondents being neutral or disagreeing.

Table 4.23: Frequency ratings of management empowerment

Management empowerment					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	2	4.7	4.7	4.7
	2	8	18.6	18.6	23.3
	3	13	30.2	30.2	53.5
	4	17	39.5	39.5	93.0
	5	3	7.0	7.0	100.0
	Total	43	100.0	100.0	

Management empowerment was the least rated, quality management personnel resourcing activity with a total of 53.5% respondents being neutral, disagreeing and strongly disagreeing. Only 46.5% agreed and strongly agreed that there existed management empowerment of the quality management personnel.

4.6.4 Perceptions on ISO certification as a quality management system or strategy

Research Question 4: What strategies could be recommended to enhance quality management in the construction of low-cost houses in the Amathole Region?

The descriptive statistical responses towards this question are presented in table 4.24 below.

Table 4.24: Perceptions on the benefits of ISO certification as a quality management system or strategy

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Decrease in defects	43	1	5	4.21	.861
Decrease in client complaints	43	1	5	4.16	.949
Improvement in product quality	43	2	5	4.42	.794
Reduction in rework costs	43	2	5	4.30	.803
Government costs saving	43	1	5	4.23	.895
Increased motivation	43	2	5	4.21	.773
Stakeholder relationships	43	2	5	4.21	.773
Improved decision making	43	1	5	4.14	.889
Improved customer relations	43	2	5	4.19	.794
Competitive capabilities	43	3	5	4.09	.648
Perception on ISO Certification Ave	43	14.00	45.00	38.0698	6.13497
Valid N (listwise)	43				

The overall perception on ISO certification as a quality management system or strategy attracted a mean 38.0698 and corresponding standard deviation of 6.13497. This is quite significant. The respondents rated all the perceived benefits of adopting ISO certification as a quality management strategy and system highly significant, with all the average means above

4. The highest perceived benefit was improvement in product quality, as result of adopting ISO certification, with a mean and corresponding standard deviation of 4.42 and 0.794, respectively. This was followed by the perception that ISO certification adoption would help reduce the re-work costs, evidenced by a mean of 4.30 and standard deviation of 0.803 and increase government costs saving, indicated by a mean of 4.23 and standard deviation of 0.895. Perceived decrease in defects, increased employee motivation and enhanced stakeholder relationships were rated evenly, with an average mean of 4.21 and corresponding standard deviations of 0.861, 0.773 and 0.773 respectively. These were followed by perceived improved customer relations leading to perceived decrease in client complaints, evidenced by the average means of 4.19 and 4.16, with corresponding standard deviations of 0.794 and 0.949, respectively. Improved decision-making processes and competitive capabilities were the least rated perceived benefits, with means of 4.14 and 4.09 and corresponding standard deviations of 0.889 and 0.648, respectively. These results are corroborated in the frequency tables below.

Table 4.25: Frequency ratings on improvement in product quality

Improvement in product quality					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	2	4.7	4.7	4.7
	3	2	4.7	4.7	9.3
	4	15	34.9	34.9	44.2
	5	24	55.8	55.8	100.0
	Total	43	100.0	100.0	

A total of 90.7%, that is, 34.9% agreeing and 55.8% strongly agreeing respondents asserted that when ISO certification is adopted as a quality management strategy and system, it would result in improvements in the quality of the product. Only 9.3% was neutral and disagreed.

Table 4.26: Frequency ratings on reduction in rework costs

Reduction in rework costs					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	1	2.3	2.3	2.3
	3	6	14.0	14.0	16.3
	4	15	34.9	34.9	51.2
	5	21	48.8	48.8	100.0
	Total	43	100.0	100.0	

Perceived improvement on the quality of the product, that is, the low-cost houses would lead to a reduction in the costs of re-doing the work to rectify the defects. A total of 83.7%, with 34.9% of the respondents agreeing and 48.8% strongly agreed that there would be reduction in rework costs.

Table 4.27: Frequency ratings on government costs savings

Government costs saving					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	2.3	2.3	2.3
	3	7	16.3	16.3	18.6
	4	15	34.9	34.9	53.5
	5	20	46.5	46.5	100.0
	Total	43	100.0	100.0	

The perceived reduction in the rework costs was perceived it would result in the government saving costs of rework. A total of 81.4%, with 34.9% of the respondents agreeing and 46.5% strongly agreeing that adopting ISO certification would result in the benefit of saving costs by the government.

Table 4.28: Frequency ratings on decrease in defects

Decrease in defects					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	2.3	2.3	2.3
	3	6	14.0	14.0	16.3
	4	18	41.9	41.9	58.1
	5	18	41.9	41.9	100.0
	Total	43	100.0	100.0	

The adoption of ISO certification as a strategy for quality management was perceived it would result in the decrease in construction defects. A total of 41.9% of the respondents agreed, while 41.9% strongly agreed.

Table 4.29: Frequency ratings on increase employee motivation

Increased motivation					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	1	2.3	2.3	2.3
	3	6	14.0	14.0	16.3
	4	19	44.2	44.2	60.5
	5	17	39.5	39.5	100.0
	Total	43	100.0	100.0	

The other benefit that was perceived would accrue from the adoption of the ISO certification as a strategy was the increased motivation of the employees, with 44.2% as 44.2% of the respondents strongly agreeing, respectively.

Table 4.30: Frequency ratings on enhanced stakeholder relationship

Stakeholder relationships					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	1	2.3	2.3	2.3
	3	6	14.0	14.0	16.3
	4	19	44.2	44.2	60.5
	5	17	39.5	39.5	100.0
	Total	43	100.0	100.0	

ISO certification adoption was perceived to enhance stakeholder relationships when adopted as a quality management system or strategy, with 44.2% of the respondents agreeing and 39.5% strongly agreeing to the assertion.

Table 4.31: frequency ratings on improved relations

Improved customer relations					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	2	4.7	4.7	4.7
	3	4	9.3	9.3	14.0
	4	21	48.8	48.8	62.8
	5	16	37.2	37.2	100.0
	Total	43	100.0	100.0	

Improved customer relations were perceived would be realised if ISO certification is adopted as a strategy for quality management. A total of 86%, with 48.8% of the respondents agreeing and 37.2% strongly agreeing that the adoption of ISO certification would result in improved customer relations.

Table 4.32: Frequency ratings on decrease in client complaints

Decrease in client complaints					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	2.3	2.3	2.3
	2	1	2.3	2.3	4.7
	3	7	16.3	16.3	20.9
	4	15	34.9	34.9	55.8
	5	19	44.2	44.2	100.0
	Total	43	100.0	100.0	

The adoption of ISO certification as a strategy for quality management was suggested would result in the perceived decrease in client complaints, with 34.9% of the respondents agreeing and 44.2% strongly agreeing. This translates into a total of 79.1% of the respondents agreeing.

Table 4.33: Frequency ratings on improved decision-making processes

Improved decision making					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	2.3	2.3	2.3
	2	1	2.3	2.3	4.7
	3	5	11.6	11.6	16.3
	4	20	46.5	46.5	62.8
	5	16	37.2	37.2	100.0
	Total	43	100.0	100.0	

Improved decision-making processes were perceived would result from the adoption of ISO certification, with 46.5% of the respondents agreeing and 37.2% strongly agreeing to the proposition.

Table 4.34: Frequency ratings on competitive capabilities

Competitive capabilities					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3	7	16.3	16.3	16.3
	4	25	58.1	58.1	74.4
	5	11	25.6	25.6	100.0
	Total	43	100.0	100.0	

Enhancement of competitive capabilities was the least rated perceived benefit that would accrue to the adoption of ISO certification as a strategy for quality management. A total of 58.1% of the respondents agreed and 25.6% strongly agreed. Table 4.35 below shows the inferential statistics results that were obtained for the research question 4 as well.

Table 4.35: Correlation of the variables

Correlations					
		Quality Management Challenges Ave	Quality Management Strategies Ave	Quality Management Personnel Ave	Perception on ISO Certification Ave
Quality Management Challenges Ave	Pearson Correlation	1	-.274	-.079	-.108
	Sig. (2-tailed)		.076	.613	.492
	N	43	43	43	43
Quality Management Strategies Ave	Pearson Correlation	-.274	1	.707**	.210
	Sig. (2-tailed)	.076		.000	.177
	N	43	43	43	43
Quality Management Personnel Ave	Pearson Correlation	-.079	.707**	1	.141
	Sig. (2-tailed)	.613	.000		.367
	N	43	43	43	43
Perception on ISO Certification Ave	Pearson Correlation	-.108	.210	.141	1
	Sig. (2-tailed)	.492	.177	.367	
	N	43	43	43	43
**. Correlation is significant at the 0.01 level (2-tailed).					

Table 4.35 above shows that there is a strong positive and significant correlation of 0.707 between the resourcing of the quality management personnel and quality management strategies employed in the construction of low-cost houses in the Amathole region. In addition to the respondents' strong perception of ISO certification adoption and its benefits as quality management strategy or system, synchronisation of the ISO certification adoption with the current quality management strategies used in the management of the project and more resourcing of the quality management personnel would go a long way towards improving the quality of the low-cost houses in the Amathole region.

4.7 Conclusion

The chapter described the presentation of the results of the study. The study used the questionnaire which was personally administered to 75 professionals. Forty-three (43) of the questionnaires were returned. The questionnaire was pre-tested to make sure that it was not ambiguous. The reliability test performed was satisfactory with the Cronbach's alpha coefficient being more than 70%. The analysis of collected data was done using the SPSS software package. The researcher believes that the applicable methods used for this study were reliable and valid for the collection and analysis of the relevant data. The next chapter presents the discussion of the results of the study.

CHAPTER FIVE: DISCUSSION OF RESULTS

5.1 Introduction

This chapter deals with the findings, discussion, interpretation and explanation of the study's findings, in relation to the literature reviewed. The main reason for reviewing the literature was to compare and present the study's contribution to the stakeholders in the construction industry, to the body of knowledge in the field of quality management, with specific reference to the construction of the low-cost houses industry.

5.2 Responses to the item variables

5.2.1 Quality management challenges

Research Question 1: What quality management factors affect the construction of low-cost houses in the Amathole region?

From table 4.7, the researcher notes that the respondents identified rework costing millions supported by the mean of 4.19 and standard deviation of 1.006; lack of communication with a mean of 3.49 and standard deviation of 0.910; use of unskilled labour supported by the mean of 3.21 and standard deviation of 1.036, and process implementation with the mean of 3.21 and standard deviation of 0.888 in that order, as the major quality management challenges and factors that affect the construction of low-cost houses in the Amathole Region. The respondents did not consider the other factors such as deficient designs; lack of technical competence and projects failure as challenges or factors affecting the quality management in the construction of the low-cost houses in the Amathole Region.

These statistical results were corroborated by the descript frequency statistics in tables 4.8; 4.9; 4.10 and 4.11 respectively. As indicated in table 4.8, 32.6% and 48.8% making a total of 81.4% of the respondents agreed and strongly agreed respectively, that rework that has cost the government millions of Rands in the rectification of the defective construction work was a challenge and a factor that is affecting the quality management of the low-cost houses in the Amathole region. These results are in line with the previous studies conducted (Honnakker,

2010: 345; Seneratne & Jayarathna, 2012: 325; Construction Industry Development Board, 2012: 123; Ofori, 2011: 78).

Table 4.9 shows that 39.5% of the respondents agreed that lack of communication was affecting the quality management of the low-cost houses in the Amathole Region low-cost houses project, while 11.6% strongly agreed, making a total of 51.1% of the respondents in support of the fact that lack of communication is a quality management challenge in the construction of low-cost houses in the Amathole. However, the researcher could not find previous studies that directly link quality management challenges in the construction of low-cost houses to lack of communication in the implementation of the housing projects. This finding or result could be a potential contribution to the current study.

These results were followed by the respondents' views on the use of unskilled labour by the construction companies of the low-cost houses. Table 4.10 indicates that a total of 39.5% of the respondents agreed that the use of unskilled labour was a challenge to quality management of the low-cost houses in Amathole. The majority of the respondents, that is, 60.5%, however, rejected this notion. Out of the 60.5% of the respondents, 39.5% was neutral, leaving 21% of the respondents completely disagreeing that the use of unskilled labour is a challenge. However, the 39.5% of the respondents confirmed the use of unskilled labour by the construction companies to be a challenge or factor affecting the management of quality in the construction of low-cost houses in the region. The results of this study confirm the findings of previous studies (Giang & Pheng, 2011: 123; Hoonakker et al. 2010: 345).

Process implementation was the least viewed as a quality management challenge, with 34.9% of the respondents agreeing and 4.7% strongly agreeing, translating into a total of 39.6% and 60.4% of the respondents was either neutral or disagreed, as indicated in table 4.11. Apparently, this rating was equal to the proportion of the respondents that was neutral, leaving 20.8% of the respondents disagreeing and strongly disagreeing. Most of the respondents never agreed that process implementation was a challenge in the management of quality in the construction of the low-cost houses in Amathole. The researcher could not find past studies that link the challenge of process implementation with quality management of the construction of low-cost houses. The results of this study present a potential contribution to the discipline of quality management, particularly in the construction of the low-cost houses projects in this country.

5.2.2 Quality management strategies

Research Question 2: What quality management strategies are used in the construction of low-cost houses in the Amathole Region?

Table 4.12 shows the quality management strategies that the respondents indicated were used in the construction of low-cost houses in Amathole. The strategies are ranked according to the means and the corresponding standard deviations. The respondents ranked project economy, number one strategy, with a mean of 4.19 and a corresponding standard deviation of 0.699. This strategy involves the construction of houses at the possible lowest cost, in order to maximise the profitability of the projects. To achieve this objective, the construction companies aim at completing each project within the planned and budgeted time. Thus, the projects timelines strategy was ranked number two, with a mean of 4.14 and a corresponding standard deviation of 0.743. Keeping within the budgeted time lines serves the construction companies costs, especially the costs of materials that naturally escalate with time. Working under pressure as a result of failure to meet the project time lines can compromise the quality of the houses. Meeting project time lines strategy was followed by employee buy-in with a mean of 4.09 and standard deviation of 0.921. The executive management values a holistic employee buy-in into the quality management systems and policies put in place, including delivering projects at the lowest possible cost and within the planned time lines. This was followed by the importance of strategic alignment, with a mean of 3.63 and corresponding standard deviation of 0.757. This covers the alignment of the strategies used with the overall goals of the construction companies, that is, in terms of the visions or the strategic intents. Following this was the clear definition of projects, evidenced by the mean of 3.35 and a standard deviation of 0.973, overall scope defined, with a mean of 3.30 and standard deviation of 0.860, continuous training and lastly, proper planning with means and standard deviations of 3.26 (1.136) and 3.12 (0.905), respectively.

The frequency table 4.13 shows that a total of 88.4% of the respondents agreed to ‘project economy’ as a strategy that guides or influences the quality management of the construction of the low-cost houses in the region. The issue is that quality management of the construction of the low-cost houses should be achieved at the lowest possible cost of the project. The lower costs of the projects should not compromise the quality of the housing projects. This strategy was strongly supported, with 55.8% of the respondents agreeing and 32.6% strongly agreeing.

These results were in line with the findings of previous studies (Giang & Pheng, 2011: 123; Hoonakker et al. 2010: 345).

The respondents in table 4.14 rated the completion of the projects within the planned projects timelines number two important strategy, with 51.2% and 32.6% of the respondents agreeing and strongly agreeing, respectively. This translates into a total of 83.8% of the respondents agreeing. This strategy is directly linked to the project economy strategy. In other words, being able to construct the low-cost houses at the possible lowest cost largely depends on the projects completed within the planned and budgeted time lines. Pushing the completion of the projects beyond the planned completion time frame may cause the construction companies to incur additional costs that can cut into the profits of the projects. The construction input costs such as costs of materials may escalate with time, as suggested by previous studies (Giang & Pheng, 2011: 123; Hoonakker et al. 2010: 345). Escalation of construction costs may compromise the quality of the projects. As a result, working within the projects time lines has a bearing on the management of quality on the other hand.

Table 4.15 shows the frequency ratings for employee buy-in in the quality management strategies that are put in place to manage the quality of the low-cost houses in Amathole. A total of 79.1% of the respondents agreed that employee buy-in was a strategic issue in the management of quality in the construction of the low-cost houses, with 41.9% of the respondents agreeing and 37.2% strongly agreeing. This gave employee buy-in a strong rating. Without adequate employee buy-in, the executive management faces a serious challenge in the management of quality in the construction projects. This makes a lot of business sense, as employees are the ones that should implement the quality management practices in the construction of the low-cost houses. The results confirm the findings from previous studies (Honnakker, 2010: 346; Gharakhani et al. 2013: 276; Jafari & Love, 2013: 76).

The strategy alignment of the low-cost housing projects to quality achievement was strongly rated by 51.2% of the respondents, who agreed and 9.3% strongly agreed to the use of the strategy in the Amathole projects. This translates into a total of 60.5% of the respondents who agreed, as indicated in table 4.16. Management of quality of products and services in business is a strategic issue that can make or break the business, especially in the light of competition. As competition soars in the industry, competitors are left with no choice other than to appeal to strategies to enhance the quality of their products and services. The construction companies of the low-cost houses in Amathole have no choice but to ensure that the houses they are

constructing are of high quality standards, bearing in mind that the literature is awash with concerns of poor workmanship in the construction industry, especially in the low-cost housing projects (Honnakker, 2010: 346; Gharakhani et al. 2013: 276; Jafari & Love, 2013: 76; Ahzahar et al. 2011:254).

Table 4.17 shows the frequency ratings of clear definition of projects plans. The strategy was fairly rated as important by 34.9% and 11.6% of the respondents, who agreed and strongly agreed, respectively, translating into a total of 46.5%. A total of 53.5% was however in disagreement or neutral. About, 30.2% out of the total of 53.5% of the respondents was neutral, leaving 23.3% of the respondents either disagreeing or strongly disagreeing. As a result, a 46.5% rating in support of the strategy is significant in line with previous studies (Honnakker, 2010: 346; Gharakhani et al. 2013: 276; Jafari & Love, 2013: 76; Ahzahar et al. 2011:254). Clear definition of project plans is linked to overall scope definition, which was marginally rated, as it is seemingly not commonly used in the quality management systems of the low-cost houses construction. Forty-one-point nine (41.9%) percent of the respondents agreed, while 4.7% strongly agreed. A total of 53.4% disagreed or was neutral. Out of the total of 53.4%, about 32.6% was neutral or indifferent.

Tables 4.19 and 4.20 show the frequency ratings of continuous training and proper planning respectively, with only a total of 38.8% of the respondents agreeing and strongly agreeing that continuous training is one of the strategies used by the construction companies of low-cost houses in Amathole. A total of 34.9% rated proper planning as one of the strategies employed by the construction companies. However, 23.3% was neutral in their ranking of continuous training and 46.5% was neutral regarding proper planning. It is clear from these results that the construction companies of low-cost houses in Amathole play a lip service to the importance of continuous training of workers on quality management and proper planning. The results of the study are contrasting the strategic management literature which emphasises the importance of proper planning in the management of any business and the importance of continuous training of staff. In terms of the previous literature, the researcher expected that the construction companies of the low-cost houses in Amathole would embrace proper planning and continuous training of their employees on issues of quality management (Stephenson et al. 2012: 398; Rhodes and Smallwood, 2012:12; Ahzahar et al. 2011: 253; Gharakhani et al. 2013: 89; Sidumedi, 2011: 126; Cagnazzo et al. 2010; 89).

5.2.3 Resourcing of quality management personnel

Research Question 3: How well resourced are the quality management personnel in the Amathole low-cost houses projects?

The respondents' rated all the quality management personnel resourcing strategic issues significant at varying degree levels of average means above 3 and less than 4, with an overall mean of 3.40698 and a corresponding standard deviation of 0.84457, as shown in table 4.21. The statistics indicate that the resourcing of the quality management personnel is low in the construction of low-cost houses in the Amathole region. The respondents' rated sufficient time devoted to quality site management as the number one resource and the support they were given by the executive management, with a mean of 3.58 and corresponding standard deviation of 1.006. Second in the perking order was the bench marking for best practices that the quality management personnel were allowed by the executive management to engage in. This is evidenced by a mean of 3.53 and corresponding standard deviation of 0.631. These quality management personnel were professionals in the construction industry.

The executive management of the construction companies allows and gives the quality management personnel the autonomy to exercise professional judgement and experience acquired over years, regarding issues of quality management of the construction projects and even benchmark as widely as possible. This is followed by regular stakeholder meetings that the quality management personnel were having, with a mean of 3.51 and a standard deviation of 0.856. Stakeholder meetings are very important in project management, for the purposes of charting the strategic way forward and for feedback purposes. Management systems support was rated with a mean of 3.42 and standard deviation of 0.823. The statistics significantly support that there were management systems in place, regarding the management of quality in the construction of the low-cost houses in the region. The respondents suggested that there was a conducive management environment, evidenced by a mean of 3.40 and corresponding standard deviation of 0.849, with requisite executive management support rated with a mean of 3.37 and standard deviation of 0.926. The least rated was management empowerment, with a mean of 3.26 and corresponding standard deviation of 1.002.

These results are corroborated in the frequency tables 4.22 to 4.28. The frequency tables also explain the low average means that characterises the results of the study. The respondents suggested that the quality management personnel were allowed ample time for quality site

management, with 41.9% of the respondents agreeing and 16.3% strongly agreeing. This translated into a total of 58.2% of the respondents agreeing. However, 30.2% of the respondents was neutral or indifferent. This was material enough to dilute the average mean to 3.58, that is, pushing the mean below 4, notwithstanding the fact that 58.2% of the respondents indicated that the quality management personnel were allowed time for quality site management.

A total of 55.8% of the respondents, that is, 53.5% agreeing and 2.3% strongly agreeing, agreed that quality management personnel were given a leeway by the executive management to benchmark for the best quality management practices, as shown in table 4.23. With a total of 39.55 of the respondents being neutral or indifferent, the average mean of this variable was low at 3.53. The researcher could not find any previous studies that dealt with issues of benchmarking for quality management best practices in the construction industry, especially in the construction of low-cost houses. The results therefore present a potential contribution of the study to the field of quality management, particularly in the construction of the low-cost houses.

Table 4.24 indicates that quality management personnel conducted or engaged in stakeholder meetings, according to 46.5% of the respondents who agreed and 9.3% of the respondents who strongly agreed, giving a total of 55.8% of the respondents in support of the assertion that quality management personnel do conduct stakeholder meetings, to a greater extent. However, 30.2% of the respondents were indifferent or neutral, again causing the average mean to be low at 3.51. The results of the study concur with the findings of previous studies (Ghodbane, 2014: 234; Cagnazzo et al. 2010: 87).

A total of 48.9% of the respondents, that is, less than 50%, with 37.25 being neutral, agreed that there were management systems put in place for the quality management personnel to utilise, for the purposes of ensuring quality management in the Amathole's low-cost housing projects, as indicated in table 4.25. There is a significant element of scepticism regarding the adequacy of the management systems in place. Quality management is a business management practice. Like any other management practice, the establishment of management systems is pre-requisite for the success of the management of quality in the construction of low-cost houses in Amathole (Stephenson et al. 2012: 398; Rhodes and Smallwood, 2012:12). The respondents, in their professional judgement as experts and professionals in the construction industry, found this aspect seriously wanting and lacking in the management of quality in the Amathole's low-cost housing projects.

The low ratings of conducive management environment, executive management support', and management empowerment, indicate that the challenges identified with respect to research question one, are emanating from these shortcomings that the respondents raised. These results are justifying the concerns about the prevalence of the defects and poor workmanship in the construction industry that have been raised by previous studies (Construction Industry Development Board, 2012: 347; Statistics South Africa, 2010: 123; Ofori, 2011: 56). The presence of a conducive management environment was also rated the same as the availability of the management systems, with 41.9% of the respondents agreeing and 7.0% strongly agreeing, however, with a total of 48.9% of the respondents being less than 50%. A total of 51.2% was neutral or disagreed, as shown in table 4.26. Executive management support was rated with a total of 44.2%, even lesser than 50%. Most of the respondents felt that there was no executive management support, with a total of 55.8% of the respondents being neutral or disagreeing. Management empowerment was the least rated quality management personnel resourcing activity, with a total of 53.5% of the respondents being neutral, disagreeing and strongly disagreeing. Only 46.5% agreed and strongly agreed that there existed management empowerment of the quality management personnel, as indicated in tables 4.27 and 4, 28 respectively.

5.2.4 Perceptions on ISO certification as a quality management system or strategy

Research Question 4: What strategies could be recommended to enhance quality management in the construction of low-cost houses in the Amathole region?

The results in table 4.29 indicate that the respondents overwhelmingly perceived that ISO certification adoption as a quality management strategy, in addition to the current strategies used by the construction companies, would further enhance the quality of the low-cost houses by minimising defects. A reduction in defects would result in the government saving millions of Rands, while at the same time reducing client complaints, as the good will of the construction companies of the low-cost houses increases. The overall perception on ISO certification as quality management system or strategy attracted a mean of 38.0698 and corresponding standard deviation of 6.13497. This is quite significant.

The respondents' rated all the perceived benefits of adopting ISO certification as a quality management strategy and system highly significant, with all the average means above 4. The highest perceived benefit was improvement in product quality as a result of adopting ISO certification, with a mean and corresponding standard deviation of 4.42 and 0.794, respectively. Being professionals in the construction industry, the respondents were well-informed about ISO certification in the industry and business, particularly the potential benefits that ISO certification would bring to the construction companies of the low-cost houses in the region. This was followed by the perception that ISO certification adoption would help reduce the rework costs, evidenced by a mean of 4.30 and standard deviation of 0.803 and increase government costs saving, indicated by a mean of 4.23 and standard deviation of 0.895.

The strong perception was that as ISO certification is bound to facilitate improved quality management of the low-cost housing projects, there would be diminished cases of defects and as a result, a decline in the costs of rework to rectify the defects from poor workmanship, thus saving the government millions of Rands. Perceived decrease in defects, increased employee motivation, and enhanced stakeholder relationships were rated evenly with an average mean of 4.21 and corresponding standard deviations of 0.861, 0.773 and 0.773, respectively. The argument is that as the number of defects decreases, the employees' motivation would increase as they would get more and satisfied with the quality of their work, leading to enhanced stakeholder relations, as clients' complaints might also decrease with an increase in satisfaction. These results concur with past studies (Stephenson et al. 2012: 398; Rhodes and Smallwood, 2012:12; Cagnazzo et al. 2010; 345; Gharakhani et al. 2013: 89; Coffey, 2011: 347; Willar & Trigunarsyah, 2011: 456; Seneratne & Jayarathna, 2012: 145).

These were followed by perceived improved customer relations leading to perceived decrease in client complaints, evidenced by average means of 4.19 and 4.16, with corresponding standard deviations of 0.794 and 0.949, respectively. Improved decision-making processes and competitive capabilities were the least rated perceived benefits with means of 4.14 and 4.09 and corresponding standard deviations of 0.889 and 0.648, respectively. It is not surprising to see issues of decision making and competitive capabilities relegated to the least valued benefits of ISO certification adoption. Quality management is more of a technical aspect of management than issues of decision-making and competitive capabilities, which are rather conceptual aspects of management. These results are corroborated in the frequency tables 4.30 to 4.39.

Table 4.30 shows that a total of 90.7%, that is, 34.9% agreeing and 55.8% strongly agreeing respondents asserted that when ISO certification is adopted as a quality management strategy and system, there would be improvements in the quality of the product, that is, in the quality of the low-cost houses in the region, in support of the statistically significant mean of 4.42. A mere total of 9.3% was neutral and indifferent. The catch is therefore that the perceived improvement on the quality of the product, that is, the low-cost houses, would lead to a reduction in the costs of re-doing the work to rectify the defects. A total of 83.7%, with 34.9% of the respondents agreeing and 48.8% strongly agreeing that there would be reduction in rework costs, as indicated in table 4.31. These results support the findings of the following previous studies (Ghodbane, 2014: 761; Jafari & Love, 2013: 147; Seneratne & Jayarathna, 2012: 91; Willar & Trigunarsyah, 2011: 88). The perceived reduction in the rework costs was perceived it would result in the government saving costs of rework. A total of 81.4%, with 34.9% of the respondents agreeing and 46.5% strongly agreeing that adopting ISO certification would result in the benefit of saving costs by the government. The adoption of ISO certification as a strategy of quality management was perceived to result in the decrease in construction defects. A total of 41.9% of the respondents agreed, while 41.9% strongly agreed.

Table 4.34 shows the perception ratings of increased motivation of the employees of the construction companies of the low-cost houses in Amathole as benefit accruing from the adoption of ISO certification, as well as a quality management strategy. A total 44.2% of the respondents and 39.5% agreed and strongly agreed, respectively. ISO certification adoption was perceived to enhance stakeholder relationships as well, when adopted as a quality management system or strategy, with 44.2% of the respondents agreeing and 39.5% strongly agreeing to the assertion. Improved customer relations were perceived would be realised if ISO certification is adopted as a strategy for quality management by the construction companies of the low-cost houses in the region. A total of 86%, with 48.8% of the respondents agreeing and 37.2% strongly agreeing that the adoption of ISO certification would result in improved customer relations. The adoption of ISO certification as a strategy for quality management was suggested would result in the perceived decrease in client complaints, with 34.9% of the respondents agreeing and 44.2% strongly agreeing. This translates into a total of 79.1% of the respondents, agreeing.

These statistical results indicate the level of importance that the respondents attached to the potential adoption of ISO certification by the low-cost houses construction companies in the future. The crust of the matter is that as the challenge of defective houses decreases because of

adopting ISO certification, the employees of the construction companies would get more and more satisfied with their workmanship and their motivation levels would increase, as stakeholder and customer relations improving as well, with very minimal clients' complaints. These results affirm the findings of the following previous studies (Cagnazzo et al. (2010: 78; Gharakhani et al. 2013: 79; Din et al. 2011: 321; Sidumedi, 2011: 143). Improved decision-making processes were perceived would result from the adoption of ISO certification, with 46.5% of the respondents agreeing and 37.2% strongly agreeing to the proposition. Enhancement of competitive capabilities was the least rated perceived benefit that would accrue to the adoption of ISO certification as a strategy for quality management. A total of 58.1% of the respondents agreed and 25.6% strongly agreed.

Table 4.40 shows the inferential statistics results that were obtained in answering the research question 4 as well. The statistical results indicate that there is a strong positive and significant correlation of 0.707 between the resourcing of the quality management personnel and the quality management strategies employed in the construction of low-cost houses in Amathole. The implications of these results are that the success of any quality management strategies that the construction companies of the low-cost houses would like to adopt hinges on the adequate and strategic resourcing of the quality management personnel. The quality management personnel are viewed as the key drivers of the implementation of the quality management strategies. However, they can only achieve their mandate through the support of the executive management of the construction companies of the low-cost houses in terms of adequate resourcing. In addition to the respondents' strong perception of ISO certification adoption and its benefits as a quality management strategy or system, synchronisation of the ISO certification adoption with the current quality management strategies used in the management of the projects, as well as more resourcing of the quality management personnel would go a long way towards improving the quality of the low-cost houses in the Amathole Region.

5.3 Conclusion

The chapter presented the discussion of the results of the study. The collected data were analysed using the SPSS software package version 24.0. The results that are presented in Chapter 4 in the form of descriptive statistics, frequencies and inferential statistics have been comprehensively discussed in this chapter. The next chapter deals with the conclusions and recommendations, based on the findings of the study.

CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This chapter presents the conclusion and recommendations of the study. The conclusions section ties up the objectives of the study with the findings, or the results of the study, in order to bring it to finality. The conclusion section is followed by the implications of the research, in terms of the study's contributions to scholarship and practical solutions or recommendations for the relevant stakeholders, such as the executive management of the low-cost housing construction companies and the relevant government departments and structures. The limitations of the study are outlined, while the recommendations to solve the research problem and recommendations for future studies, as well as the concluding summary, close the chapter.

6.2 Conclusion

The objectives of the study were to identify the factors affecting quality management in the construction of low-cost houses in the Amathole Region of the Eastern Cape Province, to determine which quality management strategies were used in the construction of low-cost houses in the region, to determine if the quality management personnel in the Amathole low-cost housing projects were well resourced, to recommend strategies that could be used to enhance quality management in the construction of low-cost houses, as well as to establish the professionals' perceptions of the benefits of ISO certification as a quality management system and strategy.

Objective 1: To identify the factors affecting quality management in the construction of low-cost houses in the Amathole Region of the Eastern Cape Province.

The results of the study indicated that the major factor and challenge that affected quality management in the construction of the low-cost houses in the Amathole Region is the 'rework costing millions' of Rands. These results corroborated the findings of the previous studies that were highlighted in Chapter 2 and in the presentation of the results in Chapter 5 that raised a concern that poor workmanship in the construction industry, especially in the construction of the low-cost houses, has cost the government billions of Rands in rework to rectify the defects. This assertion was supported by a total of 81.4% of the respondents, who generally agreed that rework has cost the government a lot of money, and also evidenced by a mean of 4.19 and standard deviation of 1.006. These results cast serious doubt on the management of quality in the construction of the low-cost houses in the Amathole region. Following was the assertion

that lack of communication impeached on the ability to manage quality in the construction of the low-cost houses in Amathole. This was supported by a total of 51.1% of the total respondents agreeing that there was a challenge of lack of communication in the management of quality in the Amathole low-cost housing projects. A mean of 3.49 and standard deviation of 0.910 were realised. The use of unskilled labour was rated the third factor or challenge in the management of quality in the construction of the low-cost houses in Amathole, with a mean of 3.21 and standard deviation of 1.036, weakly supported by a total of 39.5% of the respondents. However, the results indicate that the respondents did not feel that there were challenges of process implementation, deficient designs, lack of technical competence, and projects failure in the management of quality in the construction of the low houses in Amathole. These factors were lowly rated in terms of the means and standard deviations, as well as the corresponding percentage frequencies.

The researcher concludes that the first objective of the study was significantly achieved. There were challenges in the management of quality in the construction of low-cost houses in the Amathole region.

Objective 2: To determine which Quality Management strategies are used by the construction companies of low-cost houses at Amathole region in the Eastern Cape Province.

The following were identified as quality management strategies used in the construction of low-cost houses in the Amathole region, in the order they are given. Project economy was indicated as strategy number one, that is, concerned with the construction of the low-cost houses at the lowest possible cost to the companies, in order to maximise profits. Quality is managed in that background and understanding that the costs of construction should be as minimal as possible. This was followed by the projects timelines strategy that is, in addition to complete the projects at the lowest possible cost, the projects must be completed on time or within the budgeted time lines. To achieve this, the results indicate that employee buy-in was a strategic issue that even impacted on the management of quality as well. The rating of these strategies was supported by average means of 4.10 and percentage frequencies above 50%. However, strategic alignment, clear definition of projects, overall scope defined, and proper planning 'ratings, are supported by average means of less than 4, and percentage frequencies less than 50%.

The researcher concludes that the current strategies employed in the construction of low-cost houses incorporating the management of quality, in Amathole were very weak, especially considering that issues of strategy alignment, clear definition of the projects and their scope and proper planning disregarded and relegated to the peripherals of effective projects management practices that should revolve around quality management. With poor or weak strategies in place, it is not surprising that the problem or challenge of defects and poor workmanship that have cost the government billions of Rands in rework costs was identified.

Objective 3: To determine if the Quality Management personnel at the Amathole low-cost housing projects are well resourced

The results of the study indicate that the resourcing of the quality management personnel in the construction of low-cost houses in Amathole was very poor and inadequate. The quality management personnel were allowed time devoted to quality site management, to benchmark for the best practices in quality management, conducting stakeholder meetings, availability of management systems, conducive management environment and finally, management empowerment. These quality management personnel resourcing elements were insignificantly statistically supported, with average mean scores of less than 4 and the first three marginally positively affirmed by respondents at 50% frequencies.

The researcher concludes that there was no adequate resourcing of the quality management personnel in the construction of low-cost houses in the Amathole region. About 50% of the respondents was neutral or indifferent in the assessment of the levels of quality management personnel resourcing. The quality management personnel in the Amathole low-cost housing projects were not well-resourced.

Objective 4: To recommend strategies that could be used to enhance Quality Management in the construction of low-cost houses at Amathole Region in the Eastern Cape Province

From the results of the study, the researcher recommends the following strategies that could be used to enhance quality management in the construction of low-cost houses in the Amathole region. From objective 2, the researcher notes that from a strategic management perspective, there was a problem of misalignment of priorities in the management of quality in the construction of low-cost houses in this regard. The executive management of the construction companies of low-cost houses in Amathole were prioritising constructing houses at the possible

lowest cost and within the budgeted time lines, at the expense of proper planning, strategy alignment, clear definition of the projects and their scope. The inferential statistical results indicate that there is a strong positive and significant correlation of 0.707 between the resourcing of the quality management personnel and the quality management strategies employed in the construction of low-cost houses in Amathole.

The researcher thus recommends that the executive management of the low-cost houses construction companies seriously consider proper planning as a strategy to enhance the management of quality in the construction of the low-cost houses. In their proper planning, they should integrate clear definition of the projects and their scope and strategy alignment. The executive management of the low-cost houses construction companies should also, as part of the strategies, work towards adequate and well resourcing of the quality management personnel, in order to mitigate the identified challenges or factors that affect the management of quality in the construction of the low-cost houses in Amathole, without prioritising the challenges.

Objective 5: To determine the construction industry professionals involved in the Amathole low-cost houses projects perception of the benefits of ISO certification as a Quality Management system and strategy

Over and above the suggested strategies to enhance the management of quality in the construction of the low-cost houses in Amathole, the adoption of ISO certification as a quality management system and strategy was strongly rated in terms of its perceived benefits with an overall mean of 38.0698 and standard deviation of 6.13497. Improvement in product quality was perceived the highest benefit of adopting ISO certification, followed by reduction in rework costs, decrease in defects, increased employee motivation, enhanced stakeholder relationships, improved customer relations, decrease in client complaints, improved decision-making processes and finally, enhanced competitive capabilities, in that descending order of importance. All the perceived benefits of adopting ISO certification were supported by average mean above 4 and frequency percentages averaging 80% of the respondents agreeing on the perceived benefits of adopting ISO certification as a quality management system and strategy.

The researcher concludes that the adoption of ISO certification as a quality management system and strategy would buttress the current identified but weak strategies that are used by the construction companies of low-cost houses in Amathole. ISO certification compliance would ensure adherence to quality management detects and improve the quality of the low-cost houses

as defects and poor workmanship would be eliminated. This would save the government billions of Rands.

6.3 Implications of the research

This study contributes to body of knowledge in the field of construction, to the extent of assisting the scholars and the management to understand the critical factors that affect quality management on construction projects, especially low-cost housing projects such as the Amathole Region projects. The study creates a potential for academic engagement in the understanding of the underlying philosophical attitudes of the construction companies of low-cost houses towards quality management.

The study also sought to develop strategies of managing quality in the construction projects, especially the low-cost houses, and assist in the strategies to well-resource and empower the quality management personnel involved in these projects. Well and adequate resourcing of the quality management personnel lies at the heart of every strategy that can be employed in the management of quality, in the construction of low-cost houses.

The study also sought to develop a framework for roping construction companies involved in the construction of low-cost hoses in the country, into tapping into the benefits of ISO certification as a quality management system and strategy. Currently, it is not a requirement for the construction companies of low-cost houses to be ISO certification compliant. This study unearthed that the low-cost houses construction companies are losing out on the strategic benefits that accrue to firms that embrace ISO certification, be it in the construction industry or in any other industry. The study proves that all the concerns about poor quality work in the construction industry in this country, particularly in the low-cost houses construction industry, can be addressed through mandatory ISO certification compliance.

6.4 Limitations of the Study

There are bound to be limitations in every research, in general. In quantitative research such as this one, the structured questionnaire instrument of data collection can pose possibilities of both researcher and respondents bias. The researcher bias can manifest itself in the pre-conceived solutions to the research problem in the mind of the researchers, while the authenticity and the genuineness of the respondents' responses cannot be determined. The fact that researchers depend on sampling to conduct the research means that there would always be chances that the sample does not correctly represent the characteristics of the population of the

study. There are also challenges of generalisation of the results of studies such as this one. The researcher is very cautious that this study, like any other quantitative study, might have been prone to some of these limitations.

6.5. Recommendations to solve the research problem

The construction industry is a highly dynamic sector and its operating environment, industry structures and product characteristics, are changing at an ever-increasing pace. The researcher is recommending that in the light of the changing economic environment, managers of these construction companies and construction projects should look for emerging new construction management philosophies that are applied in similar businesses elsewhere.

Many organisations in various industries have turned to quality management as a reliable management practice and tool in the competitive market environment that leads to higher project performance, as well as financial and organisational performance. The researcher recommends that the management of the low-cost houses construction companies fully embrace quality management and well and adequately resource the quality management personnel.

Allowing the quality management personnel time devoted for quality site management, conducting stakeholder meetings and benchmarking on their own, are not good enough. The researcher recommends unreservedly, management support for the quality management personnel, in terms of fully empowering the quality management personnel with resources and decision-making autonomy.

A combination of sound formal systems and strong relationships is essential to achieve high quality in the project environment of construction, both within companies and across the supply network. The researcher recommends that the executive management creates a conducive management environment with adequate management systems for the quality management personnel to exercise their mandates.

There is concern that the quality of construction projects in South Africa has long been below par, which is evident in the reports of poor project performance, poorly implemented construction processes or worse, projects being delivered at an unexpected cost to the client. Both private and public-sector clients are dissatisfied with the quality of work produced by contractors, the rectification of substandard construction work on many of the low-cost housing projects throughout South Africa has left the state with a bill of around R50 billion. The

research therefore recommends that executive management of the low-cost houses construction companies seriously consider embracing ISO certification compliance.

There is a lot of empirical evidence that there are benefits accruing to construction companies when they regard employment of quality management systems in their operations. When quality management is no longer seen as optional, but as fundamental to the continual improvement of construction companies, there are strong chances of improving projects performance, reducing project costs, getting repeat business and increasing profits on projects. The researcher recommends that ISO certification compliance will enable the construction companies to achieve and realise the benefits of embracing quality management systems within their operations.

6.6 Recommendations for Future Studies

The current study dealt with a homogenous population and sample, with similar backgrounds and business characteristics. A truly representative sample would cover a heterogeneous sample comprising different firms in industries.

The researcher recommends future research on quality management covering different firms and organisations in different industries, in order to appreciate how different industries, deal with quality management issues for sustainable organisational performance.

The researcher recommends future research on understanding the underlying philosophical attitudes of the low-cost houses construction companies on quality management.

6.7 Summary

The study sought to answer the following research questions: What Quality Management factors affect the construction of low-cost houses at Amathole Region in the Eastern Cape Province? What Quality Management strategies are used in the construction of low-cost houses at Amathole Region in the Eastern Cape Province? How well resourced are employees at the Amathole low-cost houses projects in the Eastern Cape Province? What strategies could be recommended to enhance Quality Management in the construction of low-cost houses at Amathole Region in the Eastern Cape Province? The researcher strongly believes that the data collected for the purposes of this study adequately answered the study's research questions.

REFERENCES

- Abd-Hamida, D and Brydeb, H. (2010). Total quality management in the construction process. *International Journal of Project Management*, 15(4): 235–243.
- Abdul-Rahman, H. (2005). Some observations on the management of quality among construction professionals in the UK. *Construction Management and Economics*, 14, 485-495.
- Aday, L. (2011). *Designing and Conducting Health Surveys*. San Francisco: Jossey-Bass. University of North Carolina Survey Research Unit.
- Ahmed, S. and Hassan, M. (2013) “Survey and case investigations on application of quality management tools and techniques in SMIs”, *International Journal of Quality & Reliability Management*, vol. 20, no. 7, pp. 795-826.
- Ahzahar, N., Karim, N.A., Hassan, S.H. & Eman, J. (2011). A study of contribution factors to building failures and defects in construction industry. In: *Procedia Engineering*. 2nd International Building Control Conference, 11-12 July, Penang, Malaysia. Amsterdam: Elsevier Science, 20, pp. 249-255.
- Al Falah, K., Zairi, M. and Ahmed, A. (2015) “The role of supply-chain management in world-class manufacturing: an empirical study in the Saudi context”, *International Journal of Physical Distribution & Logistics Management*, vol. 33, no. 5, pp. 396-407.
- Alhajeri, M.A. (2008) “Defects and events giving rise to decennial liability in building and construction contracts”. In: *Proceedings of COBRA 2008: The Construction and Building Research Conference of the Royal Institution of Chartered Surveyors*, 4-5 September, Dublin Institute of Technology. London: RICS, pp: 420-432.
- Allen, N.J. and Hecht, T.D. (2014) “The ‘romance of teams’: toward an understanding of its psychological underpinnings and implications”, *Journal of Occupational and Organizational Psychology*, vol. 77, pp. 439-61.
- Ashford, T. (2013) “TQM & work culture: an empirical analysis”, *Productivity*, vol. 35, no. 3, pp. 443-6.

Auchterlounie, T. (2010). Recurring quality issues in the UK private house building industry. *Structural Survey*, 27(3), pp. 241-251.

Auruškevičienė, K., Šalciuvienė, L. & Trifanovas, G. (2010) "The Key to Japan's Competitive Success", New York, Random House.

Baiche, B., Walliman, N. & Ogden, R. (2016). Compliance with building regulations in England and Wales. *Structural Survey*, 24(4), pp. 279-299.

Barret, S. (2012) "Exploding the myth: do all quality management practices contribute to superior quality performance?" *Production and Operations Management*, vol. 8, no. 1, pp. 1-27.

Bartol, J & Abhishek, D. T. (2011) "The Machine that Changed the World", The MIT Press, Boston, MA.

Bartol, K. M. and Abhishek, S. (2012) Encouraging knowledge sharing: The role of organizational reward systems. *Journal of Leadership and Organization Studies*, 9. 64-76.

Bayo-Moriones, A., Bello-Pintado, A. and Merino-Díaz de Cerio, J. (2016) "The role of organizational context and infrastructure practices on JIT implementation", *International Journal of Operations & Production Management*, vol. 28, no. 11, pp. 1042-66.

Becker, J.E. (2001) "Implementing 5S to promote safety and housekeeping", *Professional Safety*, vol. 46, no. 8, pp. 29-31.

Benson, A. (2012) "Plant-wide systems: a world class perspective", *Production Inventory Management*, vol. 11, no. 7, July, pp. 14-45.

Black, E.E & Porter, M. (2011) "Alternative quality improvement practices and organization performance", *Journal of Operations Management*, vol. 12, no. 1, pp. 27-44.

Boston: McGraw Hill. Solansky, S. T (2010) "Team identification: a determining factor of performance", *Journal of Managerial Psychology*, vol. 26, no. 3, pp. 247-258.

Bryman, A. & Bell, E. (2007) *Business Research Methods*, Oxford University Press.

Bryman, A. and Bell, E. (2011), *Business Research Methods 3e* (Page 633). Oxford: Oxford University Press, Kindle Edition.

Burrows, V. (2009) 'A framework for manufacturing excellence', *Integrated manufacturing systems*, vol. 10, no. 1, pp. 33-44.

Buys, C.J. (1978) "Humans would do better without groups", *Personality and Social Psychology Bulletin*, vol. 4, pp. 123-5.

Cagnazzo, L., Taticchi, P. & Fuiano, F. (2010). Benefits, barriers and pitfalls coming from the ISO 9000: implementation: the impact on business performance. *Wseas Transactions on Business and Economics*, 7(4), pp. 311-321.

Camgoz-Akdag, H. (2013) 'Total quality management through six sigma benchmarking: A case study', *Benchmarking: An International Journal*, vol. 14, no. 2, 2007 pp. 186-201.

Chachadinha, N. M. (2011) *Implementing Quality Management Systems in Small and Medium Construction Companies: A contribution to a road map success. Leadership and Management in Engineering*, pp. 32-39.

Chattopadhyay, T. (2013) *5S – Handmade Management Method*, JIPM, Tokyo.

CIDB (CONSTRUCTION INDUSTRY DEVELOPMENT BOARD). (2011a). The CIDB construction industry indicators summary results. Department of Quantity Surveying and Construction Management of the University of the Free State, Bloemfontein, South Africa, pp. 1-16. [online]. Available from:
<http://www.cidb.org.za/Documents/KC/cidb_Publications/Ind_Reps_cii_archive/ind_reps_cii_2011.pdf> [Accessed: 15 March 2017].

CIDB (CONSTRUCTION INDUSTRY DEVELOPMENT BOARD). (2011b). Construction quality in South Africa – A client perspective – A discussion document, Rev 1, pp. 1-52. [online]. Available from:
<http://www.cidb.org.za/Documents/KC/cidb_Publications/Ind_Reps_Other/ind_reps_Construction_Quality_in_SA_Client_Perspective.pdf> [Accessed: 15 March 2017].

Coffey, V., Willar, D. & Trigunarsyah, B. (2011). *Quality Management System and Construction Performance*. Brisbane, IEEE Xplore Digital Library.

Construction Industry Development Board, (2010). *Results of 2010 CIDB Construction Industry Indicators*, Pretoria: CIDB.

Construction Industry Development Board, (2011). Construction Quality in South Africa: A Client Perspective, Pretoria: cidb.

Construction Industry Development Board, 2010. Results of 2010 CIDB Construction Industry Indicators, Pretoria: CIDB.

Construction Industry Development Board, 2011. Construction Quality in South Africa: A Client Perspective, Pretoria: cidb.

Construction Industry Development Board. (2010). Results of 2010 CIDB Construction Industry Indicators, Pretoria: CIDB.

Consumers Union. (2014). House wrecked, serious hidden defects plague many newer homes. Here's how to avoid trouble. Consumer Reports, 69(1), pp. 26-31.

Cooper, D.R. & Schindler, P. S. (2003) Business Research Methods, 8th Edition, Tata McGraw-Hill Publishing Company Limited.

Coronado, R., & Antony, J. (2002) "Critical success factors for the implementation of Six Sigma projects in organization". The TQM Magazine, vol. 14, no. 2, pp. 92–99.

Dada, M., Obiegbu, M. and Kunya, S. (2016). Scope of Building and Construction Skills. Agenda for Skills Development in the Nigerian Building Industry. A 2 Day Mandatory Professional Development Workshop of the Nigeria institute of Building Held in Enugu. 28th April, 2016. P. 7.

Dahlgaard, J. J., & Dahlgaard-Park, S. M. (2012). Lean production, six sigma quality, TQM and company culture. The TQM Magazine, 18, 263-281. <http://dx.doi.org/10.1108/09544780610659998>.

Dale, B. G and Plunkett, R. E. (2002), Managing Business Improvement and Quality: Implementing Key Tools and Techniques. Oxford: Blackwell Business.

Dale, R. (2013) The social justice implications of privatisation in education governance frameworks: a relational account, Special Issue –“Education, Privatisation and Social Justice”, Oxford Review of Education, 39 (4), pp. pp. 426-445.

Davies, A.J. and Kochhar, A.K. (2002) "Manufacturing best practice and performance studies: a critique", *International Journal of Operations & Production Management*, vol. 22, no. 3, pp. 289-305.

Delgado-Hernandez, D. J. & Aspin, E. (2016) Quality Management case studies in UK on industry. *Total Quality Management*, 19(9), pp. 919-938.

Deming, W.E. (2010) *Out of the Crisis*, MIT, Cambridge, MA.

Din, S., Abd-Hamid, Z. & Bryde, D. J. (2011) ISO 9000 certification and construction project performance: The Malaysian Experience. *International Journal of Project Management*, Issue 29, pp. 1044-1056.

Douglas, J. & Ransom, B. (2010). *Understanding building failures*. 3rd edition. London: Taylor & Francis.

Eid, R. (2009) 'Factors affecting the success of World Class Manufacturing in less developed countries, The case of Egypt', *Journal of Manufacturing Technology Management*, vol. 20, no. 7, pp. 989-1008.

Elghamrawy, T. & Shibayama, T., 2008. Total Quality Management Implementation in the Egyptian. *Journal of management in Engineering*, 3 July, 24(3), pp. 156-161.

Elwary, M & Shabayama, I. (2014) *Gemba Kaizen: A Common Sense, Low-cost Approach to Management*, McGraw-Hill, London.

Eriksson, L.T & Wiedersheim – Paul, F. (1997) *Investigating, researching and reporting*,

Eskildson, R. J. (2010) 'The vital elements of world-class manufacturing', *International Management*, Vol. 41 No. 5, pp. 76-8.

Eugenia, J. (2009) *Kaizen: The Key to Japan's Competitive Success*. New York, NY, US: Random House.

Evans, J & Dean, P. (2010) "Quality Is Free", McGraw-Hill, New York, NY.

Evans, J. R. and J. W. Dean. (2013). *Total Quality Management, organisation and strategy*. United States: Thomson Learning.

Fauzi, S.N.F.M., Yusof, N.A. & Abidin, N.Z. (2011). Common defects found in build-then-sell houses. *International Journal of Academic Research*, 3(4), pp. 494-497.

Feigenbaum, A. (2011) *Total Quality Control*, McGraw-Hill, New York, NY.

FindLaw. (2011). Types of construction defects. [online]. Available from: <<http://realestate.findlaw.com/construction-defects/home-construction-defect-types.html>> [Accessed: 2 December 2017]. Buys & Le Roux • Causes of defects in the South African housing.

Gapp, R et al., (2008) 'Implementing 5S within a Japanese context: an integrated management system', *Management Decision*, vol. 46, no. 4, pp. 565-579.

Georgiou, J. (2010). Verification of a building defect classification system for housing. *Structural Survey*, 28(5), pp. 370-383.

Gharakhani, D., Rhamati, H., Farrokhi, M. R. & Farahmandian, A. (2013). Total Quality Management and Organisational Performance. *American Journal of Industrial Organisation*, 1(3), pp. 46-50.

Ghodbane, B. S., 2014. The Effect of Quality Management on Business Performance: Case of Tunisian Firms. *International Journal of Information, Business and Management*, 6(4), pp. 67-103.

Ghodbane, T. G. (2014) *Manufacturing for Competitive Advantage: Becoming a World Class Manufacturer*, Ballinger Publishing Co., Cambridge, MA.

Giang, J. A & Pheng, L.S. J.A. (2011). Implementing total quality management in construction firms. *Journal of Management Engineering*, 20(1), pp. 8-15.

Gummesson, E. (1991) *Qualitative Methods in Management Research*, Sage Publication, California, pp. 83-156.

Hackman, J.R. and Wageman, R. (2005) "A theory of team coaching", *Academy of Management Review*, vol. 30, pp. 269-87.

Hall, R.W. (1983) *Zero Inventories*, Homewood, IL: Dow Jones – Irwin.

Hanson, D., Mbachu, J. & Nkado, R. (2013). Causes of client dissatisfaction in the South African building industry and ways of improvement: The contractors' perspective. In: Proceedings of the first CIDB Postgraduate Conference, 12-14 October, Port Elizabeth, South Africa, pp. 193-200.

Harris, F and McCaffer, R., (2011) *Modern Construction Management*. 5th ed. London: Blackwell Publishing.

Hart, R. and Horsthemke, W. (ed.) (2007) "What does good look like" A selection of readings and case studies, *The Journal of best practice*, vol. (1).pp. 145-546.

Hartley, J. (1994) *Case Studies in Organizational Research* in Casell and Symon (1994) *Qualitative Methods in Organizational Research*, Sage Publication, London, pp. 208-229.

Hayes, R.H. and Wheelwright, S.C. (1985) *Restoring our Competitive Edge: Competing through Manufacturing*, John Wiley & Sons, New York, NY.

Hirano, H. (1995) in Talbot, B. (Ed.), *Five Pillars of the Visual Workplace: The Sourcebook for 5S Implementation*, Productivity Press, New York, NY.

Ho, S.K. (1998) "5S practice: a new tool for industrial management", *Industrial Management & Data Systems*, vol. 98, no. 2, pp. 55-62.

Ho, S.K. (2012) "5S practice: the first step towards total quality management", *Total Quality Management*, vol. 10, no. 3, pp. 345-56.

Hoerl, R., Snee, R.D., Czarniak, S. and Parr, W.C. (2004), "The future of six sigma", *ASQ Six Sigma Forum Magazine*, vol. 3, no. 4, pp. 38-43.

Holme, I.M. & Solvang, B.K. (1991) *Research methods: qualitative and quantitative methods*, Lund: Student literature.

Hoonakker, P, Carayon, P, Loushine, T. (2010) 'Barriers and Benefits of Quality Management in the Construction Industry: An Empirical Study', *Total Quality Management*, Vol. 21, No. 9, September, pp. 953-969.

Hoonakker, T. (2010) 'Barriers and Benefits of Quality Management in the Construction Industry: An Empirical Study', *Total Quality Management*, Vol. 21, No. 9, September, pp. 953-969.

Hoyle, M. A. (2007) "Human resource management, manufacturing strategy, and firm performance", *Academy of Management Journal*, vol. 39, no. 4, pp. 836-65.

Hoyle, O. (2007) "Toyota Production System", Productivity Press.

Ilozor, B.D., Okoroh, M.I., Egbu, C.E. & Archicentre. (2014). Understanding residential house defects in Australia from the State of Victoria. *Building and Environment*, 39(3), pp. 327-337.

Ishikawa. K. (1985) *What is Total Quality Control?* Prentice-Hall Inc., Englewood Cliffs, NJ.

Islam and Karim (2010) 'Manufacturing practices and performance. Comparison among small-medium and large industries'. *International Journal of Quality & Reliability Management*, vol. 28 no. 1, 2011 pp. 43-61.

J. I. a. A. Mwashia, "The Effects of ISO Certification on Organization Workmanship Performance," *Quality Management Journal*, vol. 19(1), pp. 53-67, 2012.

Jafari, A. & Love, P. E. (2013). Quality Costs in Construction: Case of Qom Monorail Project in Iran. *Journal of Construction Engineering and Management*, 139(9), pp. 1244-1249.

Johnson, D. (1994) *Research Methods in Educational Management*, Longman Group, Essex.

Johnson, G., Scholes, K. & R. Whittington R. (2006) *Exploring Corporate Strategy*, 7th Edition. Pearson Custom Publication.

Joubert, W., Cruywagen, J.H. & Basson, G.A.J. (2015). Will the implementation of a quality management system benefit South African construction companies? *South African Journal of Industrial Engineering*, 16(1), pp. 29-40.

Juran, W. T. (2010) "The impact of just-in-time manufacturing and its infrastructure on manufacturing performance", *Management Science*, vol. 43, no. 9, pp. 124-57.

Kaushika, P and Khanduja, D (2009) “Application of Six Sigma DMAIC methodology in thermal power plants: A case study”, *Total Quality Management*, vol. 20, no. 2, February 2009, pp. 197–207.

Ketokivi, M. and Schroeder, R. (2004) “Manufacturing practices, strategic fit and performance a routine-based view”, *International Journal of Operations & Production Management*, vol. 24, no. 2, pp. 171-91.

Kolka, B. B. (2012) “World-class manufacturing project: overview and selected results”, *International Journal of Operations & Production Management*, vol. 17, no.s 7/8, pp. 671-85.

Kothari, C.R. (2004) *Research Methodology – Methods and Techniques*, 2nd Ed, New Age International Limited, Publishers.

Krasachol, J, Willey, A & Tannock, S. (2013) “Assessing manufacturing plant competitiveness. An empirical field study”, *International Journal of Operations & Production Management*, vol. 21, no. 1/2, 2001, pp. 233-253.

Kumar, M. (2016) “Implementing the lean sigma framework in an Indian SME: a case study”, *Production Planning & Control*, vol. 17, no. 4, pp. 407-23.

Leedy, P.D. (2009). *Practical Research: Planning and Design*. Macmillan Publishing Company, NY, USA.

Locke, K. (2013). *Grounded theory in management research*, Sage Publications, Thousand Oaks, C.A.

Longenecker, D. and Scazzero, M. (2012) “The relationship between total quality management practices and operational performance”, *Journal of Operations Management*, vol. 17, no. 4, pp. 393-409.

Love, P.E.D. & Edwards, D.J. (2014). Determinants of rework in building construction projects. *Engineering, Construction and Architectural Management*, 11(4), pp. 259-274.

Lubbe, S. (2013). Development of a case study methodology in the information technology (IT) field in South Africa: a step-by-step approach, *South African Journal of Information Management*, 5(4): 46-65.

- M. Abas, S.B. Khattak, I. Hussain, S. Maqsood, I. Ahmad (2015) Evaluation of Factors affecting the Quality of Construction Projects, Technical Journal, University of Engineering and Technology (UET) Taxila, Pakistan Vol. 20(SI) No.II(S)-2015.
- Magaud, B. A., 2006. The Modern Quality Movement: Origins, Development and Trends. *Total Quality Management & Business Excellence*, 17(2), pp. 179-203.
- Magaud, B. A., 2011. The Modern Quality Movement: Origins, Development and Trends. *Total Quality Management & Business Excellence*, 17(2), pp. 179-203.
- Mahachi, J. 2010. NHBRC calls for tough disciplinary measures against incompetent and negligent engineers, *Civil Engineering*, 18(9), pp. 56-59.
- Mahanti, R., & Antony, J. (2005) "Confluence of Six Sigma simulation and software development" *Managerial Auditing Journal*, vol. 20, no. 7, pp.739–762.
- Makhene, D. & Thwala, W.D. 2009. Skilled labour shortages in construction contractors: A literature review. In: *Proceedings of the CIDB 6th Post Graduate Conference*, Johannesburg, 6-8 September, pp. 128-136.
- Manning, J. (2015). Building defects spoil homeowners' dreams. *The Oregonian*. [online]. Available from: <http://www.aldrichlawoffice.com/news/building_defects_spoil.html> [Accessed: 3 October 2017].
- Marc, J, Herman, R, Karlien, F & Robert, K. (2016) "The Wisdom of Teams: Creating the High-performance Organization". Boston: Harvard Business School.
- Mathew, H., Barth, B., & Sears, B. (2005) Leveraging Six Sigma discipline to drive improvement. *International Journal of Six Sigma and Competitive Advantage*, vol. 1, no. 2, pp. 121–133.
- Mathieu, J.E., Goodwin, G.F., Heffner, T.S., Salas, E. and Cannon-Bowers, J.A. (2011) "The influence of shared mental models on team process and performance", *Journal of Applied Psychology*, vol. 85, no. 2, pp. 273-83.
- Merriam, S. B., 2009. *Qualitative Research: A Guide to Design and Implementation*. San Francisco: Jossey Bass.

- Michael, W. (2007) Machiavelli, A Man Misunderstood. Abacus.
- Mills, A., Love, P.E.D. & Williams, P. (2012). Defect costs in residential construction. *Journal of Construction Engineering and Management*, 135(1), pp. 12-16.
- Motwani, J.G., Mahmoud, E. and Rice, G. (2013) “Quality practices of Indian organisation: an empirical analysis”, *International Journal of Quality Management*, vol. 11, no. 1, pp. 38-52.
- Mulings, T.C. (2010) “Total quality management as competitive advantage: a review and empirical study”, *Strategic Management Journal*, vol. 16, no. 1, pp. 15-27.
- Myeza, M. P., (2006). A study of challenges small black electrical contractors in Durban and Pietermaritzburg areas are faced with that could lead to their failure. Pietermaritzburg: University of Kwa-Zulu Natal.
- Ndawonde, N. 2009. South Africa over 2.6 million houses built since 1994. *Architect Africa*, 8 February. [online]. Available from: <<http://architectafrica.com/node/913>> [Accessed: 10 October 2017].
- Neuman, W.L. (2010). *Social research methods qualitative and quantitative Approaches*, 6th Edition, Pearson, Boston. NSW DET. (n.d). Criteria for Quality Re-search accessed 20 June, 2017, <https://www.det.nsw.edu.au/about-us/statistics-and-research/research-partnerships>.
- Nijstad, B.A., Stroebe, W. and Lodewijkx, H.F.M. (2002) “Cognitive stimulation and interference in groups: exposure effects in an idea generation task”, *Journal of Experimental Social Psychology*, vol. 38, pp. 535-44.
- Nixon, T. (2008) *The 5S's: Five Keys to a Total Quality Environment*, Asian Productivity Organisation, Tokyo (www.tpfeurope.com, [05 October 2017]).
- Oakland, J. S. (2013) *Statistical Process Control* 2nd edition, Butterworth-Heinemann, Oxford.
- Ofori, G. (2011). The construction industries in developing countries. In G. Ofori (ed.). *New Perspectives on Construction in Developing Countries*. Abingdon: Spon, 1–16.

Ojo, A.S. (2010). Defect liability period: Employer's right and contractor's liabilities examined. In: Proceedings of COBRA 2010 - W113 Papers on Law and Dispute Resolution, 2-3 September, Paris, France, pp. 467-481.

Olatunji, A., Abimbola, W. and Nureni, F. (2012) Examining The Effect of Quality Management Practices Used on Construction Project Performance In: Laryea, S., Agyepong, S.A., Leiringer, R. and Hughes, W. (Eds) Procs 4th West Africa Built Environment Research (WABER) Conference, 24-26 July 2012, Abuja, Nigeria, 99-108.

Palys, T., 2008. Purposive Sampling. Burnaby: Simon Fraser University.

Park, S.H. (2002) Six Sigma for productivity improvement: Korean business corporations. *Productivity Journal*, vol. 43, no. 2, pp. 173–183.

Peek, H. (2008) The SABMiller Way in Manufacturing.

Pheng, L.S. and Hong, S.H. (2005). Strategic quality management for the construction industry. *Total Quality Management*, 17(1): 35–53.

Philip, B. (2009). Cost of Quality in the Construction Industry. California Polytechnic State University, San Luis Obispo. December 6, 2009. P. 17 – 18.

Powell, T.C. (1995) “Total quality management as competitive advantage: a review and empirical study”, *Strategic Management Journal*, vol. 16, no. 1, pp. 15-27.

Pride, R. H, Hughes, L. K & Kapoor, W.E. (2009) “A realistic test of individual versus group consensus decision making”, *Journal of Applied Psychology*, vol. 74, pp. 834-9.

Prince, S. N. (2013). Assessing quality management systems of SMME's in the manufacturing sector. Port Elizabeth: Nelson Mandela Metropolitan University.

Rategan, J. G. (2013) “Quality practices of Indian organisation: an empirical analysis”, *International Journal of Quality Management*, vol. 11, no. 1, pp. 38-52.

Rhodes University's Public Service Accountability Monitor (PSAM) (2012). A Case Study.

Rhodes, B. & Smallwood, J.J. (2012). Defects and rework in South African construction projects. In: Morledge, R. (ed.). Proceedings of the RICS Foundation Construction and Building Research Conference (COBRA 2002), 5-6 September, Nottingham Trent University, Nottingham. pp. 1-15.

Rockart, D. (2010) Benchmarking, SQC Press, Milwaukee, WI.

Rosenfeld, Y. (2009). Cost of Quality versus Cost of Non-Quality in Construction: The Crucial Balance. *Construction Management and Economics*, 27(2), 107 – 117.

SABMiller Way in Manufacturing. (2007) Problem Solving.

Saravanan, R., & Rao, K. S. P., (2014). An Analysis of Total Quality Service Dimensions in Service Sector–A Case Study. *International Journal of Management and Systems*, 22(8), September-December, 261-267.

Saunders, M. (2011) *Research Methods for Business Students*, 4th Ed. Financial Times – Prentice Hall, Harlow, Chapters 1, 2 & 3.

Seneratne, S. & Jayarathna, T. (2012) “Quality Planning Process of Construction Contractors: Case studies in Sri Lanka”. *Journal of Construction in Developing Countries*, 17(1), pp. 101-114.

Seneratne, S. & Jayarathna, T. (2012). Quality Planning Process of Construction Contractors: Case studies in Sri Lanka. *Journal of Construction in Developing Countries*, 17(1), pp. 101-114.

Shaughnessy, J. J., & Zechmeister, E. B. (2011). *Research methods in psychology* (4th ed.).

Sidumedi, K. S. (2011). An investigation into the relationship between the corporate culture of South African construction firms and performance. Johannesburg: University of Witwatersrand.

Smallwood, J. J. (2012). *Quality Management in Construction*. Cape Town: Nelson Mandela Metropolitan University.

Statistics South Africa. (2013). *Millennium Development Goals 2013, MDG Reports*. Pretoria: South Africa.

Steers, A. A & Porter, M. (2013) “Crafting and executing strategy”, 12th Edition.

Stephenson, P., Morrey, I., Vacher, P. & Ahmed, Z. (2012). Acquisition and structuring of knowledge for defect prediction in brickwork mortar. *Engineering, Construction and Architectural Management*, 9(5/6), pp. 396-408.

Struwig, F. W. & Stead, G. B. (2009). Planning, designing and reporting research, 5th ed. Cape Town: Pearson Education South Africa.

Subburaj, U. (2005) Investigation methods for social scientist and economists, 2nd Ed, Lund: Studentlitteratur.

Sullivan, K. T. (2011). Quality Management Programs in the Construction Industry: Best Value Compared with other Methodologies. *Journal of Management in Engineering*, 27(4), pp. 210-219.

Sullivan, K. T. (2012). Quality Management Measures in the Construction Industry: Best Value Compared with other Methodologies. *Journal of Management in Engineering*, 27(5), pp. 310-345.

Tornow, C and Wiley, G. (2011) “Competing in World Class Manufacturing: America’s 21st Century Challenge”, Business One Irwin, Homewood, IL.

Ungan, M. (2005) “Factors affecting the adoption of manufacturing best practices”, *Benchmarking: An International Journal*, vol. 11, no. 5, pp. 504-20.

UNIDO (2012). ISO 9001 — Its relevance and impact in Asian Developing Economies. Based on Project TE/RAS/09/003: A survey covering quality management system development, certification, accreditation and economic benefits, United Nations Industrial Development Organization, Retrieved from https://www.unido.org/fileadmin/user_media/Publications/Pub_free/ISO%209001%20Impact%20Survey- eBook_ver2.pdf (Accessed in 2012, April).

UNIDO (2012). ISO 9001 — Its relevance and impact in Asian Developing Economies. Based on Project TE/RAS/09/003: A survey covering quality management system development, certification, and accreditation and economic benefits, United Nations Industrial Development Organization, Retrieved from https://www.unido.org/fileadmin/user_media/Publications/Pub_free/ISO%209001%20Impact%20Survey- eBook_ver2.pdf (Accessed in 2017, April).

Van der Vegt, G.S. and Bunderson, J.S. (2015) “Learning and performance in multidisciplinary teams: the importance of collective team identification”, *Academy of Management Journal*, vol. 48, no. 3, pp. 532-47.

Van Wijk, G. (2011) “Brewing up a storm at the source of the Nile”, *Brewer and Distiller International*, vol. 7, no. 3, pp. 37 – 40.

Wang, M & Ahmed, L. (2010) “Changing the way we change”, *Harvard Business Review Journal*, November – December: pp. 127 – 139.

Waters, R. S. (2011) “Assembly bonus effect or typical group performance? A comment on Michaelsen, Watson, and Black (1989)”, *Journal of Applied Psychology*, vol. 77, no. 1, pp. 102-5.

Weber, B. and Hertel, G. (2007) “Motivation gains of inferior group members: a meta-analytical review”, *Journal of Personality and Social Psychology*, vol. 93, no. 6, pp. 973-93.

Wessel, G. and Burcher, P. (2004), “Six Sigma for small and medium-sized enterprises”, *The TQM Magazine*, vol. 16, no. 4, pp. 264-72.

West, M.A., Brodbeck, F.C. and Richter, A.W. (2004) “Does the ‘romance of teams’ exist? The effectiveness of teams in experimental and field settings”, *Journal of Occupational and Organizational Psychology*, vol. 77, pp. 467-73.

West, M.A., Hirst, G., Richter, A. and Shipton, H. (2010) “Twelve steps to heaven: successfully managing change through developing innovative teams”, *European Journal of Work and Organizational Psychology*, vol. 13, pp. 269-99.

Wickramaratne, P. (2012) “Benchmarking best practice in European Manufacturing sites”, *Business Process Re-engineering and Management Journal*, vol. 1, no. 1, pp.60-74.

Willey, J. (2011) *World Class Manufacturing*, McGraw-Hill, London.

Yusuff, R.M. (2011) “Manufacturing best practices of the electric and electronic firms in Malaysia”, *Benchmarking: An International Journal*, vol. 11, no. 4, pp. 361-9.

Zietsman, R. (2011). Defects in the South African construction industry now and then. In: *Proceedings of the Construction Industry Development Board (CIDB) 5th Post-graduate Conference on Construction Industry Development*, 16-18 March, Bloemfontein, South Africa, pp. 108-114.

Zikmund, W.G. (2011) *Business Research Methods*, 6th Ed. Orlando, the Dryden Press.

Zunguzane, N., Smallwood, J. & Emuze, F. (2012). Perceptions of the quality of low-income houses in South Africa: Defects and their causes. *Acta Structilia*, 19(1), pp. 19-38.

Appendix 1-Consent Documents



Dear Respondent,

MBA Research Project

Researcher: Monwabisi Goodyear Phetshula (0027761848855)

Email Address: phetshulamonwa@yahoo.com

Supervisor: Dr N Khumalo

Email Address: khumalon6@ukzn.ac.za

Research Office: Ms Mariette Snyman (0027 31 260 8350)

Email Address: Snymanm@ukzn.ac.za

I, Monwabisi Goodyear Phetshula (Student Number: 214577336), an MBA student at the Graduate School of Business and Leadership, of the University of KwaZulu-Natal, kindly invite you to participate in a research project entitled:

QUALITY MANAGEMENT IN THE CONSTRUCTION OF LOW-COST HOUSES IN EASTERN CAPE PROVINCE OF SOUTH AFRICA

This study seeks to determine the factors or challenges that affect Quality Management in the construction of low-cost houses at Amathole Region in the Eastern Cape Province. The study will also solicit for the construction industry professionals that are directly involved in this project`s perceptions of the benefits of ISO 9000 or 9001 certification as a Quality Management system, and more specifically:

1. To identify factors that affect Quality Management in the construction of low-cost houses at Amathole Region in the Eastern Cape Province.
2. To determine which Quality Management strategies are used in the construction of low-cost houses at Amathole Region in the Eastern Cape Province.
3. To determine if the Quality Management personnel at the Amathole low-cost housing projects are well resourced.
4. To recommend strategies that could be used to enhance Quality Management in the construction of low-cost houses at Amathole Region in the Eastern Cape Province.
5. To determine the construction industry professionals involved in the Amathole low-cost houses project`s perception of the benefits of ISO 9000 or ISO 9001 certification as a Quality Management system.

The study will provide strategies for improving Quality Management implementation in the construction industry, particularly in the construction of low-cost houses at Amathole Region in the Eastern Cape Province. There is a general concern that the quality of construction especially that of low-cost houses is very poor. Not only in the Eastern Cape Province, but also in several parts of the country. Such studies are very necessary to conscientise the stakeholders in the construction industry in South Africa on the importance of Quality Management to reduce client dissatisfaction and costs of rework and boosting the image of the construction industry.

Your participation in this project is voluntary. You may refuse to participate or withdraw from the project at any time with no negative consequences. There would be no monetary gain emanating from participating in this research. The Graduate School of Business and Leadership

at the University of KwaZulu-Natal will maintain confidentiality and anonymity of records identifying you as a participant.

If you have any questions or concerns about completing the questionnaire or about participating in this study, you may contact me or my supervisor, the details of which are listed above.

The survey should take about 10 – 15 minutes to complete. I hope you will take some of your precious time to complete the survey instrument.

Sincerely

Student/Researcher Signature:Date:

These two pages are to be retained by the participant.



Dear Respondent,

MBA Research Project

Researcher: Monwabisi Goodyear Phetshula (0027)

Email Address: phetshulamonwa@yahoo.com

Supervisor: Dr N Khumalo

Email Address: khumalon6@ukzn.ac.za

Research Office: Ms Mariette Snyman (0027 31 260 8350) Email Address:
Snymanm@ukzn.ac.za

Research Project Title:

QUALITY MANAGEMENT IN THE CONSTRUCTION OF LOW-COST HOUSES IN
EASTERN CAPE PROVINCE OF SOUTH AFRICA

CONSENT

I (Full names of participant)

Working for (Full company name)

Hereby confirm that I fully understand the contents of this document and the nature of the research project and I consent fully to participating in the research project.

I understand that I am at liberty to withdraw from the project at any time, should I so desire.

SIGNATURE OF PARTICIPANT:.....

DATE:

Appendix 2: Questionnaire

QUESTIONNAIRE – QUALITY MANAGEMENT IMPLEMENTATION

THE PARTICIPANT OR RESPONDENT IS A PROFESSIONAL IN THE CONSTRUCTION INDUSTRY

SECTION A: DEMOGRAPHICS

Date Questionnaire Was Completed.....

Preferred Language

- | | | |
|----|---------|--------------------------|
| 1. | English | <input type="checkbox"/> |
| 2. | Zulu | <input type="checkbox"/> |
| 3. | Other | <input type="checkbox"/> |

Race

- | | | |
|----|----------|--------------------------|
| 1. | Black | <input type="checkbox"/> |
| 2. | Coloured | <input type="checkbox"/> |
| 3. | Indian | <input type="checkbox"/> |
| 4. | White | <input type="checkbox"/> |

Gender

- | | | |
|----|--------|--------------------------|
| 1. | Male | <input type="checkbox"/> |
| 2. | Female | <input type="checkbox"/> |

Age Group

- | | | |
|----|-------------|--------------------------|
| 1. | 24 and less | <input type="checkbox"/> |
| | | <input type="checkbox"/> |

2. 25 – 35

3. 36 – 40

☐

4. Over 40

☐

Level of Education

1. Diploma

☐

2. First Degree

☐

3. Higher Degree

☐

SECTION B: Factors that affect Quality Management in the Construction Industry

The following statements describe factors that affect Quality Management in the construction of the low-cost houses at Amathole Region in the Eastern Cape Province.

INSTRUCTIONS: Mark with an X or tick in the column that represents your response.

	Quality Management Challenges	1 = Strongly Disagree	2 = Disagree	3 = Neutral	4 = Agree	5 = Strongly Agree
1	Problems related to Amathole low housing projects are caused by contractors using unskilled labour					
2	Millions of Rand are spent by government on repairs for defective workmanship, i.e. rework					
3	Project failure is characterised by deficiency in design documents					

4	There is a lack of communication within the project teams					
5	There is a lack of technical competence by contractors					
6	Process or activities of projects are incorrectly implemented					
7	Project failure is characterised by deficiency in design documents					
	Quality Management Strategies					
8	Each project is properly planned					
9	All projects have a plan and clear definition					
10	Projects are strategically aligned to improve quality					
11	Primary projects define the overall scope					
12	Projects are deemed successful if they are completed on specified time limits					
13	A project is deemed successful if it solves the problem it was intended to within budgets limits					
14	Employees buy-ins and participation in quality implementation is critical for project success					

15	Employees are continuously trained on quality management implementation in order to reduce defects on the projects					
	Resourcing of Quality Management Personnel					
16	Executive management gives its full support to the quality management personnel as they ensure quality management towards the implementation of projects					
17	The project management environment created by the executive management supports the culture to improve quality by the quality management personnel					
18	Strategic project management best practices are implemented to improve quality by the quality management personnel					
19	A strategic project measurement system is implemented to improve quality					
20	Quality management personnel are allowed by the executive management sufficient time devoted to quality site management					
21	Quality management personnel are empowered to involve clients for					

	feedback assessment of quality implementation on projects					
22	All stakeholders are in attendance at relevant meetings to contribute their ideas					
	Perceptions on benefits of ISO 9000 or 9001 certification as a Quality Management System					
23	There is a decrease in the number of defects/ rework					
24	Clients complaints decrease					
25	There is significant improvement in product quality					
26	There bound to be a significant reduction in costs, especially costs to re-do the work					
27	ISO certification would save the government billions of Rand in restitution costs					
28	There is bound to be increased motivation to invest in modern technology to meet world class standards					
29	There is bound to be improved internal and external relationships management					
30	There is bound to be improved evidence-based decision making					

31	There is bound to improved customer focus and processes approach					
32	There is bound to be improved competitive capabilities and increased market share					

Appendix 3: Gatekeeper letter

Appendix 4: Ethical clearance