THE QUALITY CONTROL IMPLEMENTATION IN THE CONSTRUCTION PROJECTS IN SAUDI ARABIA

A THESIS SUBMITTED TO THE GRADUATE SCHOOL OF APPLIED SCIENCES OF NEAR EAST UNIVERSITY

By

MOHAMMAD ABAZID

In Partial Fulfillment of the Requirements for

The Degree of Master of Science

in

Civil Engineering

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Approval of Director of Graduate School of

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I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

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To my Dad and Mum

ABSTRACT

The concepts of Total Quality Management are closely associated with the concept of Building Code in managing and improving the execution of the construction projects that achieve a better performance in saving time, satisfying the customers, profits increasing, coast reduction, achieving safety requirements and maintaining the coordination and the integrity with the project basic parameters (time, cost and quality). Therefore, the purpose of the study is to address the importance and to assess the impact of the application of concepts of Total Quality Management on the implementation of construction projects in Saudi Arabia and the extent of how it is related to the Building Code over the last ten years.

In order to achieve the purpose of the study, the descriptive analytical approach was used through distributing 124 questionnaires in engineering offices and construction companies. SPSS program was used in order to process the collected data.

The study found that the construction projects in Saudi Arabia still suffer from the weaknesses in the application of Total Quality Management concepts, lack of administrative, scientific and technical competencies and poor application of the standards of the Building Code in the execution of construction projects. Also, it found that the construction projects suffer from the imperfection in meeting customer's goals and needs.

The study recommended applying Total Quality Management standards in the construction projects according to the Building Code in order to improve the scientific and technical competencies in the construction work and to adjust it according to the correct specifications and standards that achieve clients' needs.

Keywords: Total Quality Management, Building Code, construction projects, standards, Saudi Arabia.

ÖZET

Toplam Kalite Yönetimi kavramı, zaman tasarrufu, müşterileri tatmin etme, kâr artışı, maliyeti azaltma, güvenlik gereksinimlerinin karşılanması ve projenin temel parametreleri (zaman, maliyet ve kalite) ile koordinasyon ve bütünlüğün sağlanması için daha iyi bir performans sağlayan inşaat projelerinin yürütülmesinde ve geliştirilmesinde Yapı Yönetmeliği kavramıyla yakından ilişkilidir. Dolayısıyla, bu araştırmanın amacı, Toplam Kalite Yönetimi kavramlarının uygulanmasının Suudi Arabistan'daki inşaat projeleri uygulamalarına etkisinin önemini ve son on yıl içinde Yapı Yönetmeliği ile nasıl ilişkili olduğunu ele almak ve değerlendirmektir.

Çalışmanın amacına ulaşmak için, 124 araştırma soru kağıdı mühendislik bürolarına ve inşaat şirketlerine dağıtarak betimsel analitik yaklaşım kullanılmıştır. Toplanan verileri işlemek için SPSS (Sosyal Bilimler İstatistik Programı) programı kullanılmıştır.

Yapılan çalışmada, Suudi Arabistan'da yer alan inşaat projelerinde Toplam Kalite Yönetimi konseptlerinin uygulanmasında hala sıkıntı çekildiğini, inşaat projelerinin yürütülmesinde idari, bilimsel ve teknik yetkinliklerin eksikliği ve Yapı Yönetmeliği standartlarının zayıf bir şekilde uygulandığı tespit edilmiştir. Ayrıca, inşaat projelerinde, müşterinin amaç ve ihtiyaçlarını karşılamada yapılan hatalardan sıkıntı çekildiği tespit edilmiştir.

Yapılan çalışma, inşaat çalışmalarında bilimsel ve pratik yeterliklerin artırılması ve müşterilerin ihtiyaçlarını karşılayan doğru spesifikasyonlara ve standartlara göre ayarlamaların yapılması amacıyla inşaat projelerinde Toplam Kalite Yönetimi standartlarının Yapı Yönetmeliğine göre uygulanmasını önermektedir.

Anahtar Kelimeler: Toplam Kalite Yönetimi, Yapı Yönetmeliği, inşaat projeleri, standartlar, Suudi Arabistan.

TABLE OF CONTENTS

CHAPTER 4: METHODOLOGY

CHAPTER 5: DATA ANALYSIS AND DISCUSSION

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

REFERENCES

APPENDICES

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

1. Introduction

Construction projects are considered one of the most successful investment phases, where the construction sector has seen significant growth over the past ten years in Saudi Arabia. Construction projects, in the present era, not only focus on the traditional achievement but also go beyond to focus on quality, profitability, reduce costs and saving time and effort.

Engineering construction projects in Saudi Arabia still suffer from deficiencies in outputs and weak stages of implementation, as well as the lack of planning, coordination, monitoring and evaluation, as a result of its lack of quality standards, in the absence of a clear vision of the top departments to apply the concepts of quality that focus on quick profit and their belief that the application of quality requires more time and effort, and insufficient commitment by the top management of companies and institutions of Construction industry to exert the required efforts for the application of quality concepts, and the lack of effective communication and coordination among Job factors of the construction project (owner, designer, executor, and supervisor) this led to the lack of standards and specifications that control the process of projects implementation, and the absence of qualified and skilled technicians and reliance on non-qualified subcontractors as well as violation of specifications and conditions , which made many of the Saudi Arabia, especially the Saudi Arabia seek to apply new concepts and foundations in the implementation of projects and work on finding a building code that achieves specifications, standards and conditions which will ensure more accurate outputs, simplifying the implementation procedures, facilitate the operations and providing safety and security factors and become occupied attentively with the application of quality concepts in all phases of the project implementation, all of this cannot be achieved without a strategic plan adopted by the higher authorities and governments and this requires work, research, training, experimentation, planning, practice, assessment and evaluation, organization and integration to keep abreast of developments, providing channels of communication, exchange of experiences, finding good suppliers, best use of modern methods and techniques and arranging execution phases within a calendar plan

based on the distribution of tasks within the specified time to achieve the required quality and customer satisfaction, so construction project becomes a certain flow of achievements and a global brand which entitled with excellence and creativity, the advantages of applying the concepts of total quality management on the implementation of construction projects in Saudi Arabia are shown in the following:

- Reducing errors, increasing the chances of success and improving the quality of outputs.
- Administration of sufficient control by the supervising authorities during the implementation and conducting all possible tests to ensure a good level of implementation.
- Continuous improvement of all operations and activities related to the planning and implementation.
- Saving of time, reducing effort and increasing profits.
- Co partnership among Job factors of the construction project (owner, designer, executor and supervisor).
- Removing factor of fears for engineers, technicians and workers, and work to find the appropriate climate and a catalyst for everyone to work effectively for the implementation of the project.
- Creating an environment that supports and maintains the continuous development of all implementation processes.
- Planning to improve standards and increasing its congruence.
- Satisfying the continuously growing needs and desires of clients.
- Increasing the efficiency of contractors and consultants in the implementation of projects.
- Comply with all required conditions, standards and specifications.
- Improving working environment and increasing safety factors.
- Optimal utilization of resources and reduce wastage.
- Using the scientific methods of engineering management in project implementation and reducing the necessary tasks and activities.

In consequence, this study will examine the assessment of the reality of applying total quality concepts implementation of construction projects in Saudi Arabia, through making

studies, analysis and evaluation tools and methodology of the observed results, taking into account the major determinants of the project represented in time and cost, which integrate to reach the required quality.

1.2 Importance of Studying

- The study dealt with the importance of raising the reality of applying management quality concepts to engineering offices and construction companies, where the concepts of quality were linked to factories.

- Defining the mechanisms and methods that support engineering departments in designing and implementation to achieve engineering efficiency and in comply with the determinants of the project (time, cost and quality).

- The study monitored some powerful experiences on applying management quality concepts in the implementation of construction projects.

- The importance of this study is highlighted as being serious, scientific attempt to bridge the apparent lack of research in the field of Implementation of construction projects in Saudi Arabia.

- Seeking to achieve integration between the concepts of quality and building code to achieve an accurate and perfection outputs.

1.3 Objectives of the Study

Despite the availability of basic references to the concepts of quality in many Western countries as a result of applying it effectively, but its spread in Saudi Arabia remains limited especially in the contracting and engineering consultancy sector, Dealing with these challenges requires intensive efforts to get rid of the traditional administrative methods and adopting modern concepts of administrative work to be able to provide appropriate solutions to these challenges by revising and editing the current models of quality concepts to reach the best performance, which kept pace with modern developments.

The review of some experiences that applied quality concept shows that Japan has managed to apply the concepts of quality that dealt with these challenges effectively. The following points clarify the Objectives of the study:

- Evaluating the reality of applying total quality management concepts and building code on the implementation of construction projects.
- Definition of total quality management concepts and their practical applications.
- Analysis of some international experiences in this field.
- Shed light on the most important obstacles that hinder from achieving quality in the implementation of construction projects in the Saudi Arabia.
- Promote the importance of focusing on continuous improvement during the implementation phases of the Construction project.
- Clarify the relationship between quality and building code and its impact on the implementation of the Construction Projects.
- To identify the causes of poor application of building code by engineering departments.
- Study and analysis of the obstacles to the application of quality and building code in Construction Projects.
- Determining the role of top management in the application of quality.
- Analysis of the relationship between cost, time and quality.
- Studying the reasons for the reluctance of engineering departments from the application of building code.

- Achieve the requirements for the application of total quality management in the field of construction projects.
- Clarify the impact of training the personnel to achieve quality.

1.4 The Problem of the Study

The nature of the this stage in the light of contemporary changes imposes new needs and capabilities that will ignite a productivity revolution which is based on the quality, speed, saving time, increased profits, saving effort, symmetry Planning to work in harmony in all operations and controlling chaos and random, all these factors clarify the concept of the modern management for engineering construction projects in the quality industry.

The problems of engineering construction projects in Saudi Arabia are shown in, breaking a lot of projects during its implementation, the poor quality of project outputs or delivering the project after its due date and increased costs as an advance against profits, as a result of lack of understanding of the real management of the project and the lack of a comprehensive theory, which regulates the construction work.

1.5 Summary of the Study Problems

First: non- commitment of top management to the application of total quality management concepts in the implementation of construction projects.

Second: psychological inflexibility of workers to work as a team, nitpick without establishing true partnership rules and developing skills.

Third: the absence of real understanding of the importance of building code to achieve quality by the parties of constructing project.

Fourthly: they do not keep up with all engineering infrastructure such as developments, knowledge, modern technologies and collecting and updating information.

1.6 Hypotheses

The hypotheses of the study have been based on the problem of the study and its various elements, these assumptions are considered as real-time answers to the studied phenomenon.

1.6.1 Main Hypothesis

There is a statistically significant relationship between the non- commitment of top management to the application of quality concepts and the lack of success of the application of total quality management concepts in the implementation of construction projects.

1.6.2 Sub Hypothesis

A. There is a statistically significant relationship between the absence of administrative, scientific, technical, professional cadres and competencies that are necessary for the application of quality concepts in the implementation of structural projects and the lack of success of the application of total quality management concepts in the implementation of construction projects.

B. There is a statistically significant relationship between non-application of standards, requirements and specifications of building code and lack of success of the application of total quality management concepts in the implementation of construction projects.

C. There is a statistically significant relationship between failure to achieve goals and targets of customer or entrepreneurs and lack of success of the application of total quality management concepts in the implementation of construction projects.

1.7 Society and the Research Sample

The research society includes engineering offices and contracting companies in Saudi Arabia that are specialists in various construction works, that approved by chambers of commerce and municipalities.

1.8 Data Sources

1.8.1 Main sources

In order to address the analytical framework of the study, structured questionnaire was distributed to the target group. Respondents were asked to provide opinions on the variables of this research.

1.8.2 Secondary sources

Secondary sources: In order to address the theoretical framework of the study, these secondary resources included: reference books, reports, papers published in scientific journals and magazines, papers from scientific conferences, electronic newspapers articles, unpublished papers, theses and dissertations that were obtained from universities websites, and some readings and reports from various websites that are related to the study topic.

1.9 The Study Methodology

The research used descriptive analytical approach for the purpose of reach to the results of the study through the use of field-style in the collection of data by questionnaire and statistically analyzes it and the design was quantitative because the data took a numerical form.

1.10 Data Measurement

In this research, ordinal scales were used. Ordinal scale is a ranking or a rating data that normally uses integers in ascending or descending order. The numbers assigned to the important (1 to 5) do not indicate that the interval between scales are equal, nor do they indicate absolute quantities. The Data analysis made utilizing (SPSS). The researcher utilizes the following statistical tools:

- Kolmogorov-Smirnov test.
- Pearson correlation coefficient.
- Frequency and Descriptive analysis.
- Parametric Tests (One-sample T test, Independent Samples T-test and Analysis of Variance).

1.11 Research Design

The first chapter consists of research hypotheses, defining the problems and objective of the study and development research.

The second chapter of the research consists of definitions of Quality, Total Quality Management and Building Code.

The third chapter consists of a summary of the literature review that have topics are close to Total Quality Management.

The fourth chapter of the research included the methodology that used in the research.

The fifth chapter of the research included data analysis and discussion and SPSS software was used to perform the required analysis.

The final chapter includes the conclusions and recommendations.

CHAPTER 2
DEFINITION

2.1 Definition of Quality

Quality has multiple definitions, and some of them will be reviewed such as:

Goucher and Coffey (1993) defined it as "satisfying customers at the lowest cost".

Juran and Gryna (1980) described it as "appropriate use" meaning that goods and services must meet the needs of the community which will use it.

Joseph Jablonski (1991) defined it as" the distinguishing characteristics of a product or a service in which the user is associating it with quality".

Leebov and Ersoz (1991) also defined it as "The right things done properly".

In these definitions, it is indicated that there is a relationship between quality and meeting the needs of customers. These definitions, however, are concise and focus on the importance of meeting the expectations of members of society.

Ali Al Sulaimi (1995) defined Quality as "the total qualities and characteristics of a piece of goods or service that shows its ability to achieve declared or undeclared wishes".

This definition is unique because it refers to the product quality as well as the quality of service.

James Teboul (1991) also defined quality as "the ability to satisfy the needs at the time of purchase and during the usage at the best cost, while reducing losses and increasing competitiveness".

This definition points out to the cost factor and loses reduction and improving competitiveness.

Subhi Alawa (2002) indicated that "the quality in general is a set of activities that carried out for the purpose of setting performance standards, monitoring and improving the performance to make the provided service effective and efficient and also safe".

This definition is distinguished by linking quality and performance standards together, as quality is a set of administrative measures, which aim at providing service to customers at the highest level of exactness.

Goetsch and Davis (1995) noted that despite that there is no universal concept that agreed upon for quality, it can be enumerated certain elements that are shared in quality definitions as follows:

- Quality aims at satisfying customer's expectations or more.
- Applying quality could be generalized on commodities, services, operations and individuals.
- Quality is marked by continuity of change, as what is acceptable today may not be acceptable later.

By taking these elements into consideration quality is not characterized by stability, but it is characterized by dynamic change. It is linked to commodities, services, operations, individuals and the environment, according to what customers and administration can expect or even more.

This definition is an inclusive definition, as it points out that quality does not mean only the quality of commodities, but also the quality of services and individuals. The definition also focuses on the principle of continuity which is considered an important element of quality. This definition is the only one which concentrates on this principle. This is the reason for considering it as the best one at all.

2.2 Definition of Total Quality Management

There is no universal definition that is agreed upon and gained acceptance from intellectuals and researchers for Total Quality Management. But there are various definitions for it that are essential to review such as:

The Definition of Total Quality Management by the Federal Institute of the United States of America as "the right things done properly from the prima fade relying on the client's evaluation to see the degree of the improved performance".

The International Organization for Standardization (ISO) (2000) defines it as "an administrative field that focuses on quality of all members of the institution are

contributing to achieve long-term success through client's satisfaction and achieving win-win outcomes".

British Quality Association's Definition: "It is the administrative philosophy of the institution, through which it can achieve all the needs of the consumer as well as the targets of the foundation".

This definition is characterized by identifying the concept of Total Quality Management as the philosophy that achieves the goal of the client and the institution at the same time.

John Okland (1987) defined it as: "It is the mean by which the organization seeks to develop its effectiveness, flexibility and competitive position on the scope of the work as a whole". It is believed that this definition links between Total Quality Management and competitiveness. The definition overlooks the importance of customer satisfaction as the primary objective of the organization.

However, by analyzing the words in the concept of Total Quality Management, it can be found that:

- Management: it is the activity of exercising the functions of planning, organizing and monitoring.
- Quality: is the degree of excellence provided by a product or a service.
- Total: it includes all parts and components.

Thus, Total Quality Management is "the art of managing all parts and components of the organization in order to achieve excellence. Total Quality is known as a philosophy and a set of principles which constitute the basis of the organization that pursues a continuous improvement, through the application of quantitative methods and the effective use of human resources within the organization to meet the needs of the customers, even more than this in the present time and in the future". Total Quality Management combines and integrates the deriving benefits from the basic administrative methods and the current efforts for improvement and development as well as the various technical tools within the framework of an orderly field to achieve the objectives of the organization and its development.

Jablonski (1991) defined it as "a cooperative style of doing business that is based on common abilities and skills of the workers and the management to achieve the continuous improvement of production and quality through teamwork and individual work".

His definition is distinguished by its emphasis on the continuous improvement and cooperation, while it is criticized for the lack of reference to the customer satisfaction when using services or goods provided by the institution.

If the definition by Cohen and Brand (1993) has been examined, it can be found that it is one of the most comprehensive definitions of TQM. They explain each word in the term Total Quality Management as follows:

Management: the conservation and the development of the organization in order to continuously improve the quality.

Quality: meeting the requirements and needs of the beneficiary or the client, even providing more than this.

Total: includes the implementation of the principle of seeking quality in any form of work, starting with identifying the needs of the beneficiary and ending with the assessment of the client whether he or she is satisfied with the products and the services provided to him or her.

Hakes (1991) define it as "a cultural revolution on the method that is used by the management on improving quality. It is a field of expressing more common sensation in management practices and the importance of statistical measures. It is a continuous change by the administration in view of the results, through the management that understands and manages the operations to accomplish the goals. It is the outcome of management practices and the analytical methods that help in the process of continuous improvement, hence the cost reduction".

Another definition which is developed by the United States Department of Defense indicates that "Total Quality Management represents a philosophy and a set of guiding principles which are considered as the pillars of continuous improvement of the organization. It is the implementation of the quantitative methods and human resources in order to improve the materials and services supplied to the organization and the degree of fulfilling of the needs of the current and the future needs of the customer".

Ahmed Moussa (1996) provided a definition of Total Quality Management describing it as "creating a doctrine for all employees in project management to develop their working style to ensure that workers do their work in an integrated manner and to ensure rending service on a level that satisfies the customer".

It can be understood from the definition that Total Quality Management has essential properties and elements, which are:

- Creating a culture among all employees that is designed to perform best work efficiently as possible in order to achieve customer satisfaction.
- Ensuring the integration and coordination between the staff and projects management to achieve the ultimate goal of the project.
- The need to identify customer satisfaction, which would contribute to attain the highest possible quality of the project through statistical analysis and client's opinion to determine the levels and quality standards.
- The need to create personnel training system to help them gaining skills and instilling the principle of satisfying the customer.

In addition, Ahmed Mustafa (1998) has examined the Total Quality Management as "a field of a comprehensive and continuous development that includes all stages and performance domains". This development constitutes joint and several liabilities for senior management, departments, sections, teamwork and individuals in an effort to satisfy the needs and expectations of the client. The field of Total Quality Management includes all operating phases since dealing with the supplier and operation processes and even dealing with customer in sale and services.

The field of Quality Management is moving, via the efforts of the working groups, to meet the broad objectives such as improving the quality, cost reduction, increasing market share and development. Quality Management includes, and requires, a harmonious structure of continuous administrative and innovative efforts and specialized technical skills as to help attaining the continuous improvement of all activities of the organization. This requires a deep commitment and continuous efforts from the staff and the management at all organizational levels and in work teams.

From the aforementioned, it can be summarized that Total Quality Management is: an administrative system which is based on a number of principles and requirements through comprehending the philosophy and the concept of Total Quality Management and the commitment of the leadership to implement it. This can be done through the conduct of participation, strategic planning, the focus on internal and external customers, continuous improvement of the performance and the offered services and products, determining the standards of measurement and task analysis, preventing errors before they occur, providing the necessary motivation and professional training for the employees.

2.3 Definitions of Building Code

Building Code is known as a set of laws and technical and scientific and managerial systems adopted by a government department (or departments) specialized in building to ensure the acceptable limits of safety and public health on the basis of scientific laws, natural conditions, rules of engineering, material properties and natural disasters such as: earthquakes, fires as well as the purpose of the use of the building. There have been a lot of adverse effects on human health and safety as a result of construction errors caused by using materials that lack quality or building the structure without having the ability to resist natural disasters such as storms and earthquakes or accidents like fires. As a result, new regulations and laws that ensure the safe construction of buildings have been issued since thousands of years.

The accumulated experience and expertise of human are resulted from facing accidents and disasters, whether man-made or natural fatalism and documenting these incidents through studies and laboratory tests, has led to the legislation of a huge number of laws and regulations of each society and environment.

CHAPTER 3
LITERATURE REVIEW

Through searching in references, books and on the internet, for the purpose of finding researches and studies that have topics that are close to this research topic, it has been found the following studies:

3.1 Al-Swafeery's Study (1997) that is titled: Developing Internal Audit's Functions in the Light of the International Quality Standards Requirements (ISO 9000)

The study aimed at showing and examining the International Quality Standards "ISO" 9000. Also, it aimed at examining and analyzing the standards of the intellectual and philosophical frameworks of the Total Quality Management as its implementation ensures providing the appropriate environment for developing and improving the Total Quality.

However, the study indicated that there are deficiencies and inappropriateness in the nature of the traditional internal audit with the modern and the advanced concepts of the International Quality Standards and the concept of Total Quality Management. Moreover, the study pointed out to the importance of changing the traditional framework of the internal auditor and the importance of changing the scope of the financial auditing and reviewing the compliance with the policies, procedures, rules, regulations and laws to a framework that is more responsive to the audit quality systems concepts.

3.2 Hijazi's Study (1997) "Total Quality Management- Introduction to Improve Quality Product in Spinning and Tissue Industry in Arab Republic of Egypt".

The study aimed at defining and recording the intellectual and philosophical frameworks of the introductory of Total Quality Management as it is a new approach in business administration and it is as a managerial approach that aims at achieving the continuous improving and developing quality and productivity and the performance. This is through addressing the various concepts and contributions of the pioneers in the field.

However, one of the remarkable results of the study is that the textile companies that were examined could not get the needed requirements for getting one of the international quality certificates (ISO) which is considered as the first step in implementing Total Quality

Management. Till now, there was no company that took serious steps in forming the internal and the organizational structure and made the necessary developments for advancement and obtaining one of these certificates.

3.3 Ali Al-Jembaz's Study (2010) "Evaluating the Managerial Factors that are Delaying the Construction Projects"

The study was conducted in Qatar. The purpose of the study is to examine the significance and the impact of the managerial factors on the performance of the construction projects in terms of the duration of completing the project. The methodology that was used is surveying a sample of project managers in consultation offices and construction companies. The study concluded that:

1. There is impact, with statistical indication, for leadership competency with its dimensions (leadership abilities, leadership skills and the choice of manpower) on the time for completing construction projects.

2. There is impact, with statistical indication, for management efficiency with its dimensions (team building and understanding the internal environment for the contractor) on the time for completing construction projects.

3. There is impact, with statistical indication, for scientific and cognitive efficiency with its dimensions (legal skills, scientific skills and managing human resources) on the time for completing construction projects.

However, there are several significant recommendations that have been recommended by the study, which are:

• The founders of the construction companies and the board of directors should be careful in the selecting the manpower who will manage the companies.

• Forming alliances and corporations among some construction companies locally or internationally for executing huge projects. Thus, it will help in sharing experiences and getting to know the latest scientific approaches in project management.

• Expanding the academic professional training in order to equip the employees who are working in construction industry with the scientific, theoretical, cognitive and professional experiences.

3.4 Al-Swafeery's Study (1997) that is titled: Developing Internal Audit's Functions in the Light of the International Quality Standards Requirements (ISO 9000)

The study aimed at showing and examining the International Quality Standards "ISO" 9000. Also, it aimed at examining and analyzing the standards of the intellectual and philosophical frameworks of the Total Quality Management as its implementation ensures providing the appropriate environment for developing and improving the Total Quality.

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3.5 Seedy's Study (1999) that is titled: Introduction to Total Quality Management to Improve the Efficiency and Effectiveness of the Internal Audit Management.

The study aimed at investigating whether the internal audit management in the companies that have the International Quality Certificates apply the principles of Total Quality Management at the level of each variable or the total level of the performance of the variables. It also aimed at investigating whether the internal audit management uses the resources and the human resources efficiently as it is expected and whether the challenges that are facing the internal audit management require benefiting from the introduction of Total Quality Management in order to improve the effectiveness. The sample that had studied is the private companies that have the International Quality Certificate in the Arab Republic of Egypt. The number of the companies that had studied is 106 companies. The researcher used program SPSS.

The study recommended the following recommendations:

• Expanding the scope of internal audit services to include the provision of advisory services to the senior management and the various departments in the company.

• Focusing on developing the skills of the internal auditors and introducing them to the modern methods in managements.

• It is vital to train the internal auditors and to develop their skills in using the statistical methods while performing their job in the internal audit.

• Development in applying the Total Quality Management in the internal audit departments, particularly in the companies that got International Quality Certificates (ISO 9000).

3.6 Al-Ghabary's Study (2000) that is titled: The Recent Trends in the Internal Auditing and Its Importance in Determining the Future Trends

The study aimed at highlighting the accounting perspective that is associated with the process of the internal auditing and identifying the areas in which can add value to the auditing process and setting a framework that helps in facing the challenges and to determine its future trends.

The study sat a framework that determines the future directions for the work of the internal audit in the light of the increased competition and the emergence of many challenges. This lead the organizations to maximize the effective use of this available resources in order to maximize the role of the internal audit to include additional areas that are related to the important activities that are influencing the work of the organization such as: strategic planning , the work of re-engineering, total quality systems and environmental audit.

3.7 Labeeb's Study (2002) that is titled: Towards Reaching a Comprehensive Framework of Professional Efficiency Standards for the Internal Audit in Facing the Financial Corruption Phenomenon in the Business Industry.

The study aimed at presenting a comprehensive framework of regulations that aim at increasing the professional efficiency of the internal audit in facing the financial corruption phenomenon. In addition, it aimed at directing the academic and the professional efforts

towards forming a new framework for the professional efficiency standards for the internal audit in order to be able of facing the financial corruption in business industry, particularly after the problems of the collapse of many global businesses.

That study found that there are set of standards that can increase the degree of professionalism for the internal auditors. Some of the standards are: achieving the greatest possible autonomy for the internal auditors, activating the role of audit committees and developing the standards of professional performance for internal auditing.

3.8 Sulaiman's Study (2005) that is titled: Improving the Internal Audit Measurement to Meet the Needs of Total Quality Audit in the Industrial Installations- Normative Analysis with Multiple Variables.

The study aimed at attempting to develop the measurement of the quality services of the internal audit in order to meet the needs of the Total Quality Audit in the industrial installations. Also, it is aimed at showing the importance of the internal auditing profession in the environment of the economic activity which is inevitable to use the concept of Total Quality Management as a strategy to face the challenges in this environment and to clarify the accounting implications of this concept on the profession.

The study proved its hypothesis with regards to the importance of the proposed measurements for evaluating the quality service of the internal audit, which includes twenty one measurements on the partial level of the assessment and sixteen measurements on the Total level that includes has significantly higher ability in explaining the contrast in level of the quality services of the internal audit.

The study indicated that there is a significant relationship between applying the traditional tasks and applying Total Quality Management programs and getting quality certificates, which can be said that the importance of internal auditing is increasing in these companies comparing to their counterparts.

3.9 Helal's Study (1974) that is titled: Management Auditing and Its role in Rationalizing the Managerial Decisions.

The study aimed at addressing the current trends in auditing, especially in the fields of the managerial auditing and showing its benefits and its role in designing a new framework for

the managerial auditing concept and defining the legal and the organizational position for the managerial auditing. It aimed at illustrating the required academic qualifications of the auditor and his or her role in rationalizing the decisions of the senior management among different alternatives. The study concluded that:

• The managerial auditing is considered as a development of the internal auditing that aims at achieving new goals in addition to the traditional goals of the internal auditing.

• The process of performance assessment is important and fundamental in the managerial auditing.

3.10 Ameed Fathi's Study (2014) that is titled: Assessing the Impact of the Application of Total Quality Concepts on the Execution of Construction Projects in the Arab Countries and How it is Related to Engineering Code.

The most important finding by the study is that the need of strengthening the application of Total Quality Management concepts in the environment of executing the construction projects and achieving the integration with the Engineering Code in order to enhance the quality of implementing construction projects.

3.11 Basem Abbas Koredy's study (2012) "Total Quality Principles and Its Impact on Achieving the Priorities of the Competitiveness in Factories".

The study indicated the need for factories to take modern procedures in the field of Total Quality Management and to adapt its principles to achieve the priorities for competitiveness.

3.12 Alaa Aldeen Ali Aldery's Study (2011) that is titled: The Impact of Poor Planning on the Duration of Executing Construction Projects.

The sample of the study included project managers. However, the most important finding by the study is that the delay in executing the engineering projects is due to the lack of the awareness of the importance of the managerial and the engineering planning in the construction companies.

3.13 Bomadyan Yosof's Study (2007) that is titled: Total Quality Management and the Outstanding Performance.

The most significant finding in the research is that the need to adapt the scientific approach in implementing Total Quality. Also, the organizations should take all the necessary measures for the proper implementation of Total Quality principles.

3.14 Zeyad Sulaiman Mohammad Khalid's Study (2005) that it titled: Improving the Quality of the Implemention of Construction Projects in the Government Contracting Companies in Iraq.

The research included that the project managers in the Ministry of Construction and Housing in Iraq. However, one of the most significant findings in the study is that the wages and the incentives are the most influential factors that are affecting the quality of project execution.

3.15 Miozzo and Ivory's Study (2000) that is titled: Restriction in the British Construction Industry: Implication of Recent in Project and Technology.

The study had conducted in Britain and it used questionnaires with the sample that is included all parties who are involved in construction: contractors, consultants, sole contractors and suppliers. The study aimed at highlighting the administrative components of the construction projects. The study concluded that there is a strong link between these components in terms of:

1. The way of dealing among the parties who are involved in the construction process.
2. The methods that are used in tendering and dealing with stages of project design and the supervision and the execution and financing every stage.
3. The usage of modern technologies that help the project outputs (cost, time, quality).

The study, however, recommended using the modern technology in managing and planning the construction projects in all phases starting from the idea and ending with the delivery of the project and put it under investment. The researcher has been benefitted from this study in enhancing the understanding of the components of the construction project and finding ways that ensure the balance among all parties who are involved in construction projects.

3.16 Ahcom's Study (2004) that is titled: A Model for Benchmarking Contractors Project Management Elements in KSA.

The study was conducted in the Kingdom of Saudi Arabia where it surveyed the opinions of the project managers and the engineers in the construction companies and the consultancy offices that are charged with overseeing some government projects. It aimed at building a model for construction contractors in order to improve their administrative performance. It concluded that the reasons for delay in the construction projects are directly related to increase in the cost which can be reduced through:

1. The proper and the excellent planning for the project.
2. The constant surveillance of the project plan by the management of the project.
3. The coordination between the contractor and the external parties who are involved in the project like the suppliers and the soles contractors and others.
4. The harmony among team work members.
5. The compliance with the instructions and the government regulations.
6. Contractor's commitment in providing: cadres who have high efficiency, skilled labor and high quality materials on time.

The study recommended that the contractor to form the working teams from different specialties and high expertise, and to take care of the effective communication and the proper planning and the surveillance in all phases in the project. However, this study benefitted the researcher by adopting many points as benchmark for his study, especially with regards to the planning and its association with the time of project execution.

3.17 Comment on previous studies

• **Through reviewing the previous studies, it can be found that:**

1. Most of the studies aimed at showing the importance of the application of Total Quality Management as it is generally have significance in improving companies' performance.
2. The majority of the studies used the descriptive analytical method.

• **The similarities:**

1. The current study is consistent with some of the previous studies that studied the internal audit and its relation with Total Quality Management and the extent of the evolution in the internal audit in the various economic sectors.
2. The current study is consistent with the majority of the previous studies in terms of the usage of the descriptive analytical method.
3. The current study is consistent with most of the previous studies in terms of using questionnaires.

• **The benefits from the previous studies:**

1. It has been benefited from the previous studies in determining in the questionnaire's aspects and choosing the methodology of the study.
2. The previous studies helped in enriching the knowledge and the various ideas that are related with the subject, and this contributed to the crystallization of the current study's problem to be linked to the concepts of Total Quality Management as one of the advanced topics that are imposed by the circumstances and the current developments, and that was reflected on the concepts of the reciprocal relationship between Total Quality Management and the internal audit.

• **distinguishes the current study are:**

1. This study is one of the first studies that study Total Quality Management and its relationship with the Building Code in the Kingdom of Saudi Arabia.
2. This study proposes recommendations for activating the earnest role of the management in the application of Total Quality Management.

3. Showing the recent changes in the internal audit environment under the application of Total Quality and to indicate the continuous improvement in the internal audit performance.

4. Addressing the most influential factors in the application of Total Quality Management concept.

CHAPTER 4
METHODOLOGY

This chapter illustrates the methodology that was used in this study. The adopted methodology uses the following techniques: research population, questionnaire design, statistical data analysis, content validity and pilot study.

4.1 Methodology of study

The study used analytical descriptive approach for the purpose of reach to the results of the study through the use of field-style in the collection of data by questionnaire and statistically analyze it to select the validity of hypotheses in addition to library scanning to take advantage of books and scientific journals in the field of project's quality in order to build a theoretical framework for the study.

4.2 Data Collection Methodology

In order to collect the needed data for the research, we used secondary sources containing previous studies, books, references, certified researchers and websites that discussed this topic, and through distributing questionnaires on the research population in order to get their views on Quality Control Implementation in the Construction of Projects in Saudi Arabia and their Relation to the Building Codes and standards.

4.3 Population and Sample Size

The population included engineering offices and contracting companies in Saudi Arabia that are specialists in various construction works and approved by chambers of commerce, municipalities.

Figure 4.1 shows the methodology flowchart, which leads to achieve the research objective.
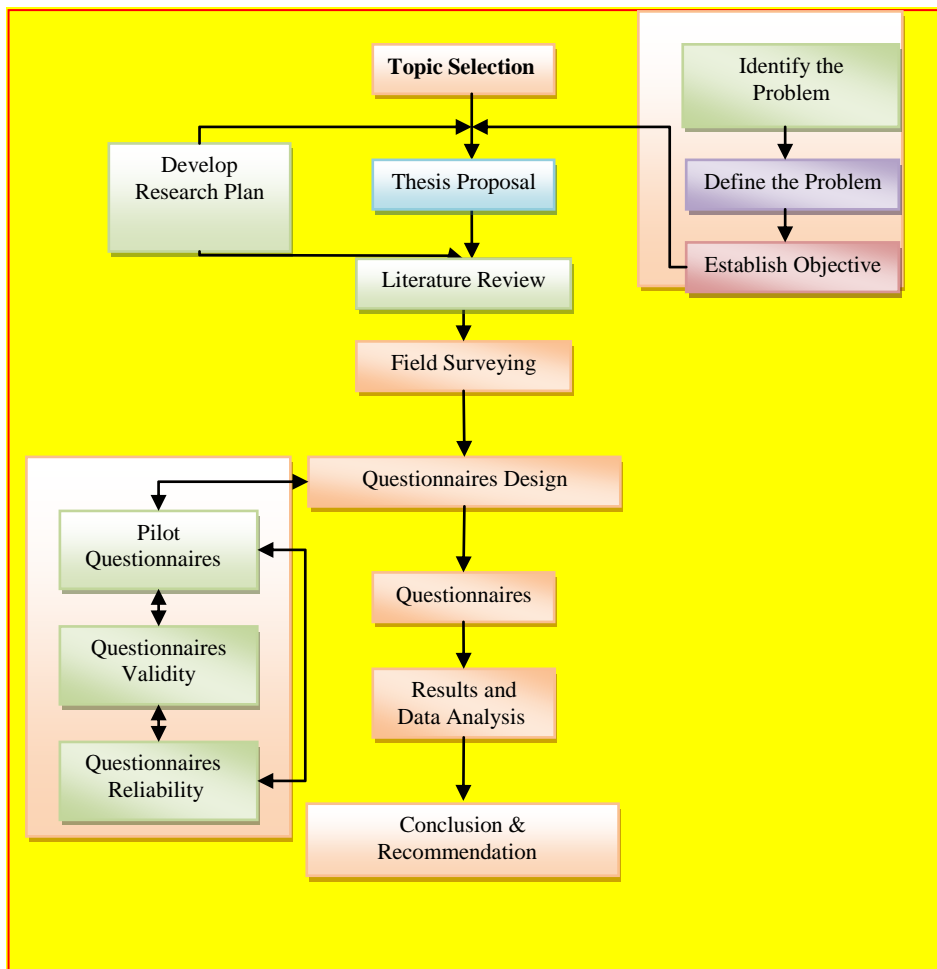
Figure 4.1: Methodology flowchart

4.4 Data Measurement

In order to determine the proper method of analysis, the ordinal scales were used based on Likert scale as following:

Table 4.1 Likert scale

Item	Completely Agree	Mostly Agree	Slightly Agree	Mostly Disagree	Completely Disagree
Scale	5	4	3	2	1

4.5 Questionnaire

The questionnaire is a set of questions given to a sample of people; it was used in this study as the basic tool for data collection, the questionnaire is considered one of the widely used scientific research methods to collect data or information about the conditions of the people, trends, motives, thoughts and beliefs.

The questionnaire was published in Arabic and English version on engineering offices and contracting companies in Saudi Arabia, that are specialists in various construction work in order to be understood by respondents. It started with a covering letter explaining the purpose of the study, the way of responding aim of the research and the security of information in order to encourage respondents to answer in a proper way and provide correct information, also questions were arranged in a logical order and a proper sequencing see appendix.

4.5.1 Questionnaire Design

The questionnaire was carefully designed in order to facilitate the collection process, in addition to maximize the reliability and validity of data gathered from respondents. The questionnaire included six sections as follows:

Section (1): It focused on the personal characteristics of the respondents including (organization, scientific qualification, experience and employment status).

Section (2): questions focused on the non - commitment of top management to the application of total quality concepts.

Section (3): questions focused on the absence of administrative, scientific, technical, professional cadres and competencies.

Section (4): questions focused on the non-application of standards, requirements and specifications of building code.

Section (5): questions focused on between failure to achieve goals and targets of the customers.

4.6 Validity of Questionnaire

Validity means the degree to which an instrument measures what it is has to be measuring. Validity has a various aspects and assessment methods. Statistical validity is used to assess instrument validity, which involve internal validity and structure validity.

4.6.1 Internal Validity

Internal validity of the questionnaire is the first statistical test that is used to examine the validity of the questionnaire. It is measured by a scouting sample, which consisted of 30 questionnaires through measuring the correlation coefficients between each item in one field and the whole field.

Table 4.2 clarifies the correlation coefficient for each item of the "Non - commitment of top management to the application of total quality concepts" and the total of the field. The p-values (Sig.) are less than 0.05, so the correlation coefficients of this field are significant at α = 0.05, so it can be said that the items of this field are consistent and valid to be measure what it was set for.

Table 4.2: Correlation coefficient of each item of "Non - commitment of top management to the application of total quality concepts" and the total of this field

No.	Item	Pearson Correlation Coefficient	P-Value (Sig.)
1.	How do you evaluate management statistical control on the accuracy of Total Quality?	.703	0.000
2.	To what extent would you evaluate the division of quality responsibilities?	.749	0.000
3.	How would you evaluate company's focus on achieving all standards of quality?	.763	0.000
4.	How would you evaluate management's efforts to inform the employees about the relationship between product's quality and costs?	.709	0.000
5.	How do you evaluate the continuous improvement of the quality system?	.785	0.000
6.	How would you evaluate the necessary measures to remove the causes of poor application quality?	.886	0.000
7.	How would you evaluate the corrective actions that prevent the recurrence of poor application quality?	.841	0.000
8.	How would you evaluate reviewing the corrective actions and documenting the results?	.581	0.000
9.	How would you evaluate the practical approaches to achieve effective control and the efficiency of operations?	.616	0.000
10.	How would you evaluate the application of practical approaches to quality ?	.544	0.000

Table 4.3 clarifies the correlation coefficient for each item of the "The absence of administrative, scientific, technical, professional cadres and competencies" and the total of the field. The p-values (Sig.) are less than 0.05, so the correlation coefficients of this field are significant at α = 0.05, so it can be said that the items of this field are consistent and valid to be measure what it was set for.

Table 4.3: Correlation coefficient of each item of "The absence of administrative, scientific, technical, professional cadres and competencies" and the total of this field

No.	Item	Pearson Correlation Coefficient	P-Value (Sig.)
1.	How would you evaluate company's essential competencies (administrative, scientific and technical) for the application of Total Quality concepts?	.809	0.000
2.	To what extent you evaluate the performance of the committee which monitors the application of quality concepts?	.793	0.000
3.	How do you evaluate the level of expertise among Committee members?	.864	0.000
4.	How would you evaluate Committee's commitment to conduct sessions on time and its application of quality concepts?	.888	0.000
5.	How would you evaluate the courses for the scientific and technical cadres on the application of quality concepts?	.917	0.000
6.	How would you evaluate the clarifications of Total Quality concepts to the labor and engineers?	.799	0.000

Table 4.4 clarifies the correlation coefficient for each item of the "The Non-application of standards, requirements and specifications of building code″ and the total of the field. The p-values (Sig.) are less than 0.05, so the correlation coefficients of this field are significant at α = 0.05, so it can be said that the items of this field are consistent and valid to be measure what it was set for.

Table 4.4: Correlation coefficient of each item of "The Non-application of standards, requirements and specifications of building code″ and the total of this field

No.	Item	Pearson Correlation Coefficient	P-Value (Sig.)
1.	In the case of applying standards and conditions of Engineering Building Code, how would you evaluate its impact on (time, cost and scope of the project)?	.406	0.013
2.	How do you evaluate the planning for designing stage, starting from the idea, then the initial and final design, production and the stage of using the scheme according to the principles of the Engineering Building Code?	.871	0.000
3.	How would you evaluate the examination of every stage in designing phase and the confirmation of using safety standards of Engineering Building Code in the design?	.838	0.000
4.	How do you evaluate the clarification of the responsibilities and powers of the executors of the design?	.860	0.000
5.	To what extent do you evaluate the process of reviewing the designs at the appropriate stage?	.914	0.000
6.	How do you evaluate suggestions solutions, in the case of evaluation?	.859	0.000
7.	How would you evaluate the documentation of the results of the design on a special register for this purpose?	.834	0.000
8.	How do you evaluate the identification and documentation of the changes that occur to the design?	.764	0.000

Table 4.5 clarifies the correlation coefficient for each item of the "Failure to achieve goals and targets" and the total of the field. The p-values (Sig.) are less than 0.05, so the correlation coefficients of this field are significant at α = 0.05, so it can be said that the items of this field are consistent and valid to be measure what it was set for.

Table 4.5: Correlation coefficient of each item of "Failure to achieve goals and targets of customer" and the total of this field

No.	Item	Pearson Correlation Coefficient	P-Value (Sig.)
1.	How would you evaluate company's focus on customer satisfaction?	.841	0.000
2.	How would you evaluate entrepreneurs' or (client's) satisfaction with the execution or planning the project according to the standards of Engineering Building Code?	.792	0.000
3.	To what extent would you evaluate company's identification of the client's requirements, including delivery and after delivery requirements?	.918	0.000
4.	How do you evaluate company's identification of the client's non-specific requirements and convincing him with the necessity of using it?	.845	0.000
5.	To what extent would you define company's specifications of the required obligations that are related to designing and execution, including the statutory and legal requirements?	.869	0.000
6.	How do you evaluate company's review of every order to ensure the availability of the requirements for its implementation?	.841	0.000
7.	How do you evaluate the process of presenting the new requirements on the concerned departments and units to seek their opinions before execution?	.850	0.000
8.	How do you evaluate the documentation of the results of reviewing orders, contracts and the consequent actions in a special record for this purpose?	.694	0.000

4.6.2 Structure Validity of the Questionnaire

Structure validity is the second statistical test that utilized to examine the validity of the questionnaire structure by examining the validity of each field and the validity of the whole questionnaire. It measures the correlation coefficient between one field and all the fields of the questionnaire that have the same level of liker scale.

Table 4.6 clarifies the correlation coefficient for each field and the whole questionnaire. The p-values (Sig.) are less than 0.05, so the correlation coefficients of all the fields are significant at α = 0.05, so it can be said that the fields are valid to be measured what it was set for to achieve the main aim of the study.

Table 4.6: Correlation coefficient of each field and the whole of questionnaire

No.	Field	Pearson Correlation Coefficient	P-Value (Sig.)
1.	Non - commitment of top management to the application of total quality concept	.927	0.000
2.	The absence of administrative, scientific, technical, professional cadres and competencies	.828	0.000
3.	The Non-application of standards, requirements and specifications of building code	.891	0.000
4.	Failure to achieve goals and targets of customer	.917	0.000

4.7 Reliability of the Research

The reliability of an instrument is the degree of consistency which measures the attribute; it is supposed to be measuring (George and Mallery, 2006). The less variation an instrument produces in repeated measurements of an attribute, the higher its reliability. Reliability can be equated with the stability, consistency, or dependability of a measuring tool. The test is repeated to the same sample of people on two occasions and then compares the scores obtained by computing a reliability coefficient (George and Mallery, 2006). To insure the reliability of the questionnaire, Cronbach's Coefficient Alpha should be applied.

4.8 Cronbach's Coefficient Alpha

Cronbach's alpha is designed as a measure of internal consistency, that is, do all items within the instrument measure the same thing? The normal range of Cronbach's coefficient alpha value between 0.0 and + 1.0, and the higher values reflects a higher degree of internal consistency (George and Mallery, 2006). The Cronbach's coefficient alpha was calculated for each field of the questionnaire.

Table 4.7 shows the values of Cronbach's Alpha for each field of the questionnaire and the entire questionnaire. For the fields, values of Cronbach's Alpha were in the range from 0.913 and 0.923. This range is considered high; the result ensures the reliability of each field of the questionnaire. Cronbach's Alpha equals 0.968 for the entire questionnaire which indicates an excellent reliability of the entire questionnaire.

Table 4.7: Cronbach's Alpha for each field of the questionnaire

No.	Field	Cronbach's Alpha
1.	Non - commitment of top management to the application of total quality concept	0.913
2.	The absence of administrative, scientific, technical, professional cadres and competencies	0.920
3.	The Non-application of standards, requirements and specifications of building code	0.918
4.	Failure to achieve goals and targets of customer	0.923
	All items of the questionnaire	0.968

The Thereby, it can be said that the researcher proved that the questionnaire was valid, reliable, and ready for distribution for the population sample.

4.9 Test of Normality

The One-Sample Kolmogorov-Smirnov test procedure compares the observed cumulative distribution function for a variable with a specified theoretical distribution, which may be normal, uniform, Poisson, or exponential. The Kolmogorov-Smirnov Z is computed from the largest difference (in absolute value) between the observed and theoretical cumulative distribution functions. This goodness-of-fit test tests whether the observations could reasonably have come from the specified distribution. Many parametric tests require normally distributed variables. The one-sample Kolmogorov-Smirnov test can be used to test that a variable of interest is normally distributed (Henry, C. and Thode, Jr., 2002).

Table 4.8 shows the results for Kolmogorov-Smirnov test of normality. From Table (4.8), the p-value for each variable is greater than 0.05 level of significance, then the distributions for these variables are normally distributed. Consequently, parametric tests should be used to perform the statistical data analysis.

Table 4.8: Kolmogorov-Smirnov test

Field	Kolmogorov-Smirnov	
	Statistic	**P-value**
Non - commitment of top management to the application of total quality concept	0.554	0.918
The absence of administrative, scientific, technical, professional cadres and competencies	0.834	0.489
The Non-application of standards, requirements and specifications of building code	0.870	0.436
Failure to achieve goals and targets of customer	0.896	0.398
All items of the questionnaire	1.110	0.170

4.10 Statistical Analysis Tools

The researcher used data analysis both qualitative and quantitative data analysis methods. The Data analysis made utilizing (SPSS 23). The researcher utilizes the following statistical tools:

1) Kolmogorov-Smirnov test of normality.
2) Pearson correlation coefficient for Validity.
3) Cronbach's Alpha for Reliability Statistics.
4) Frequency and Descriptive analysis.
5) Stepwise regression.
6) One-sample T test

T-test is used to determine if the mean of a item is significantly different from a hypothesized value 3 (Middle value of Likert scale). If the P-value (Sig.) is smaller than or equal to the level of significance, $\alpha = 0.05$, then the mean of a item is significantly different from a hypothesized value 3. The sign of the Test value indicates whether the mean is significantly greater or smaller than hypothesized value 3. On the other hand, if the P-value (Sig.) is greater than the level of significance $\alpha = 0.05$, then the mean a item is insignificantly different from a hypothesized value 3.

CHAPTER 5

DATA ANALYSIS AND DISCUSSION

5.1 Personal data of participants in the questionnaire

5.1.1 Qualification of participants in the questionnaire

Table 5.1 shows that 90.3% of the sample are " Bachelor " and the frequency is 112 , 8.9% of the sample are " Master " and the frequency is 11 and 0.8% of the sample are " PhD " holders and the frequency is 1.

Table 5.1: Frequency and Percentage of qualification of participants

Qualification	Frequency	Percent
Bachelor	112	90.3
Master	11	8.9
PhD	1	0.8
Total	124	100.0

Figure 5.1 shows that 90.3% of the sample are "Bachelor ", 8.9% of the sample are" Master" and 0.8% of the sample are "PhD" holders. And we conclude that the Percent of master is higher than PhD but the percent o master is the highest.
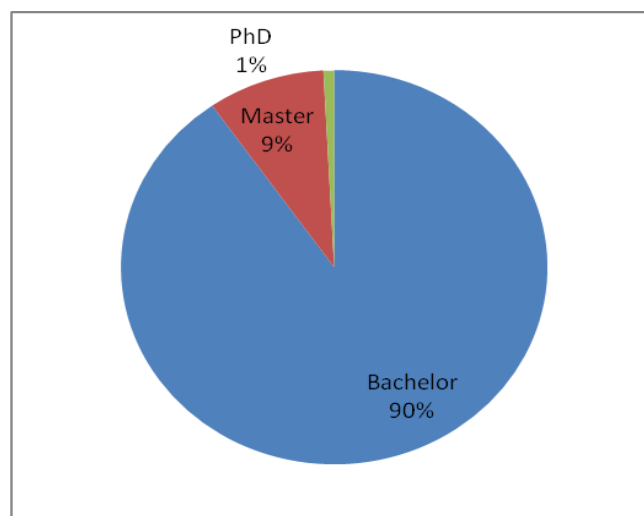
Figure 5.1: Percentage of qualification of participants

5.1.2 Job of participants in the questionnaire

Table 5.2 shows that 55.6% of the sample are site engineer and the frequency is 14, 33.1% are site manager and the frequency is 42 and 11.3% of the sample are company manager and the frequency is 69.

Table 5.2: Frequency and Percentage of job of participants

Job	Frequency	Percent
Company manager	14	11.3
Site Manager	41	33.1
Site Engineer	69	55.6
Total	124	100.0

Figure 5.2 shows that 55.6% of the sample are site engineer, 33.1% are site manager and 11.3% of the sample are company manager so we conclude that the Percent of site engineer is the highest and the percent of site manager is higher than company manager.
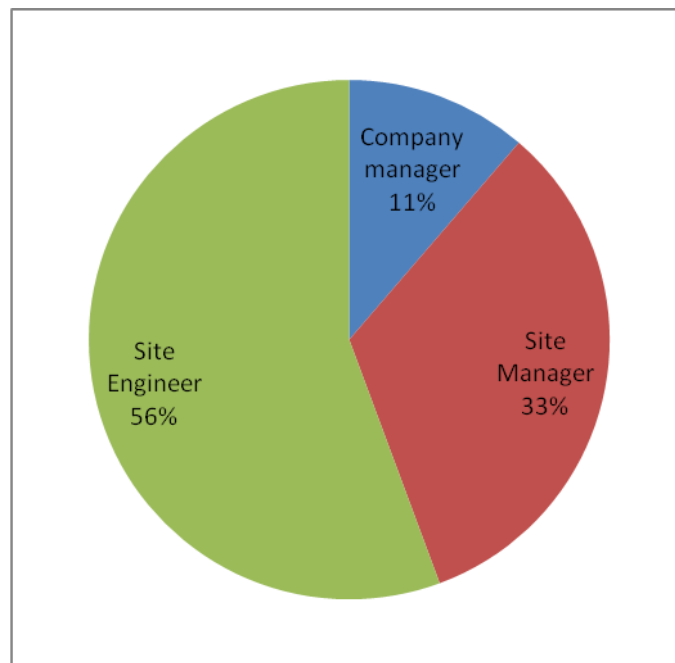
Figure 5.2: Percentage of job of participants

5.1.3 Organization of participants in the questionnaire

Table 5.3 shows that 73.4% of the sample are contractor organization and the frequency is 13, 16.1% are consultant organization and the frequency is 20 and 10.5% of the sample are government organization and the frequency is 91.

Table 5.3: Frequency and Percentage of organization of participants

Organization	Frequency	Percent
Government	13	10.5
Consultant	20	16.1
Contractor	91	73.4
Total	124	100.0

Figure (5.3) shows that 73.4% of the sample are contractor organization, 16.1% are consultant organization and 10.5% of the sample are government organization so we conclude that the percent of consultant is higher than government but the percent of contractor is the highest.
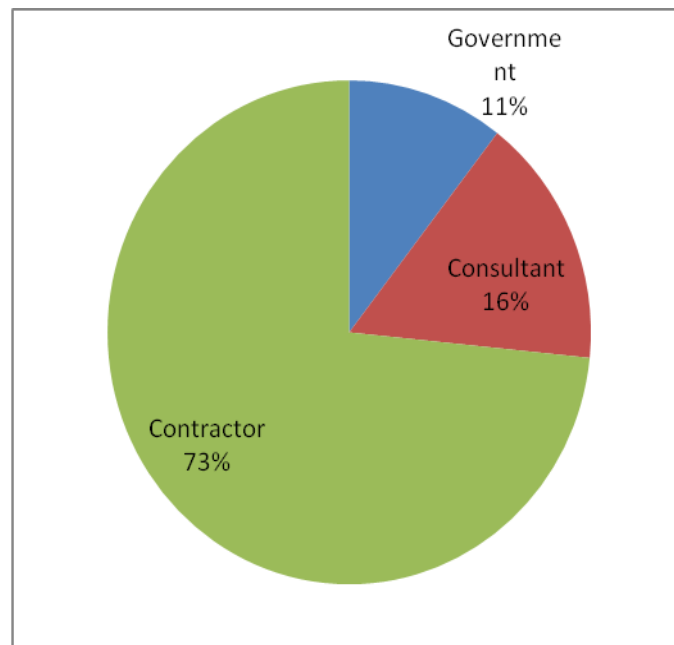
Figure 5.3: Percentage of organization of participants

5.1.4 Experience of participants in the questionnaire

Table 5.4 shows that 41.1% of the sample have experience "1-5 years" and the frequency is 51, 37.9% of the sample have experience "5-10 years" and the frequency is 47 and 21.0% of the sample have experience "more than 10 years" and the frequency is 26.

Table 5.4: Frequency and Percentage of experience of participants

Experience	Frequency	Percent
1-5 years	51	41.1
5-10 years	47	37.9
More than 10 years	26	21.0
Total	124	100.0

Figure 5.4 shows that 41.1% of the sample have experience "1-5 years", 37.9% of the sample have experience "5-10 years" and 21.0% of the sample have experience "more than 10 years".
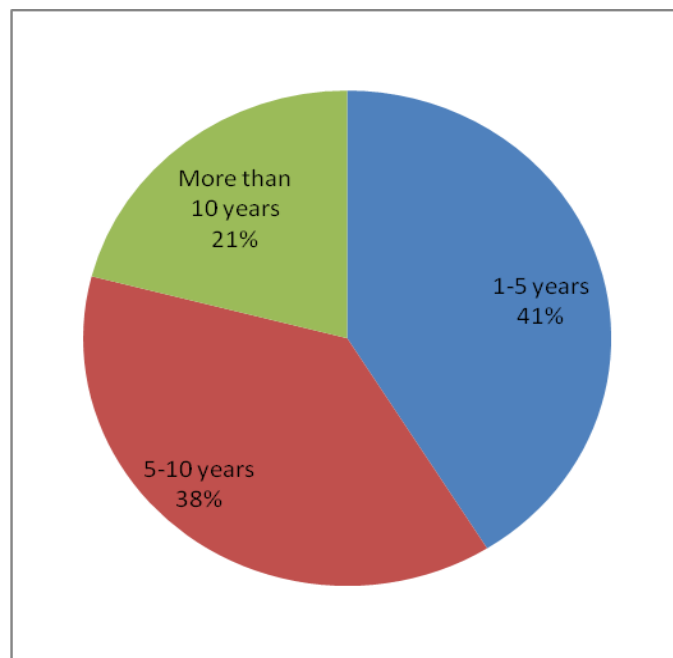
Figure 5.4: Percentage of experience of participants

5.2 Research Hypothesis

5.2.1 Analysis the Questions Related to Main Hypothesis

The main hypothesis is " There is a statistically significant relationship between the non-commitment of top management to the application of total quality concepts and the lack of success of the application of quality concepts in the implementation of construction projects", it is related to questions (1 to 10).

5.2.1.1 Analysis of Question 1

The analysis of question No 1 "How do you evaluate management statistical control on the accuracy of Total Quality?" is as follows:

Table 5.5 shows the frequency of "very poor" is 26, the frequency of " poor" is 13, the frequency of "middle" is 52, the frequency of "good" is 19 and the frequency of "very good" is 14. Also Table 5.5 and Figure 5.5 shows the percent of "very poor" is 21%, the percent of " poor" is 10.5%, the percent of "middle" is 41.9%, the percent of "good" is 15.3% and the percent of "very good" is 11.3%.

Table 5.5: Frequency and Percentage of Q1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very poor	26	21.0	21.0	21.0
	poor	13	10.5	10.5	31.5
	middle	52	41.9	41.9	73.4
	good	19	15.3	15.3	88.7
	very good	14	11.3	11.3	100.0
	Total	124	100.0	100.0	
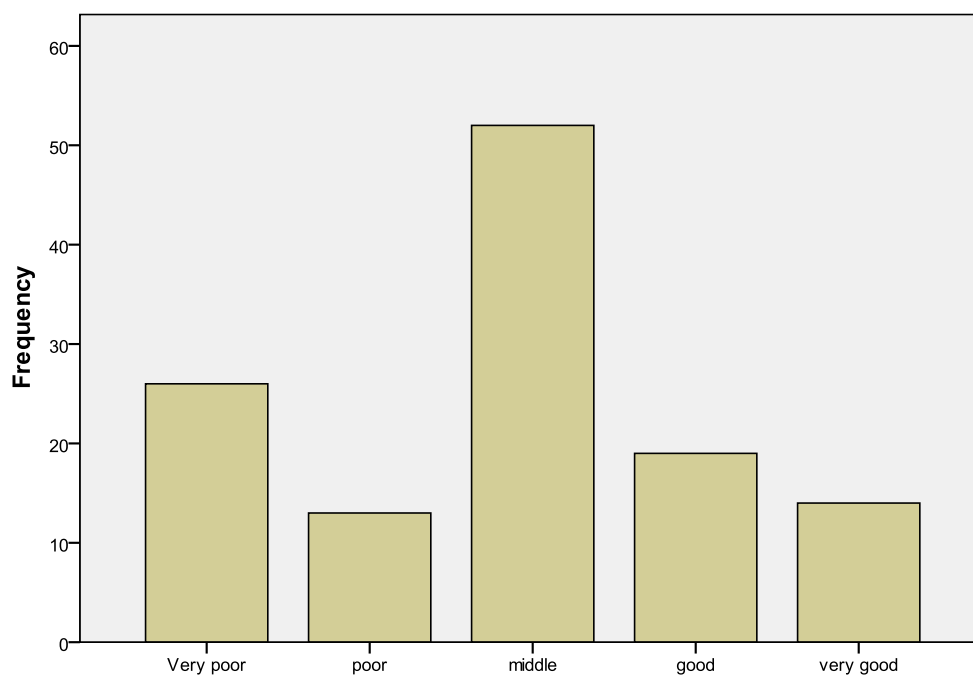
Figure 5.5: Frequency of Q1

Table 5.6 shows the mean of item "How do you evaluate management statistical control on the accuracy of Total Quality?" equals 2.85 (57.10%), Test value = -1.30, and P value = 0.098 which is more than the level of significance $\alpha = 0.05$, so the mean of this item is insignificantly different from the hypothesized value 3. We found that the respondents (neutral) to this item.

Table 5.6: Means and Test values for Q1

Item	Mean	Proportional mean	Test value	P value (Sig.)
How do you evaluate management statistical control on the accuracy of Total Quality?	2.85	57.10	-1.30	0.098

5.2.1.2 Analysis of Question 2

The analysis of question No 2 "To what extent would you evaluate the division of quality responsibilities?" is as follows:

Table 5.7 shows the frequency of "very poor" is 16, the frequency of " poor" is 31, the frequency of "middle" is 42, the frequency of "good" is 27 and the frequency of "very good" is 8. Also Table 5.7 and Figure 5.6 shows the percent of "very poor" is 12.9%, the percent of " poor" is 25%, the percent of "middle" is 33.9%, the percent of "good" is 21.8% and the percent of "very good" is 6.5%.

Table 5.7: Frequency and Percentage of Q2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very poor	16	12.9	12.9	12.9
	poor	31	25.0	25.0	37.9
	middle	42	33.9	33.9	71.8
	good	27	21.8	21.8	93.5
	very good	8	6.5	6.5	100.0
	Total	124	100.0	100.0	
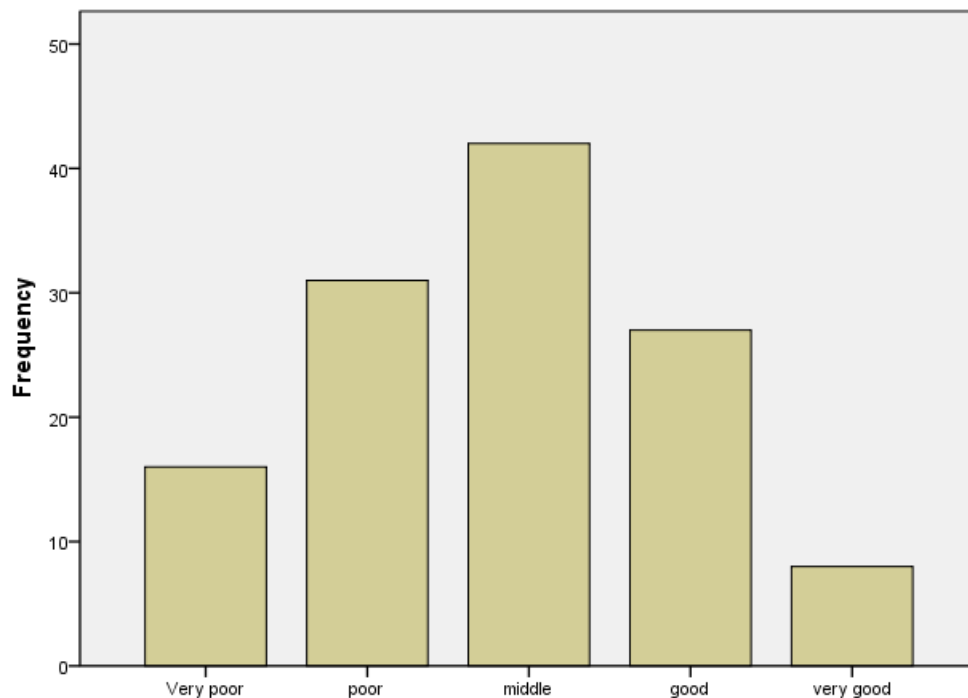
Figure 5.6: Frequency of Q2

Table 5.8 shows the mean of item "To what extent would you evaluate the division of quality responsibilities?" equals 2.84 (56.77%), Test value = -1.62, and P value = 0.054 which is more than the level of significance $\alpha = 0.05$, so the mean of this item is insignificantly different from the hypothesized value 3. We found that the respondents (neutral) to this item.

Table 5.8: Means and Test values for Q2

Item	Mean	Proportional mean	Test value	P value (Sig.)
To what extent would you evaluate the division of quality responsibilities?	2.84	56.77	-1.62	0.054

5.2.1.3 Analysis of Question 3

The analysis of question No 3 "How would you evaluate company's focus on achieving all standards of quality?" is as follows:

Table 5.9 shows the frequency of "very poor" is 12, the frequency of " poor" is 37, the frequency of "middle" is 41, the frequency of "good" is 23 and the frequency of "very good" is 11. Also Table 5.9 and Figure 5.7 shows the percent of "very poor" is 9.7%, the percent of " poor" is 29.8%, the percent of "middle" is 33.1%, the percent of "good" is 18.5% and the percent of "very good" is 8.9%.

Table 5.9: Frequency and Percentage of Q3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very poor	12	9.7	9.7	9.7
	poor	37	29.8	29.8	39.5
	middle	41	33.1	33.1	72.6
	good	23	18.5	18.5	91.1
	very good	11	8.9	8.9	100.0
	Total	124	100.0	100.0	
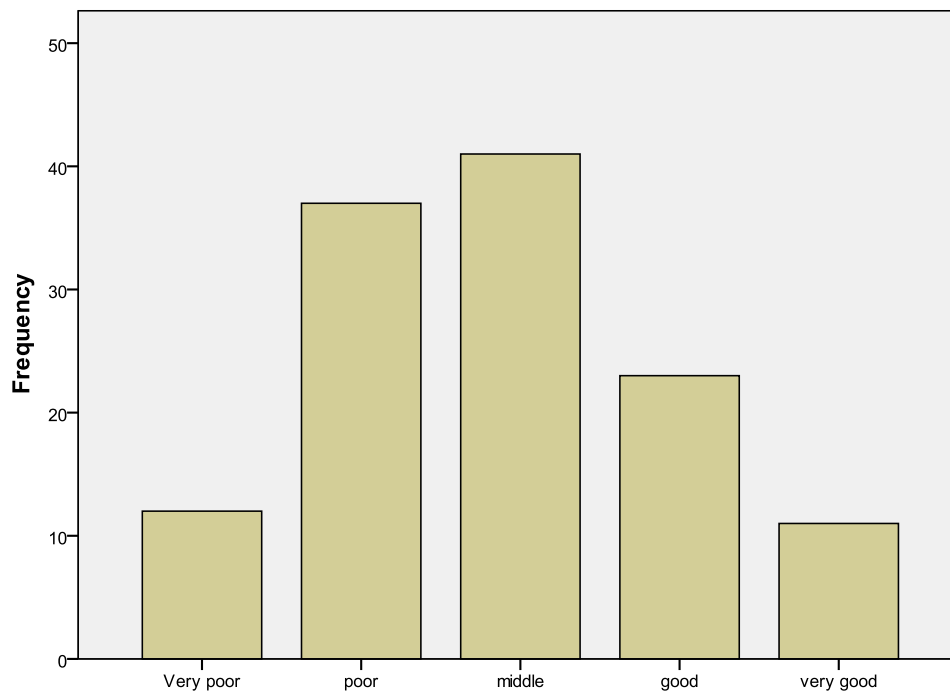
Figure 5.7: Frequency of Q3

Table 5.10 shows the mean of item "How would you evaluate management's efforts to inform the employees about the relationship between product's quality and costs?" equals 2.87 (57.42%), Test value = -1.30, and P value = 0.098 which is more than the level of significance $\alpha = 0.05$, so the mean of this item is insignificantly different from the hypothesized value 3. We found that the respondents (neutral) to this item.

Table 5.10: Means and Test values for Q3

Item	Mean	Proportional mean	Test value	P value (Sig.)
How would you evaluate management's efforts to inform the employees about the relationship between product's quality and costs?	2.87	57.42	-1.30	0.098

5.2.1.4 Analysis of Question 4

The analysis of question No 4 "How would you evaluate management's efforts to inform the employees about the relationship between product's quality and costs?" is as follows:

Table 5.11 shows the frequency of "very poor" is 16, the frequency of " poor" is 31, the frequency of "middle" is 40, the frequency of "good" is 27 and the frequency of "very good" is 10. Also Table 5.11 and Figure 5.8 shows the percent of "very poor" is 12.9%, the percent of " poor" is 25%, the percent of "middle" is 32.3%, the percent of "good" is 21.8% and the percent of "very good" is 8.1%.

Table 5.11: Frequency and Percentage of Q4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very poor	16	12.9	12.9	12.9
	poor	31	25.0	25.0	37.9
	middle	40	32.3	32.3	70.2
	good	27	21.8	21.8	91.9
	very good	10	8.1	8.1	100.0
	Total	124	100.0	100.0	
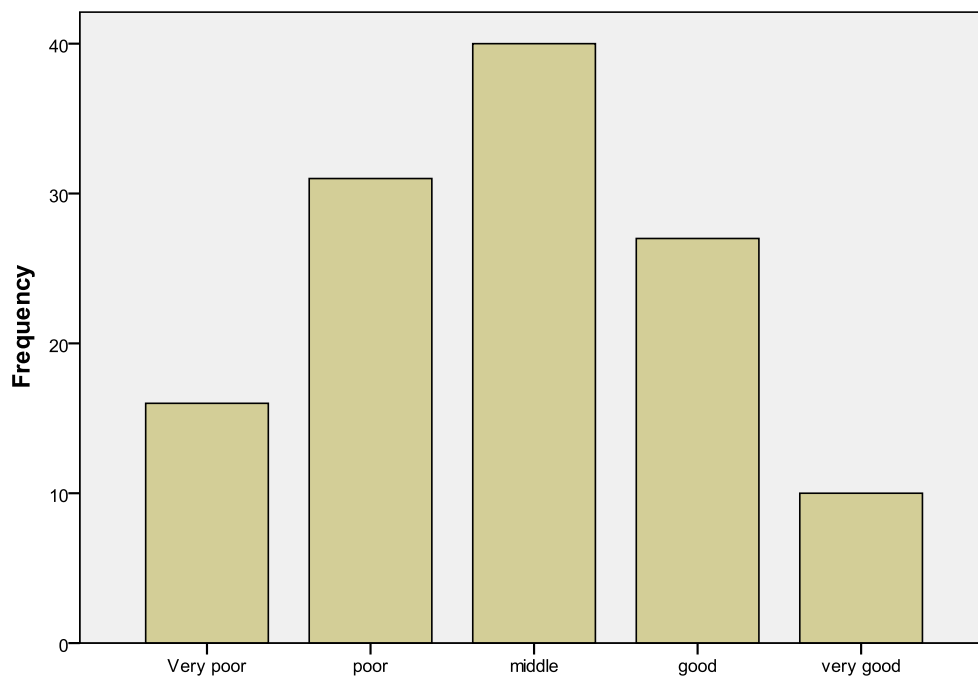
Figure 5.8: Frequency of Q4

Table 5.12 shows the mean of item "The management must educate their employees about the relationship between product quality and costs" equals 2.87 (57.42%), Test value = -1.26, and P value = 0.098 which is more than the level of significance $\alpha = 0.05$, so the mean of this item is insignificantly different from the hypothesized value 3. We found that the respondents (neutral) to this item.

Table 5.12: Means and Test values for Q4

Item	Mean	Proportional mean	Test value	P value (Sig.)
The management must educate their employees about the relationship between product quality and costs?	2.87	57.42	-1.26	0.105

5.2.1.5 Analysis of Question 5

The analysis of question No 5 "How do you evaluate the continuous improvement of the quality system?" is as follows:

Table 5.13 shows the frequency of "very poor" is 11, the frequency of " poor" is 32, the frequency of "middle" is 47, the frequency of "good" is 22 and the frequency of "very good" is 12. Also Table 5.13 and Figure 5.9 shows the percent of "very poor" is 8.9%, the percent of " poor" is 25.8%, the percent of "middle" is 37.9%, the percent of "good" is 17.7% and the percent of "very good" is 9.7%.

Table 5.13: Frequency and Percentage of Q5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very poor	11	8.9	8.9	8.9
	poor	32	25.8	25.8	34.7
	middle	47	37.9	37.9	72.6
	good	22	17.7	17.7	90.3
	very good	12	9.7	9.7	100.0
	Total	124	100.0	100.0	
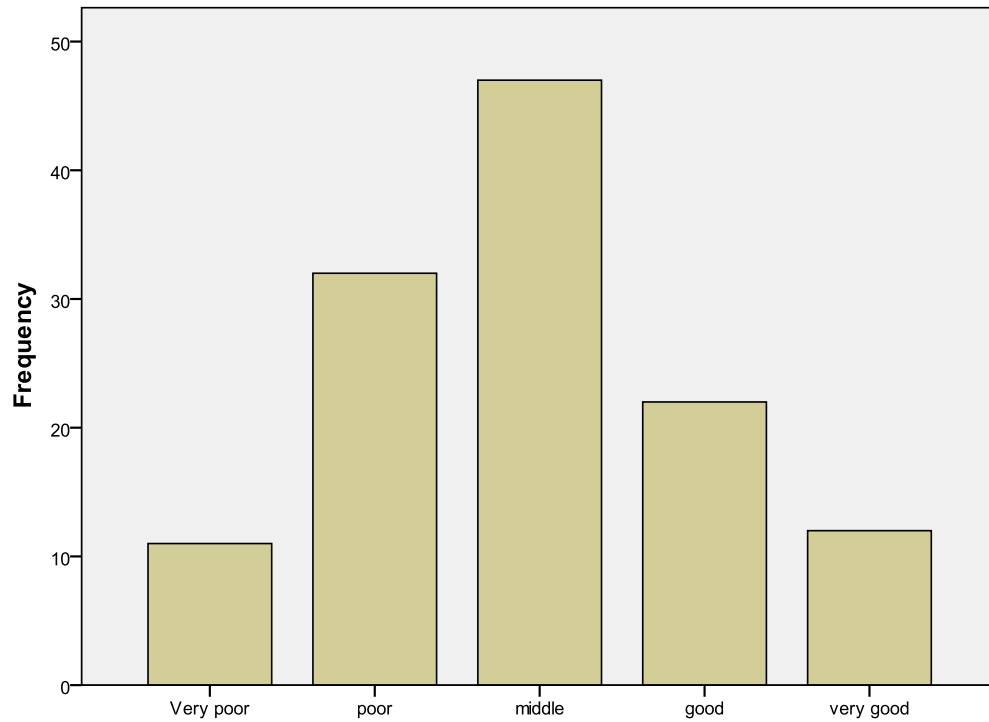
Figure 5.9: Frequency of Q5

Table 5.14 shows the mean of item "How do you evaluate the continuous improvement of the quality system?" equals 2.94 (58.71%), Test value = -0.66, and P value = 0.255 which is more than the level of significance $\alpha = 0.05$, so the mean of this item is insignificantly different from the hypothesized value 3. We found that the respondents (neutral) to this item.

Table 5.14: Means and Test values for Q5

Item	Mean	Proportional mean	Test value	P value (Sig.)
How do you evaluate the continuous improvement of the quality system?	2.94	58.71	-0.66	0.255

5.2.1.6 Analysis of Question 6

The analysis of question No 6 "How would you evaluate the necessary measures to remove the causes of poor application quality?" is as follows:

Table 5.15 shows the frequency of "very poor" is 17, the frequency of " poor" is 28, the frequency of "middle" is 42, the frequency of "good" is 20 and the frequency of "very good" is 17. Also Table 5.15 and Figure 5.10 shows the percent of "very poor" is 13.7%, the percent of " poor" is 22.6%, the percent of "middle" is 33.9%, the percent of "good" is 16.1% and the percent of "very good" is 13.7%.

Table 5.15: Frequency and Percentage of Q6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very poor	17	13.7	13.7	13.7
	poor	28	22.6	22.6	36.3
	middle	42	33.9	33.9	70.2
	good	20	16.1	16.1	86.3
	very good	17	13.7	13.7	100.0
	Total	124	100.0	100.0	
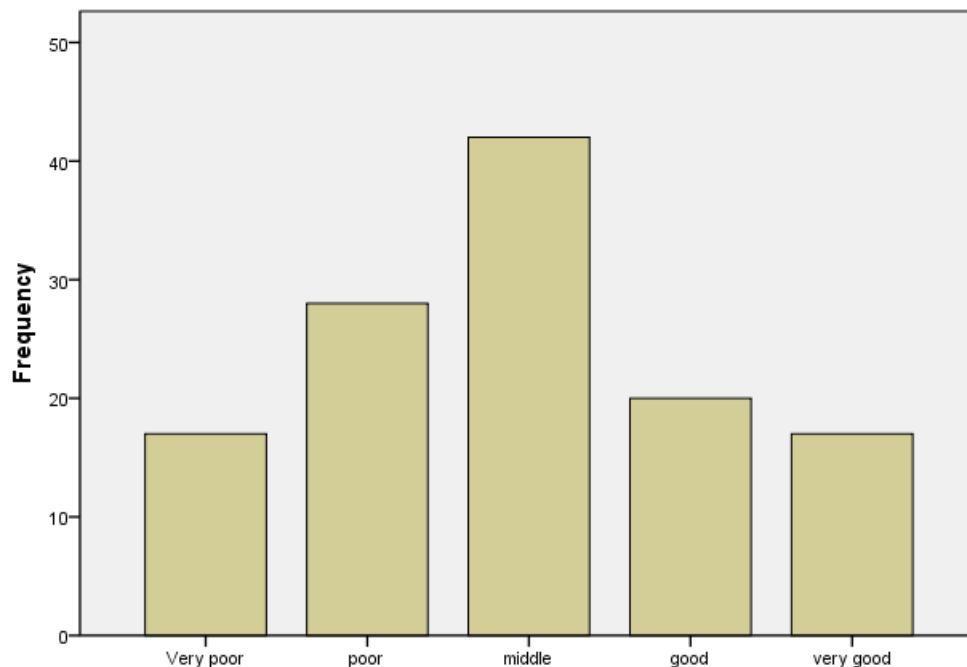
Figure 5.10: Frequency of Q6

Table 5.16 shows The mean of item "How would you evaluate the necessary measures to remove the causes of poor application quality?" equals 2.94 (58.71%), Test value = -0.59, and P value = 0.279 which is more than the level of significance $\alpha = 0.05$, so the mean of this item is insignificantly different from the hypothesized value 3. We found that the respondents (neutral) to this item.

Table 5.16: Means and Test values for Q6

Item	Mean	Proportional mean	Test value	P value (Sig.)
How would you evaluate the necessary measures to remove the causes of poor application quality?	2.94	58.71	-0.59	0.279

5.2.1.7 Analysis of Question 7

The analysis of question No 7 "How would you evaluate the corrective actions that prevent the recurrence of poor application quality?" is as follows:

Table 5.17 shows the frequency of "very poor" is 21, the frequency of " poor" is 19, the frequency of "middle" is 46, the frequency of "good" is 25 and the frequency of "very good" is 13. Also Table 5.17 and Figure 5.11 shows the percent of "very poor" is 16.9%, the percent of " poor" is 15.3%, the percent of "middle" is 37.1%, the percent of "good" is 20.2% and the percent of "very good" is 10.5%.

Table 5.17: Frequency and Percentage of Q7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very poor	21	16.9	16.9	16.9
	poor	19	15.3	15.3	32.3
	middle	46	37.1	37.1	69.4
	good	25	20.2	20.2	89.5
	very good	13	10.5	10.5	100.0
	Total	124	100.0	100.0	
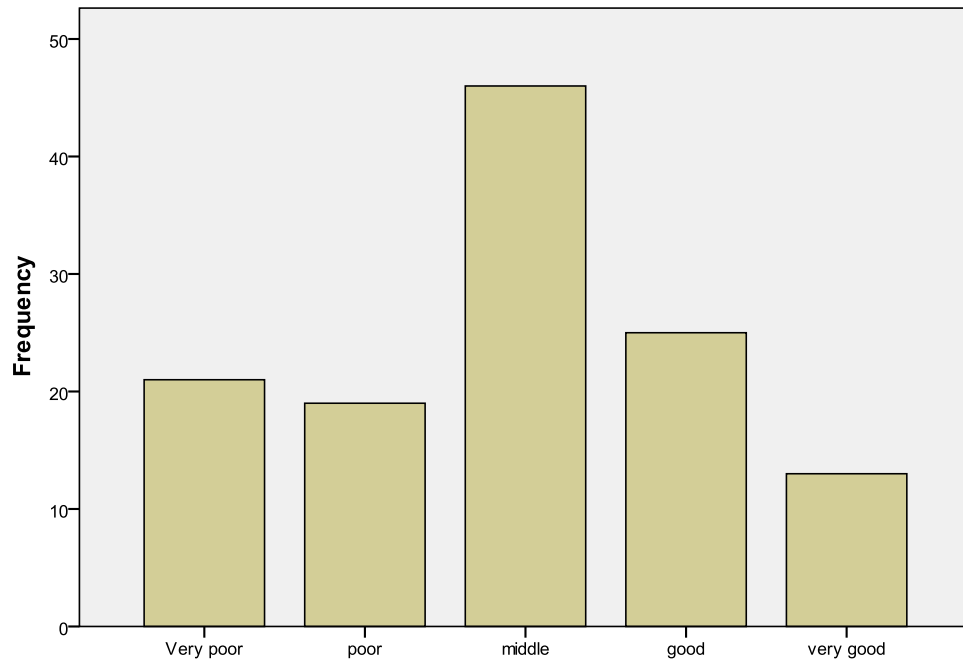
Figure 5.11: Frequency of Q7

Table 5.18 shows the mean of item ""How would you evaluate the corrective actions that prevent the recurrence of poor application quality?" equals 2.94 (58.39%), Test value = -0.74, and P value = 0.229 which is more than the level of significance $\alpha = 0.05$, so the mean of this item is insignificantly different from the hypothesized value 3. We found that the respondents (neutral) to this item.

Table 5.18: Means and Test values for Q7

Item	Mean	Proportional mean	Test value	P value (Sig.)
"How would you evaluate the corrective actions that prevent the recurrence of poor application quality?	2.92	58.39	-0.74	0.229

5.2.1.8 Analysis of Question 8

The analysis of question No 8 "How would you evaluate reviewing the corrective actions and documenting the results?" is as follows:

Table 5.19 shows the frequency of "very poor" is 14, the frequency of " poor" is 31, the frequency of "middle" is 48, the frequency of "good" is 24 and the frequency of "very good" is 7. Also Table 5.19 and Figure 5.12 shows the percent of "very poor" is 11.3%, the percent of " poor" is 25%, the percent of "middle" is 38.7%, the percent of "good" is 19.4% and the percent of "very good" is 5.6%.

Table 5.19: Frequency and Percentage of Q8

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very poor	14	11.3	11.3	11.3
	poor	31	25.0	25.0	36.3
	middle	48	38.7	38.7	75.0
	good	24	19.4	19.4	94.4
	very good	7	5.6	5.6	100.0
	Total	124	100.0	100.0	
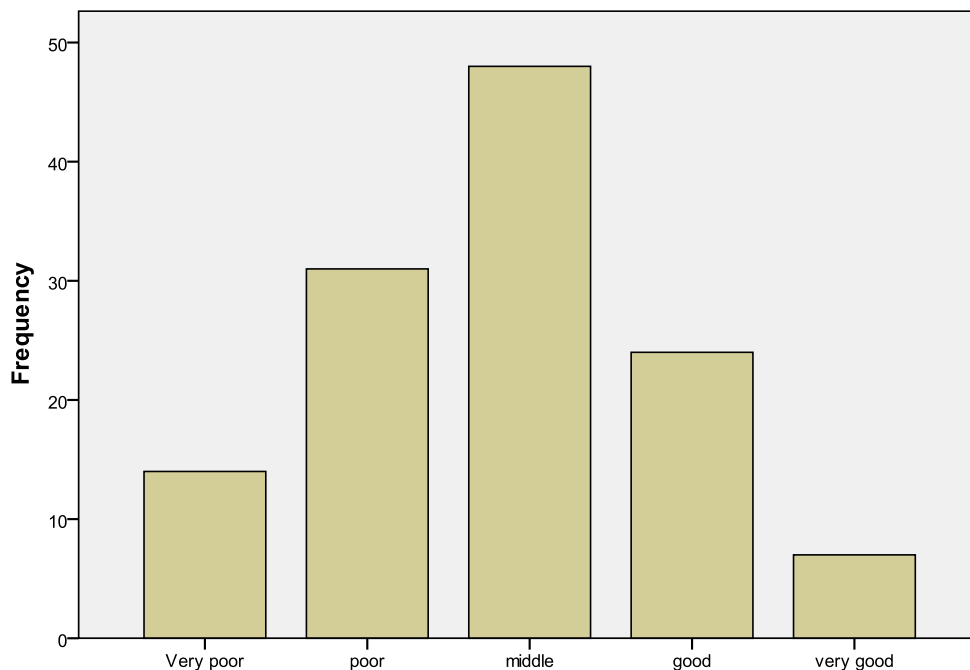
Figure 5.12: Frequency of Q8

Table 5.20 shows the mean of item "How would you evaluate reviewing the corrective actions and documenting the results?" equals 2.83 (56.61%), Test value = -1.80, and P value = 0.037 which is less than the level of significance $\alpha = 0.05$. The sign of the test is negative, so the mean of this item is significantly less than the hypothesized value 3. We found that the respondents disagreed to this item.

Table 5.20: Means and Test values for Q8

Item	Mean	Proportional mean	Test value	P value (Sig.)
How would you evaluate reviewing the corrective actions and documenting the results?	2.83	56.61	-1.80	0.037

5.2.1.9 Analysis of Question 9

The analysis of question No 9 "How would you evaluate the practical approaches to achieve effective control and the efficiency of operations?" is as follows:

Table 5.21 shows the frequency of "very poor" is 12, the frequency of " poor" is 36, the frequency of "middle" is 44, the frequency of "good" is 22 and the frequency of "very good" is 10. Also Table 5.21 and Figure 5.13 shows the percent of "very poor" is 9.7%, the percent of " poor" is 29%, the percent of "middle" is 35.5%, the percent of "good" is 17.7% and the percent of "very good" is 8.1%.

Table 5.21: Frequency and Percentage of Q9

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very poor	12	9.7	9.7	9.7
	poor	36	29.0	29.0	38.7
	middle	44	35.5	35.5	74.2
	good	22	17.7	17.7	91.9
	very good	10	8.1	8.1	100.0
	Total	124	100.0	100.0	
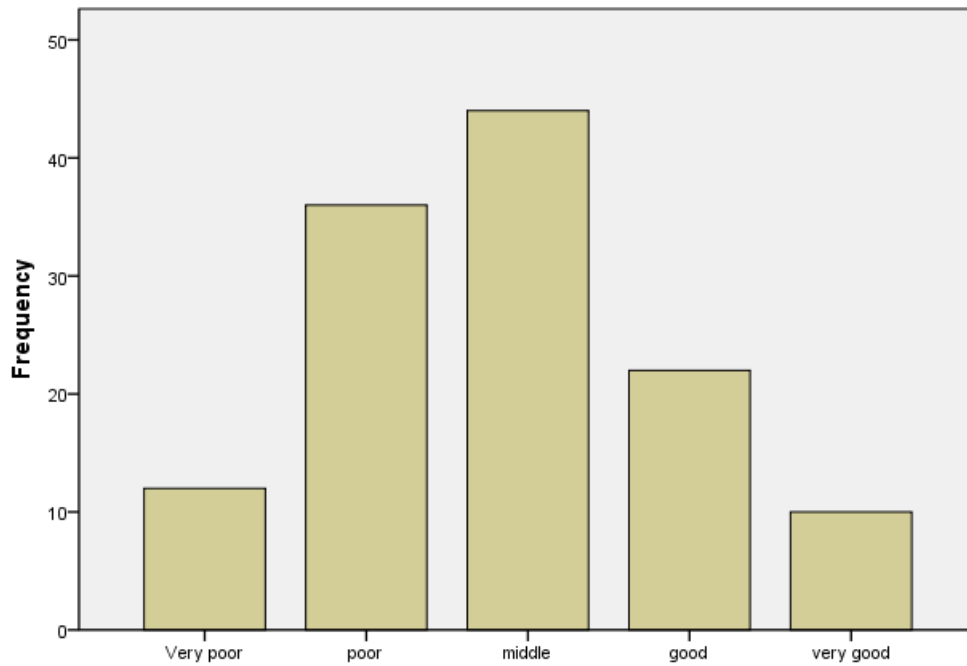
Figure 5.13: Frequency of Q9

Table 5.22 shows the mean of item "How would you evaluate the practical approaches to achieve effective control and the efficiency of operations?" equals 2.85 (57.10%), Test value = -1.50, and P value = 0.068 which is more than the level of significance $\alpha = 0.05$, so the mean of this item is insignificantly different from the hypothesized value 3. We found that the respondents (neutral) to this item.

Table 5.22: Means and Test values for Q9

Item	Mean	Proportional mean	Test value	P value (Sig.)
How would you evaluate the practical approaches to achieve effective control and the efficiency of operations?	2.85	57.10	-1.50	0.068

5.2.1.10 Analysis of Question 10

The analysis of question No 10 "How would you evaluate the application of practical approaches to quality?" is as follows:

Table 5.23 shows the frequency of "very poor" is 8, the frequency of " poor" is 38, the frequency of "middle" is 46, the frequency of "good" is 18 and the frequency of "very good" is 14. Also Table 5.23 and Figure 5.14 shows the percent of "very poor" is 6.5%, the percent of " poor" is 30.6%, the percent of "middle" is 37.1%, the percent of "good" is 14.5% and the percent of "very good" is 11.3%.

Table 5.23: Frequency and Percentage of Q10

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very poor	8	6.5	6.5	6.5
	poor	38	30.6	30.6	37.1
	middle	46	37.1	37.1	74.2
	good	18	14.5	14.5	88.7
	very good	14	11.3	11.3	100.0
	Total	124	100.0	100.0	
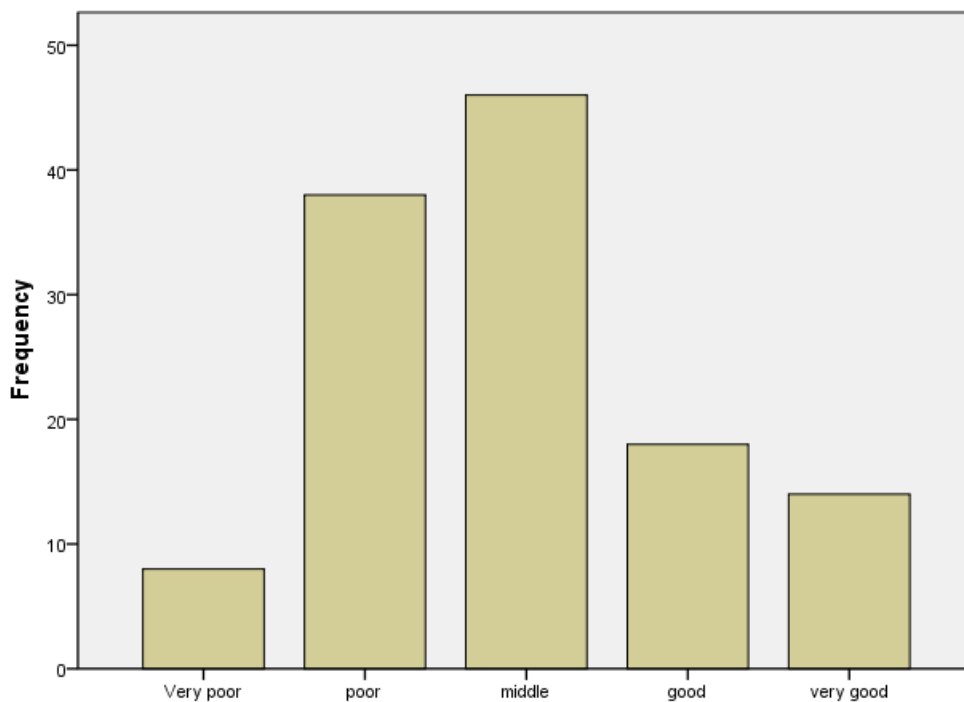
Figure 5.14: Frequency of Q10

Table 5.24 shows the mean of item "How would you evaluate the application of practical approaches to quality?" equals 2.94 (58.71%), Test value = -0.67, and P value = 0.254 which is more than the level of significance $\alpha = 0.05$, so the mean of this item is insignificantly different from the hypothesized value 3. We found that the respondents (neutral) to this item.

Table 5.24: Means and Test values for Q10

Item	Mean	Proportional mean	Test value	P value (Sig.)
How would you evaluate the application of practical approaches to quality?	2.94	58.71	-0.67	0.254

5.2.1.11 The Means and Test values for Main Hypothesis

Table 5.25: Means and Test values for Main Hypothesis

No	Item	Mean	Proportional mean	Test value	P value (Sig.)	Rank
1	How do you evaluate management statistical control on the accuracy of Total Quality?	2.85	57.10	-1.30	0.098	7
2	To what extent would you evaluate the division of quality responsibilities?	2.84	56.77	-1.62	0.054	9
3	How would you evaluate company's focus on achieving all standards of quality?	2.87	57.42	-1.30	0.098	5
4	How would you evaluate management's efforts to inform the employees about the relationship between product's quality and costs?	2.87	57.42	-1.26	0.105	6
5	How do you evaluate the continuous improvement of the quality system?	2.94	58.71	-0.66	0.255	1
6	How would you evaluate the necessary measures to remove the causes of poor application quality?	2.94	58.71	-0.59	0.279	1
7	How would you evaluate the corrective actions that prevent the recurrence of poor application quality?	2.92	58.39	-0.74	0.229	4
8	How would you evaluate reviewing the corrective actions and documenting the results?	2.83	56.61	-1.80	0.037	10

9	How would you evaluate the practical approaches to achieve effective control and the efficiency of operations?	2.85	57.10	-1.50	0.068	8
10	How would you evaluate the application of practical approaches to quality?	2.94	58.71	-0.67	0.254	1
	All items of the field	2.89	57.69	-1.32	0.095	

Table 5.25 shows The mean of the filed "Non - commitment of top management to the application of total quality concept" equals 2.89 (57.69%), Test value = -1.32, and P-value=0.095 which is more than the level of significance $\alpha = 0.05$. The mean of this field is insignificantly different from the hypothesized value 3. We found that the respondents (Do not know, neutral) to field of "Non - commitment of top management to the application of total quality concept".

Figure 5.15 shows the questions with the maximum mean are questions 5, 6 and 10 at 2.94, while question 8 has the minimum mean at 2.83. It also shows the mean of the Main Hypothesis is significantly less than the hypothesized value 3.
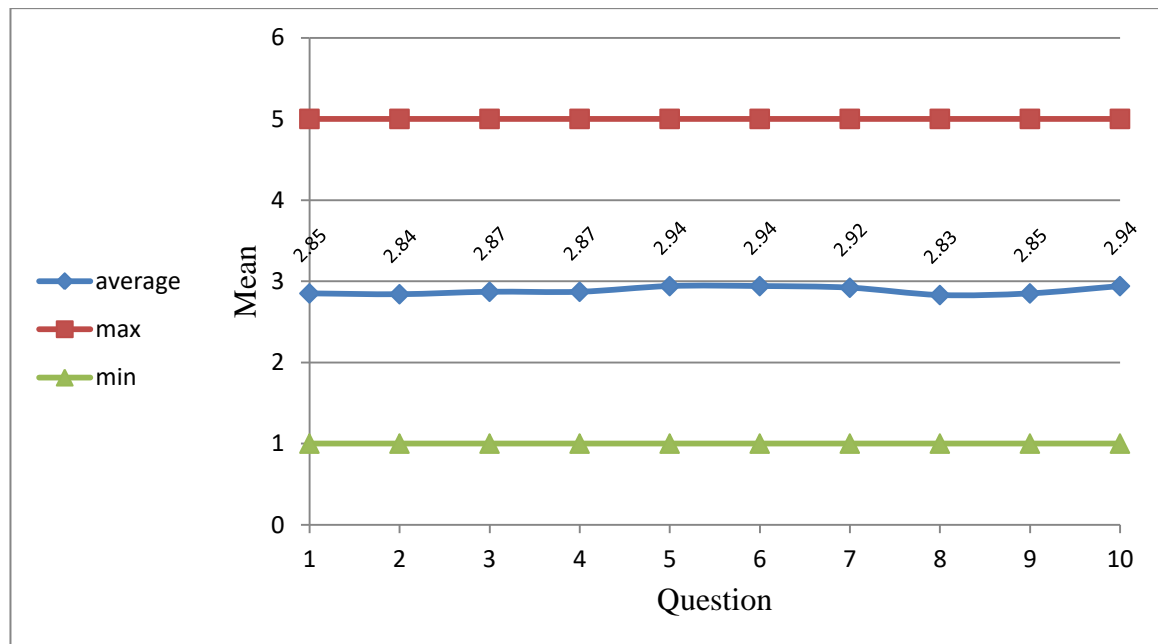
Figure 5.15: Mean of questions related to main hypothesis

5.2.2 Analysis the Questions Related to Sub-Hypothesis A

The sub-hypothesis A is "There is a statistically significant relationship between the absence of administrative, scientific, technical, professional cadres and competencies that are necessary for the application of quality concepts in the implementation of structural projects and lack of success of applying quality concepts in the implementation of construction projects", it is related to questions (11 to 16).

5.2.2.1 Analysis of Question 11

The analysis of question No 11 "How would you evaluate company's essential competencies (administrative, scientific and technical) for the application of Total Quality concepts?" is as follows:

Table 5.26 shows the frequency of "very poor" is 15, the frequency of " poor" is 40, the frequency of "middle" is 37, the frequency of "good" is 18 and the frequency of "very good" is 14. Also Table 5.26 and Figure 5.16 shows the percent of "very poor" is 12.1%, the percent of " poor" is 32.3%, the percent of "middle" is 29.8%, the percent of "good" is 14.5% and the percent of "very good" is 11.3%.

Table 5.26: Frequency and Percentage of Q11

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very poor	15	12.1	12.1	12.1
	poor	40	32.3	32.3	44.4
	middle	37	29.8	29.8	74.2
	good	18	14.5	14.5	88.7
	very good	14	11.3	11.3	100.0
	Total	124	100.0	100.0	
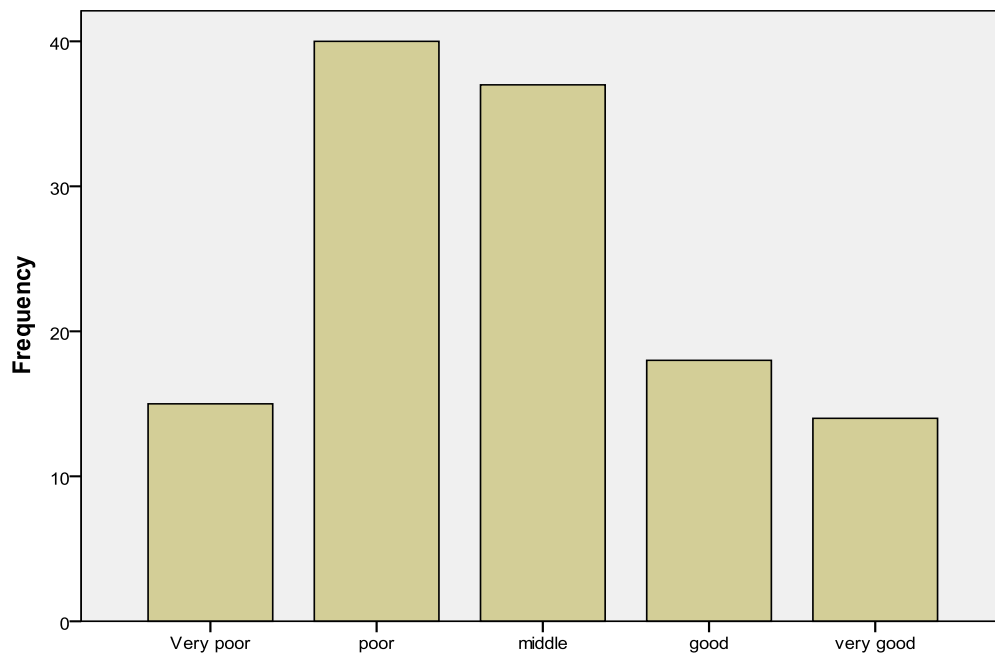
Figure 5.16: Frequency of Q11

Table 5.27 shows the mean of item "How would you evaluate company's essential competencies (administrative, scientific and technical) for the application of Total Quality concepts?" equals 2.81 (56.13%), Test value = -1.84, and P value = 0.034 which is less than the level of significance $\alpha = 0.05$. The sign of the test is negative, so the mean of this item is significantly less than the hypothesized value 3. We found that the respondents disagreed to this item.

Table 5.27: Means and Test values for Q11

Item	Mean	Proportional mean	Test value	P value (Sig.)
How would you evaluate company's essential competencies (administrative, scientific and technical) for the application of Total Quality concepts?	2.81	56.13	-1.84	0.034

5.2.2.2 Analysis of Question 12

The analysis of question No 12 "To what extent you evaluate the performance of the committee which monitors the application of quality concepts?" is as follows:

Table 5.28 shows the frequency of "very poor" is 17, the frequency of " poor" is 41, the frequency of "middle" is 39, the frequency of "good" is 21 and the frequency of "very good" is 6. Also Table 5.28 and Figure 5.17 shows the percent of "very poor" is 13.7%, the percent of " poor" is 33.1%, the percent of "middle" is 31.5%, the percent of "good" is 16.9% and the percent of "very good" is 4.8%.

Table 5.28: Frequency and Percentage of Q12

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very poor	17	13.7	13.7	13.7
	poor	41	33.1	33.1	46.8
	middle	39	31.5	31.5	78.2
	good	21	16.9	16.9	95.2
	very good	6	4.8	4.8	100.0
	Total	124	100.0	100.0	
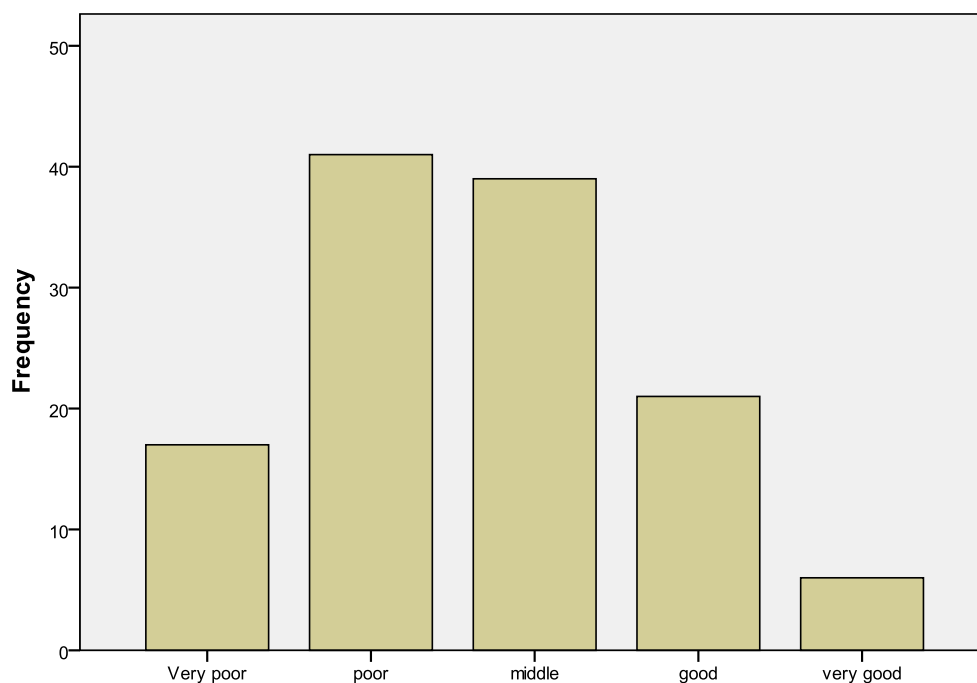
Figure 5.17: Frequency of Q12

Table 5.29 shows the mean of item "To what extent you evaluate the performance of the committee which monitors the application of quality concepts?" equals 2.66 (53.23%), Test value = -3.54, and P value = 0.000 which is less than the level of significance $\alpha = 0.05$. The sign of the test is negative, so the mean of this item is significantly less than the hypothesized value 3. We found that the respondents disagreed to this item.

Table 5.29: Means and Test values for Q12

Item	Mean	Proportional mean	Test value	P-value(Sig.)
To what extent you evaluate the performance of the committee which monitors the application of quality concepts?	2.66	53.23	-3.54	0.000

5.2.2.3 Analysis of Question 13

The analysis of question No 13 "How do you evaluate the level of expertise among Committee members?" is as follows:

Table 5.30 shows the frequency of "very poor" is 16, the frequency of " poor" is 38, the frequency of "middle" is 34, the frequency of "good" is 22 and the frequency of "very good" is 14. Also Table 5.30 and Figure 5.18 shows the percent of "very poor" is 12.9%, the percent of " poor" is 30.6%, the percent of "middle" is 27.4%, the percent of "good" is 17.7% and the percent of "very good" is 11.3%.

Table 5.30: Frequency and Percentage of Q13

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very poor	16	12.9	12.9	12.9
	poor	38	30.6	30.6	43.5
	middle	34	27.4	27.4	71.0
	good	22	17.7	17.7	88.7
	very good	14	11.3	11.3	100.0
	Total	124	100.0	100.0	
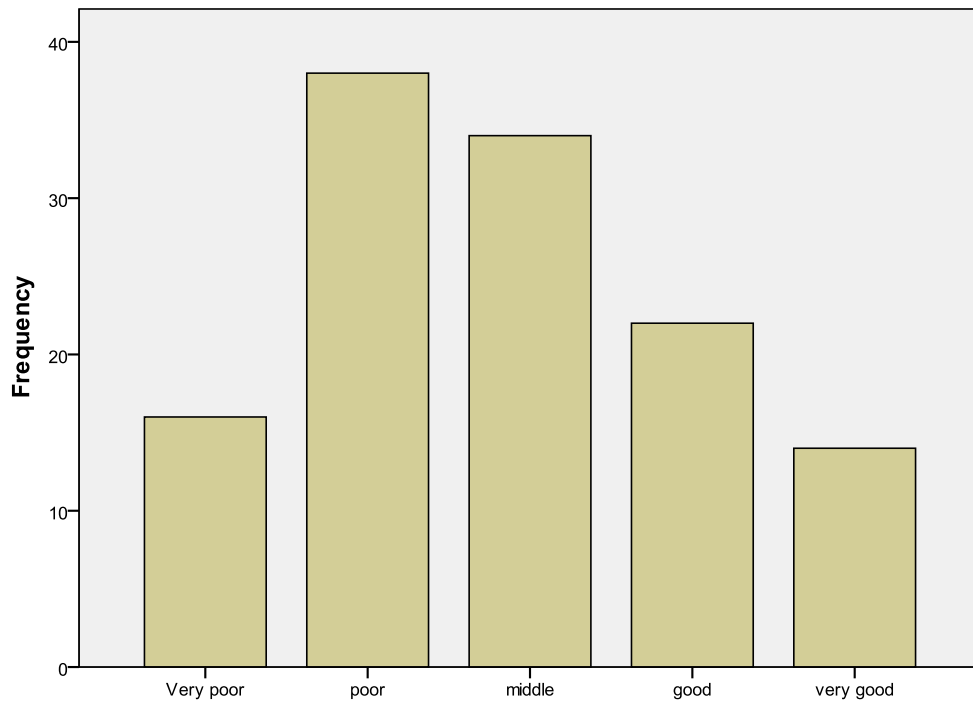
Figure 5.18: Frequency of Q13

Table 5.31 shows the mean of item "How do you evaluate the level of expertise among Committee members?" equals 2.84 (56.77%), Test value = -1.50, and P value = 0.068 which is more than the level of significance $\alpha = 0.05$. Then the mean of this item is insignificantly different from the hypothesized value 3. We found that the respondents (neutral) to this item.

Table 5.31: Means and Test values for Q13

Item	Mean	Proportional mean	Test value	P value (Sig.)
How do you evaluate the level of expertise among Committee members?	2.84	56.77	-1.50	0.068

5.2.2.4 Analysis of Question 14

The analysis of question No 14 "How would you evaluate Committee's commitment to conduct sessions on time and its application of quality concepts?" is as follows:

Table 5.32 shows the frequency of "very poor" is 20, the frequency of " poor" is 48, the frequency of "middle" is 34, the frequency of "good" is 15 and the frequency of "very good" is 7. Also Table 5.32 and Figure 5.19 shows the percent of "very poor" is 16.1%, the percent of " poor" is 38.7%, the percent of "middle" is 27.4%, the percent of "good" is 12.1% and the percent of "very good" is 5.6%.

Table 5.32: Frequency and Percentage of Q14

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very poor	20	16.1	16.1	16.1
	poor	48	38.7	38.7	54.8
	middle	34	27.4	27.4	82.3
	good	15	12.1	12.1	94.4
	very good	7	5.6	5.6	100.0
	Total	124	100.0	100.0	
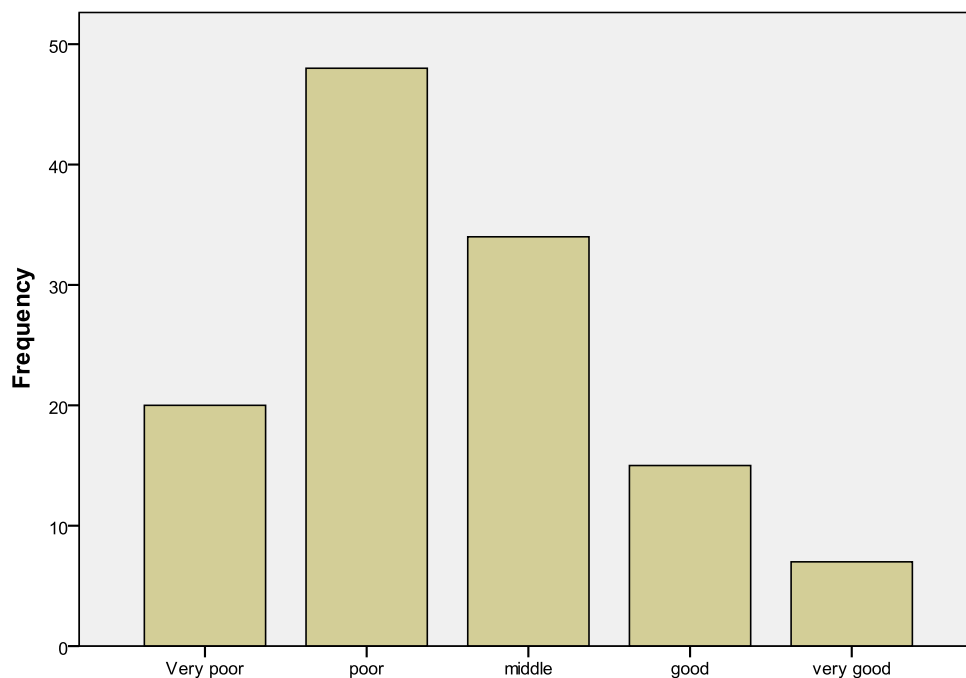
Figure 5.19: Frequency of Q14

Table 5.33 shows the mean of item "How would you evaluate Committee's commitment to conduct sessions on time and its application of quality concepts?" equals 2.52 (50.48%), Test value = -4.92, and P value = 0.000 which is less than the level of significance $\alpha = 0.05$. The sign of the test is negative, so the mean of this item is significantly less than the hypothesized value 3. We found that the respondents disagreed to this item.

Table 5.33: Means and Test values for Q14

Item	Mean	Proportional mean	Test value	P value (Sig.)
How would you evaluate Committee's commitment to conduct sessions on time and its application of quality concepts?	2.52	50.48	-4.92	0.000

5.2.2.5 Analysis of Question 15

The analysis of question No 15 "How would you evaluate the courses for the scientific and technical cadres on the application of quality concepts?" is as follows:

Table 5.34 shows the frequency of "very poor" is 25, the frequency of " poor" is 38, the frequency of "middle" is 40, the frequency of "good" is 13 and the frequency of "very good" is 8. Also Table 5.34 and Figure 5.20 shows the percent of "very poor" is 20.2%, the percent of " poor" is 30.6%, the percent of "middle" is 32.3%, the percent of "good" is 10.5% and the percent of "very good" is 6.5%.

Table 5.34: Frequency and Percentage of Q15

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very poor	25	20.2	20.2	20.2
	poor	38	30.6	30.6	50.8
	middle	40	32.3	32.3	83.1
	good	13	10.5	10.5	93.5
	very good	8	6.5	6.5	100.0
	Total	124	100.0	100.0	
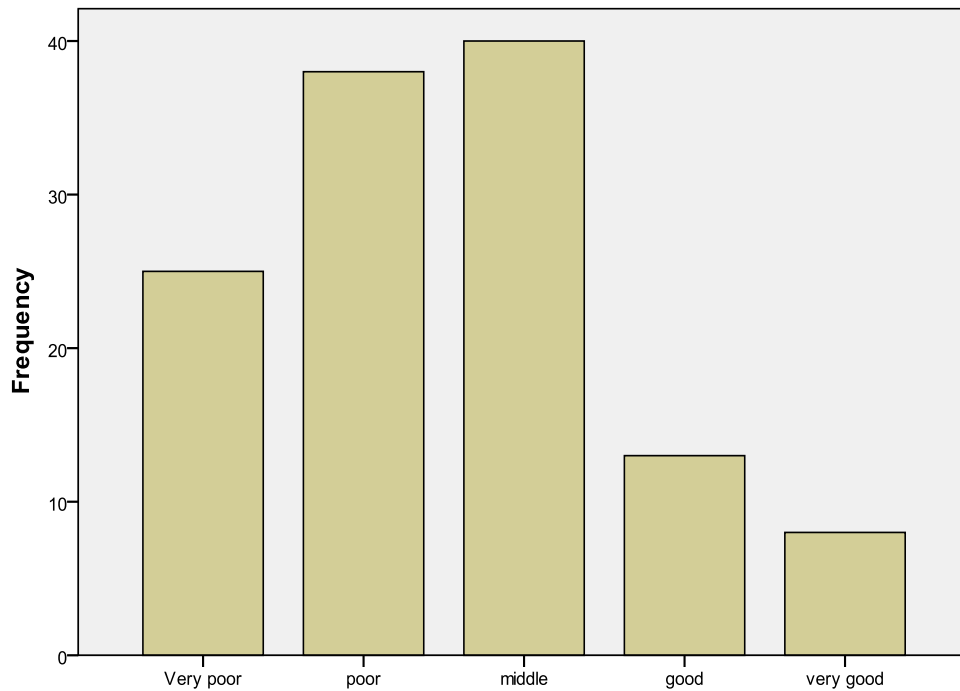
Figure 5.20: Frequency of Q15

Table 5.35 shows the mean of item "How would you evaluate the courses for the scientific and technical cadres on the application of quality concepts?" equals 2.52 (50.48%), Test value = -4.72, and P value = 0.000 which is less than the level of significance $\alpha = 0.05$. The sign of the test is negative, so the mean of this item is significantly less than the hypothesized value 3. We found that the respondents disagreed to this item.

Table 5.35: Means and Test values for Q15

Item	Mean	Proportional mean	Test value	P value (Sig.)
How would you evaluate the courses for the scientific and technical cadres on the application of quality concepts?	2.52	50.48	-4.72	0.000

5.2.2.6 Analysis of Question 16

The analysis of question No 16 "How would you evaluate the clarifications of Total Quality concepts to the labor and engineers?" is as follows:

Table 5.36 shows the frequency of "very poor" is 18, the frequency of " poor" is 44, the frequency of "middle" is 40, the frequency of "good" is 9 and the frequency of "very good" is 13. Also Table 5.36 and Figure 5.21 shows the percent of "very poor" is 14.5%, the percent of " poor" is 35.5%, the percent of "middle" is 32.2%, the percent of "good" is 7.3% and the percent of "very good" is 10.5%.

Table 5.36: Frequency and Percentage of Q16

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very poor	18	14.5	14.5	14.5
	poor	44	35.5	35.5	50.0
	middle	40	32.3	32.3	82.3
	good	9	7.3	7.3	89.5
	very good	13	10.5	10.5	100.0
	Total	124	100.0	100.0	
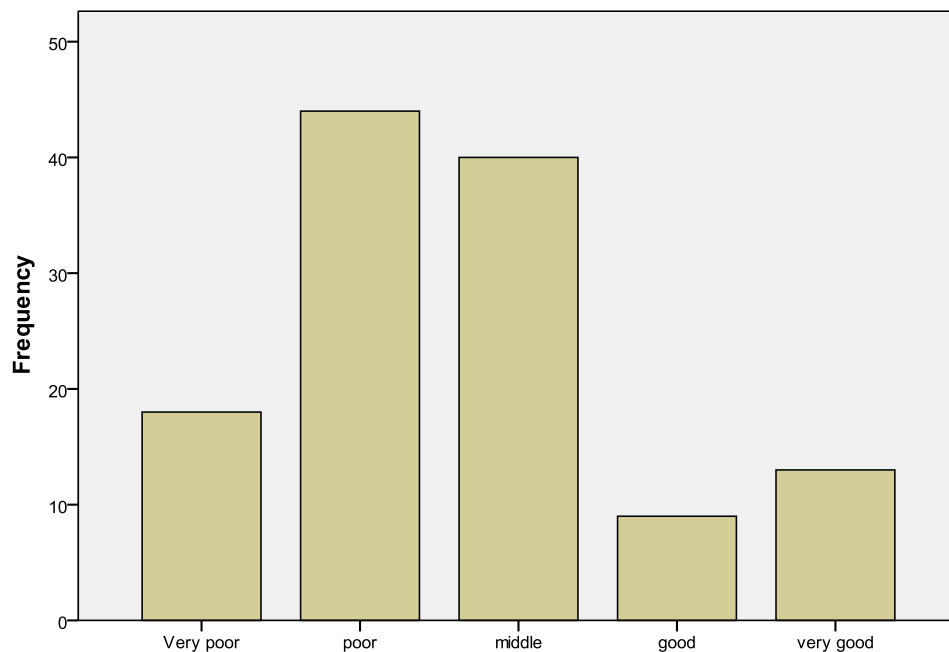
Figure 5.21: Frequency of Q16

Table 5.37 shows the mean of item "How would you evaluate the clarifications of Total Quality concepts to the labor and engineers?" equals 2.64 (52.74%), Test value = -3.54, and P value = 0.000 which is less than the level of significance $\alpha = 0.05$. The sign of the test is negative, so the mean of this item is significantly less than the hypothesized value 3. We found that the respondents disagreed to this item.

Table 5.37: Means and Test values for Q16

Item	Mean	Proportional mean	Test value	P value (Sig.)
How would you evaluate the clarifications of Total Quality concepts to the labor and engineers?	2.64	52.74	-3.54	0.000

5.2.2.7 The Means and Test values for Sub-Hypothesis A

Table 5.38: Means and Test values for Sub-Hypothesis A

No	Item	Mean	Proportional mean (%)	Test value	P value (Sig.)	Rank
11	How would you evaluate company's essential competencies (administrative, scientific and technical) for the application of Total Quality concepts?	2.81	56.13	-1.84	0.034	2
12	To what extent you evaluate the performance of the committee which monitors the application of quality concepts?	2.66	53.23	-3.54	0.000	3
13	How do you evaluate the level of expertise among Committee members?	2.84	56.77	-1.50	0.068	1
14	How would you evaluate Committee's commitment to conduct sessions on time and its application of quality concepts?	2.52	50.48	-4.92	0.000	5
15	How would you evaluate the courses for the scientific and technical cadres on the application of quality concepts?	2.52	50.48	-4.72	0.000	6
16	How would you evaluate the clarifications of Total Quality concepts to the labor and engineers?	2.64	52.74	-3.54	0.000	4
	All items of the field	2.67	53.31	-4.12	0.000	

Table 5.38 shows the mean of the field "The absence of administrative, scientific, technical, professional cadres and competencies" equals 2.67 (53.31%), Test value = -4.12, and P-value= 0.000 which is less than the level of significance $\alpha = 0.05$. The sign of the test is negative, so the mean of this field is significantly less than the hypothesized value 3. We found that the respondents disagreed to field of "The absence of administrative, scientific, technical, professional cadres and competencies.

Figure 5.7 shows the question with the maximum mean is question 13 at 2.84, while questions 14 and 15 have the minimum mean at 2.52. It also shows the mean of the Sub-Hypothesis A is significantly less than the hypothesized value 3.
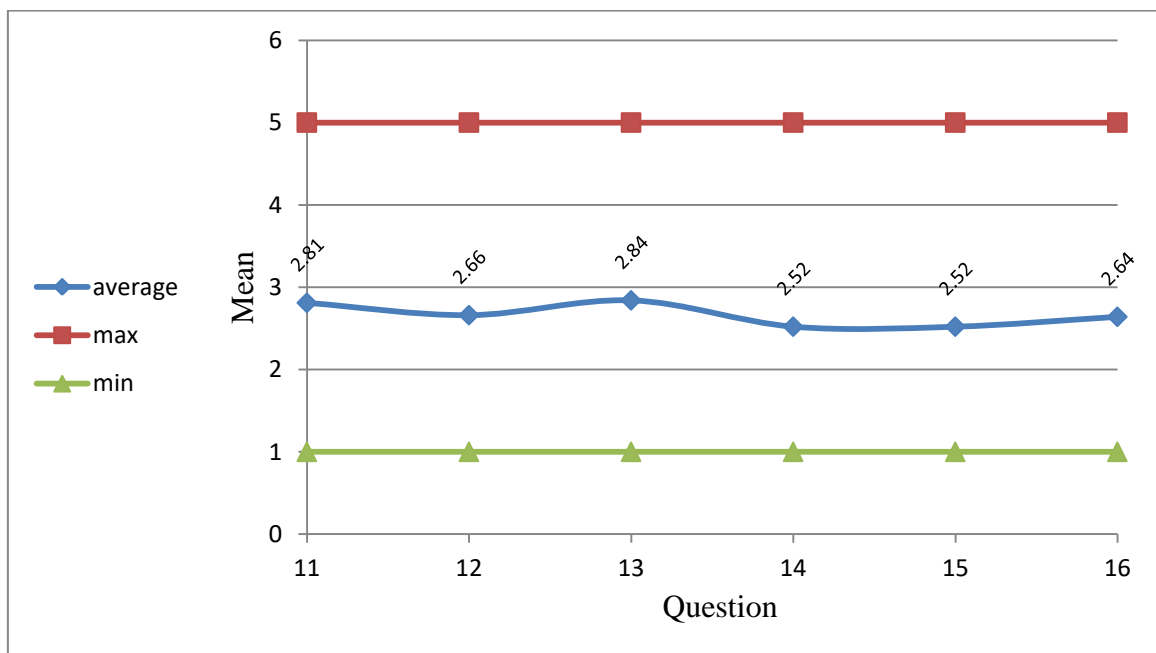
Figure 5.22: Mean of questions related to sub-hypothesis A

5.2.3 Analysis the Questions Related to Sub-Hypothesis B

The sub-hypothesis B is "There is a statistically significant relationship between non application of standards, requirements and specifications of building code and lack of success of the application of quality concepts in the implementation of structural projects", it is related to questions (17 to 24).

5.2.3.1 Analysis of Question 17

The analysis of question No 17 "In the case of applying standards and conditions of Engineering Building Code, how would you evaluate its impact on (time, cost and scope of the project)?" is as follows:

Table 5.39 shows the frequency of "very poor" is 16, the frequency of " poor" is 37, the frequency of "middle" is 46, the frequency of "good" is 10 and the frequency of "very good" is 15. Also Table 5.39 and Figure 5.23 shows the percent of "very poor" is 12.9%, the percent of " poor" is 29.8%, the percent of "middle" is 37.1%, the percent of "good" is 8.1% and the percent of "very good" is 12.1%.

Table 5.39: Frequency and Percentage of Q17

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very poor	16	12.9	12.9	12.9
	poor	37	29.8	29.8	42.7
	middle	46	37.1	37.1	79.8
	good	10	8.1	8.1	87.9
	very good	15	12.1	12.1	100.0
	Total	124	100.0	100.0	
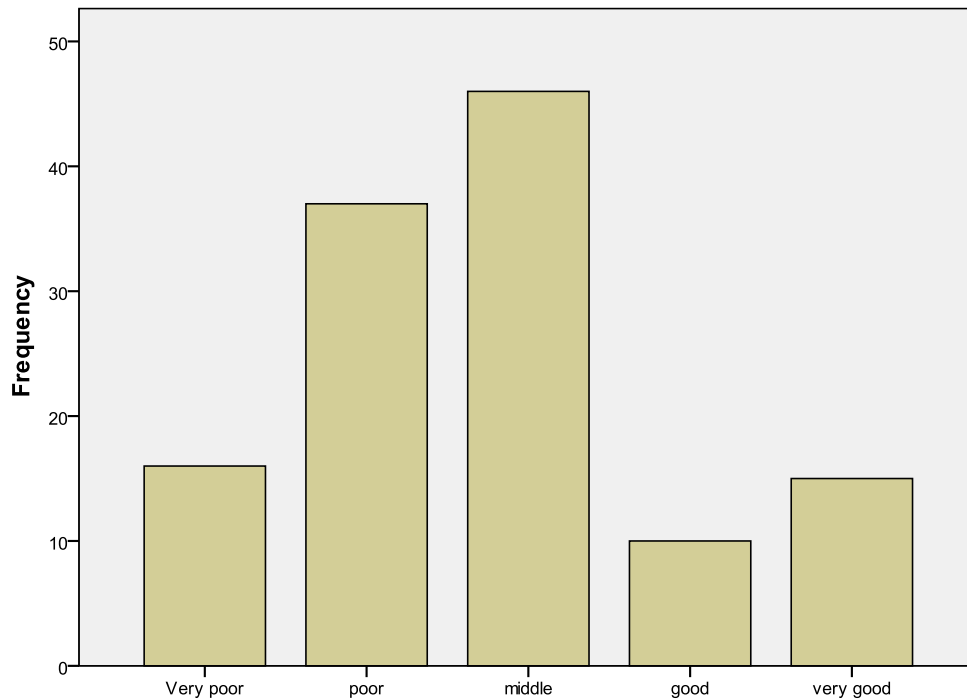
Figure 5.23: Frequency of Q17

Table 5.40 shows the mean of item "In the case of applying standards and conditions of Engineering Building Code, how would you evaluate its impact on (time, cost and scope of the project)?" equals 2.77 (55.32%), Test value = -2.25, and P value = 0.013 which is less than the level of significance $\alpha = 0.05$. The sign of the test is negative, so the mean of this item is significantly less than the hypothesized value 3. We found that the respondents disagreed to this item.

Table 5.40: Means and Test values for Q17

Item	Mean	Proportional mean	Test value	P value (Sig.)
In the case of applying standards and conditions of Engineering Building Code, how would you evaluate its impact on (time, cost and scope of the project)?	2.77	55.32	-2.25	0.013

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5.2.3.2 Analysis of Question 18

The analysis of question No 18 "How do you evaluate the planning for designing stage, starting from the idea, then the initial and final design, production and the stage of using the scheme according to the principles of the Engineering Building Code?" is as follows:

Table 5.41 shows the frequency of "very poor" is 15, the frequency of " poor" is 37, the frequency of "middle" is 44, the frequency of "good" is 16 and the frequency of "very good" is 12. Also Table 5.41 and Figure 5.24 shows the percent of "very poor" is 12.1%, the percent of " poor" is 29.8%, the percent of "middle" is 35.5%, the percent of "good" is 12.9% and the percent of "very good" is 9.7%.

Table 5.41: Frequency and Percentage of Q18

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very poor	15	12.1	12.1	12.1
	poor	37	29.8	29.8	41.9
	middle	44	35.5	35.5	77.4
	good	16	12.9	12.9	90.3
	very good	12	9.7	9.7	100.0
	Total	124	100.0	100.0	
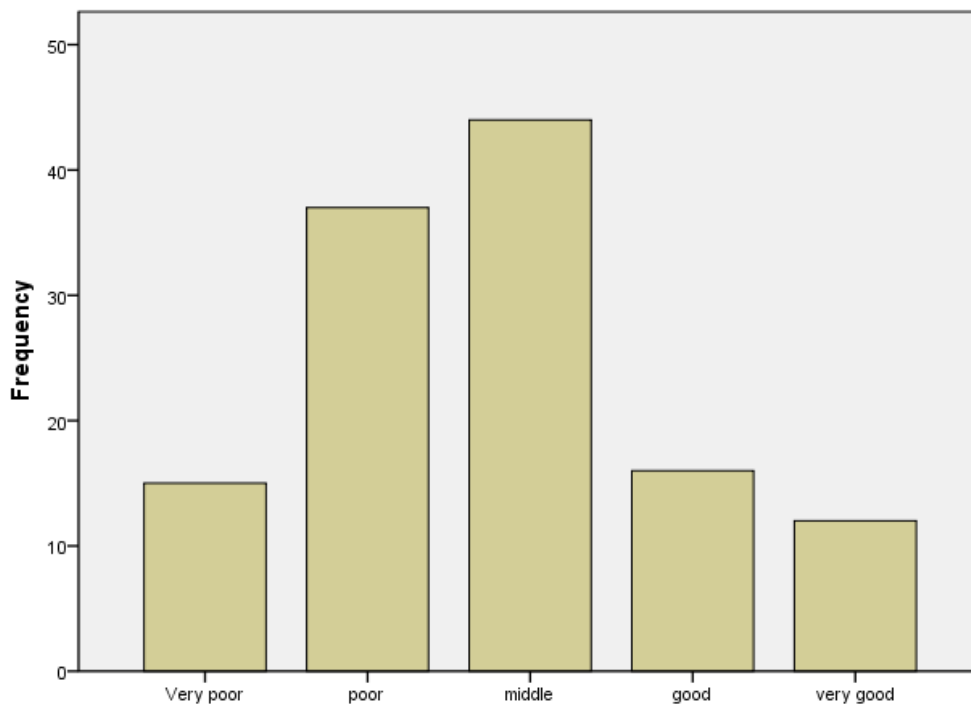
Figure 5.24: Frequency of Q18

Table 5.42 shows The mean of item "How do you evaluate the planning for designing stage, starting from the idea, then the initial and final design, production and the stage of using the scheme according to the principles of the Engineering Building Code?" equals 2.78 (55.65%), Test value = -2.16, and P value = 0.016 which is less than the level of significance $\alpha = 0.05$. The sign of the test is negative, so the mean of this item is significantly less than the hypothesized value 3. We found that the respondents disagreed to this item.

Table 5.42: Means and Test values for Q18

Item	Mean	Proportional mean	Test value	P value (Sig.)
How do you evaluate the planning for designing stage, starting from the idea, then the initial and final design, production and the stage of using the scheme according to the principles of the Engineering Building Code?	2.78	55.65	-2.16	0.016

5.2.3.3 Analysis of Question 19

The analysis of question No 19 "How would you evaluate the examination of every stage in designing phase and the confirmation of using safety standards of Engineering Building Code in the design?" is as follows:

Table 5.43 shows the frequency of "very poor" is 22, the frequency of " poor" is 37, the frequency of "middle" is 34, the frequency of "good" is 19 and the frequency of "very good" is 12. Also Table 5.43 and Figure 5.25 shows the percent of "very poor" is 17.7%, the percent of " poor" is 29.8%, the percent of "middle" is 27.4%, the percent of "good" is 15.3% and the percent of "very good" is 9.7%.

Table 5.43: Frequency and Percentage of Q19

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very poor	22	17.7	17.7	17.7
	poor	37	29.8	29.8	47.6
	middle	34	27.4	27.4	75.0
	good	19	15.3	15.3	90.3
	very good	12	9.7	9.7	100.0
	Total	124	100.0	100.0	
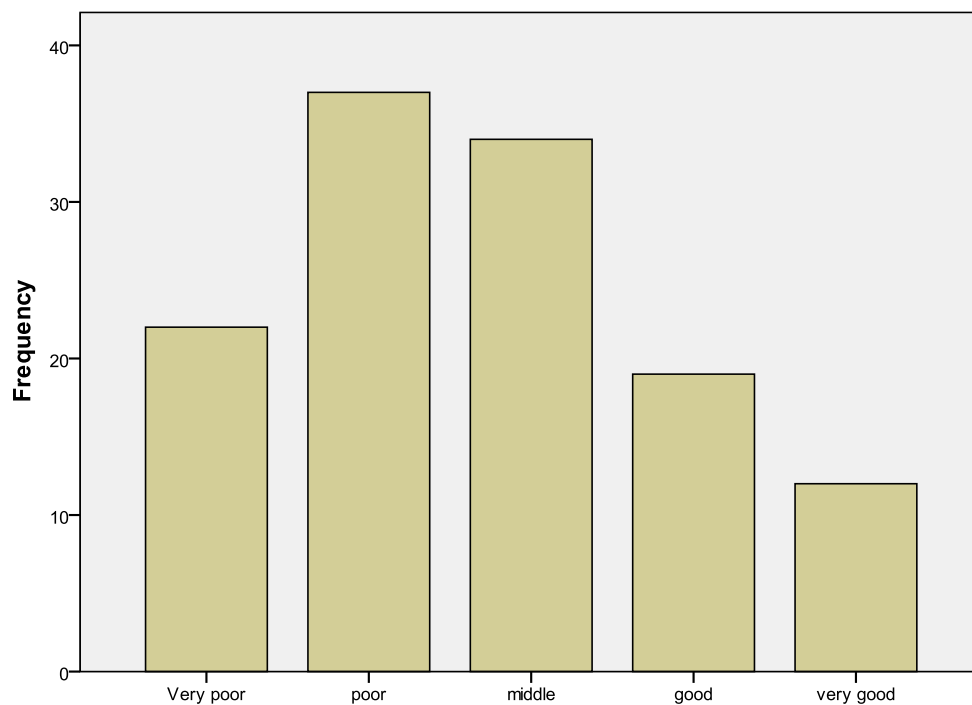
Figure 5.25: Frequency of Q19

Table 5.44 shows the mean of item "How would you evaluate the examination of every stage in designing phase and the confirmation of using safety standards of Engineering Building Code in the design?" equals 2.69 (53.87%), Test value = -2.82, and P value = 0.003 which is less than the level of significance $\alpha = 0.05$. The sign of the test is negative, so the mean of this item is significantly less than the hypothesized value 3. We found that the respondents disagreed to this item.

Table 5.44: Means and Test values for Q19

Item	Mean	Proportional mean	Test value	P value (Sig.)
How would you evaluate the examination of every stage in designing phase and the confirmation of using safety standards of Engineering Building Code in the design?	2.69	53.87	-2.82	0.003

5.2.3.4 Analysis of Question 20

The analysis of question No 20 "How do you evaluate the clarification of the responsibilities and powers of the executors of the design?" is as follows:

Table 5.45 shows the frequency of "very poor" is 12, the frequency of " poor" is 43, the frequency of "middle" is 40, the frequency of "good" is 17 and the frequency of "very good" is 12. Also Table 5.45 and Figure 5.26 shows the percent of "very poor" is 9.7%, the percent of " poor" is 34.7%, the percent of "middle" is 32.3%, the percent of "good" is 13.7% and the percent of "very good" is 9.7%.

Table 5.45: Frequency and Percentage of Q20

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very poor	12	9.7	9.7	9.7
	poor	43	34.7	34.7	44.4
	middle	40	32.3	32.3	76.6
	good	17	13.7	13.7	90.3
	very good	12	9.7	9.7	100.0
	Total	124	100.0	100.0	
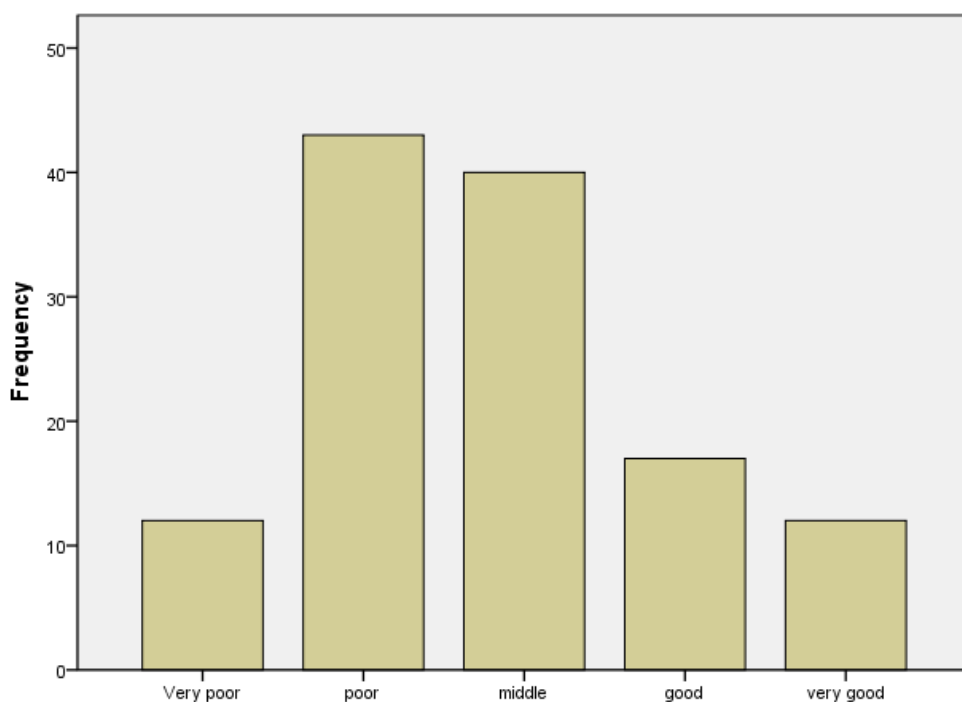
Figure 5.26: Frequency of Q20

Table 5.46 shows the mean of item "How do you evaluate the clarification of the responsibilities and powers of the executors of the design?" equals 2.79 (55.81%), Test value = -2.11, and P value = 0.018 which is less than the level of significance $\alpha = 0.05$. The sign of the test is negative, so the mean of this item is significantly less than the hypothesized value 3. We found that the respondents disagreed to this item.

Table 5.46: Means and Test values for Q20

Item	Mean	Proportional mean	Test value	P value (Sig.)
How do you evaluate the clarification of the responsibilities and powers of the executors of the design?	2.79	55.81	-2.11	0.018

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5.2.3.5 Analysis of Question 21

The analysis of question No 21 "To what extent do you evaluate the process of reviewing the designs at the appropriate stage?" is as follows:

Table 5.47 shows the frequency of "very poor" is 12, the frequency of " poor" is 45, the frequency of "middle" is 45, the frequency of "good" is 10 and the frequency of "very good" is 12. Also Table 5.47 and Figure 5.27 shows the percent of "very poor" is 9.7%, the percent of " poor" is 36.3%, the percent of "middle" is 36.3%, the percent of "good" is 8.1% and the percent of "very good" is 9.7%.

Table 5.47: Frequency and Percentage of Q21

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very poor	12	9.7	9.7	9.7
	poor	45	36.3	36.3	46.0
	middle	45	36.3	36.3	82.3
	good	10	8.1	8.1	90.3
	very good	12	9.7	9.7	100.0
	Total	124	100.0	100.0	
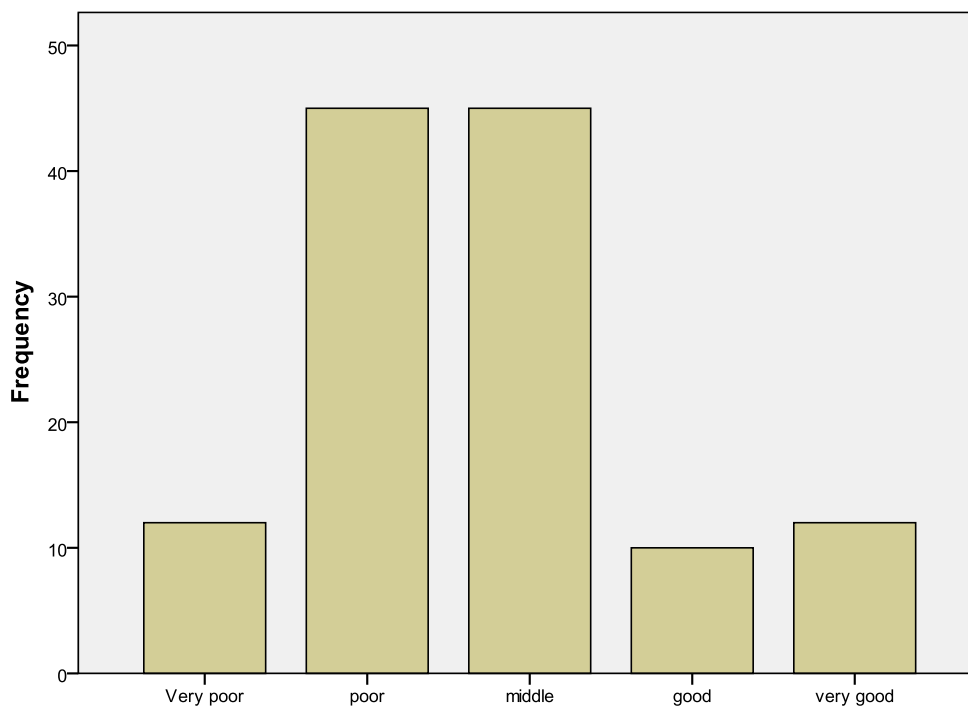
Figure 5.27: Frequency of Q21

Table 5.48 shows the mean of item "To what extent do you evaluate the process of reviewing the designs at the appropriate stage?" equals 2.72 (54.35%), Test value = -2.93, and P value = 0.002 which is less than the level of significance $\alpha = 0.05$. The sign of the test is negative, so the mean of this item is significantly less than the hypothesized value 3. We found that the respondents disagreed to this item.

Table 5.48: Means and Test values for Q21

Item	Mean	Proportional mean	Test value	P value (Sig.)
To what extent do you evaluate the process of reviewing the designs at the appropriate stage?	2.72	54.35	-2.93	0.002

5.2.3.6 Analysis of Question 22

The analysis of question No 22 "How do you evaluate suggestions solutions, in the case of evaluation?" is as follows:

Table 5.49 shows the frequency of "very poor" is 15, the frequency of " poor" is 34, the frequency of "middle" is 47, the frequency of "good" is 16 and the frequency of "very good" is 12. Also Table 5.49 and Figure 5.28 shows the percent of "very poor" is 12.1%, the percent of " poor" is 27.4%, the percent of "middle" is 37.9%, the percent of "good" is 12.9% and the percent of "very good" is 9.7%.

Table 5.49: Frequency and Percentage of Q22

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very poor	15	12.1	12.1	12.1
	poor	34	27.4	27.4	39.5
	middle	47	37.9	37.9	77.4
	good	16	12.9	12.9	90.3
	very good	12	9.7	9.7	100.0
	Total	124	100.0	100.0	
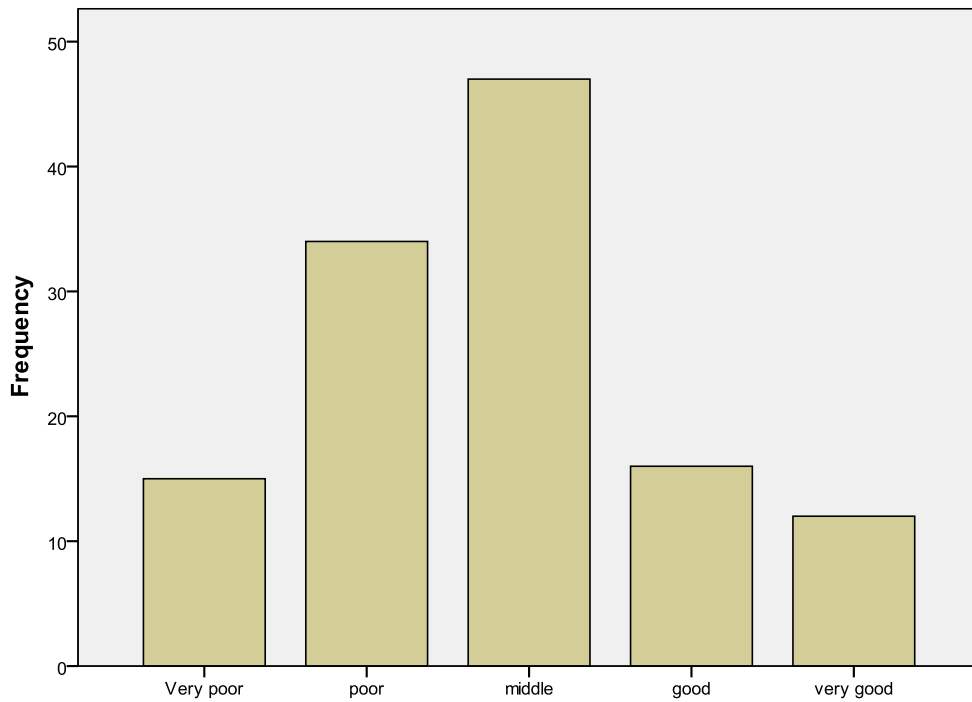
Figure 5.28: Frequency of Q22

Table 5.50 shows the mean of item "How do you evaluate suggestions solutions, in the case of evaluation?" equals 2.81 (56.13%), Test value = -1.93, and P value = 0.028 which is less than the level of significance $\alpha = 0.05$. The sign of the test is negative, so the mean of this item is significantly less than the hypothesized value 3. We found that the respondents disagreed to this item.

Table 5.50: Means and Test values for Q22

Item	Mean	Proportional mean	Test value	P value (Sig.)
How do you evaluate suggestions solutions, in the case of evaluation?	2.81	56.13	-1.93	0.028

5.2.3.7 Analysis of Question 23

The analysis of question No 23 "How would you evaluate the documentation of the results of the design on a special register for this purpose?" is as follows:

Table 5.51 shows the frequency of "very poor" is 17, the frequency of " poor" is 37, the frequency of "middle" is 45, the frequency of "good" is 14 and the frequency of "very good" is 11. Also Table 5.51 and Figure 5.29 shows the percent of "very poor" is 13.7%, the percent of " poor" is 29.8%, the percent of "middle" is 36.3%, the percent of "good" is 11.3% and the percent of "very good" is 8.9%.

Table 5.51: Frequency and Percentage of Q23

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very poor	17	13.7	13.7	13.7
	poor	37	29.8	29.8	43.5
	middle	45	36.3	36.3	79.8
	good	14	11.3	11.3	91.1
	very good	11	8.9	8.9	100.0
	Total	124	100.0	100.0	
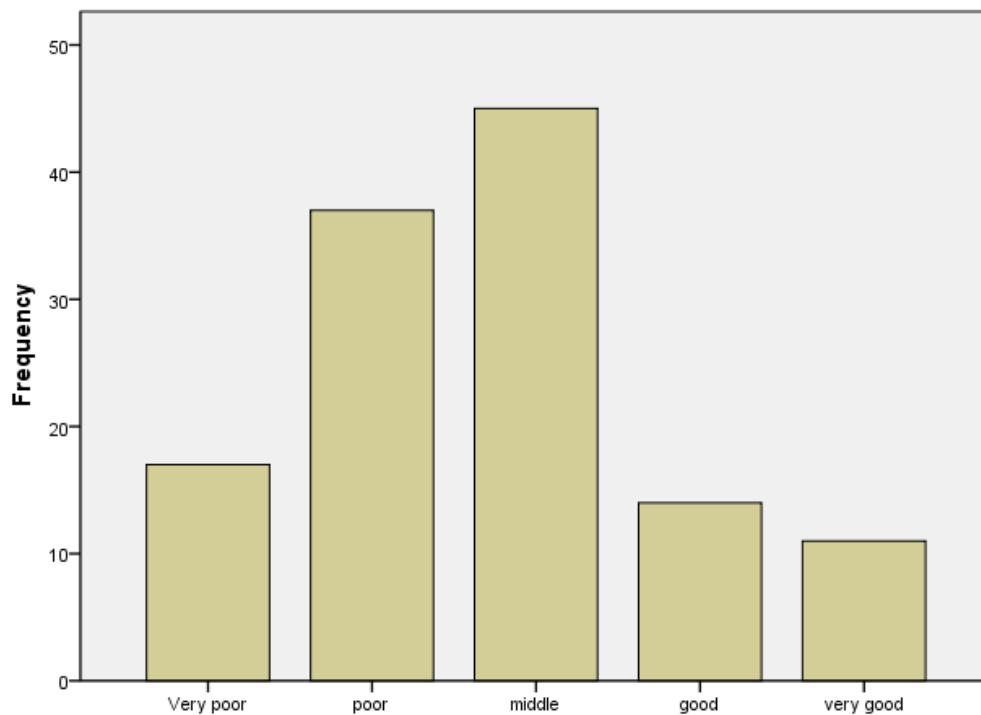
Figure 5.29: Frequency of Q23

Table 5.52 shows the mean of item "How would you evaluate the documentation of the results of the design on a special register for this purpose?" equals 2.72 (54.35%), Test value = -2.82, and P value = 0.003 which is less than the level of significance $\alpha = 0.05$. The sign of the test is negative, so the mean of this item is significantly less than the hypothesized value 3. We found that the respondents disagreed to this item.

Table 5.52: Means and Test values for Q23

Item	Mean	Proportional mean	Test value	P value (Sig.)
How would you evaluate the documentation of the results of the design on a special register for this purpose?	2.72	54.35	-2.82	0.003

5.2.3.8 Analysis of Question 24

The analysis of question No 25 "How do you evaluate the identification and documentation of the changes that occur to the design?" is as follows:

Table 5.53 shows the frequency of "very poor" is 15, the frequency of " poor" is 35, the frequency of "middle" is 46, the frequency of "good" is 17 and the frequency of "very good" is 11. Also Table 5.53 and Figure 5.30 shows the percent of "very poor" is 12.1%, the percent of " poor" is 28.2%, the percent of "middle" is 37.1%, the percent of "good" is 13.7% and the percent of "very good" is 8.9%.

Table 5.53: Frequency and Percentage of Q24

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very poor	15	12.1	12.1	12.1
	poor	35	28.2	28.2	40.3
	middle	46	37.1	37.1	77.4
	good	17	13.7	13.7	91.1
	very good	11	8.9	8.9	100.0
	Total	124	100.0	100.0	
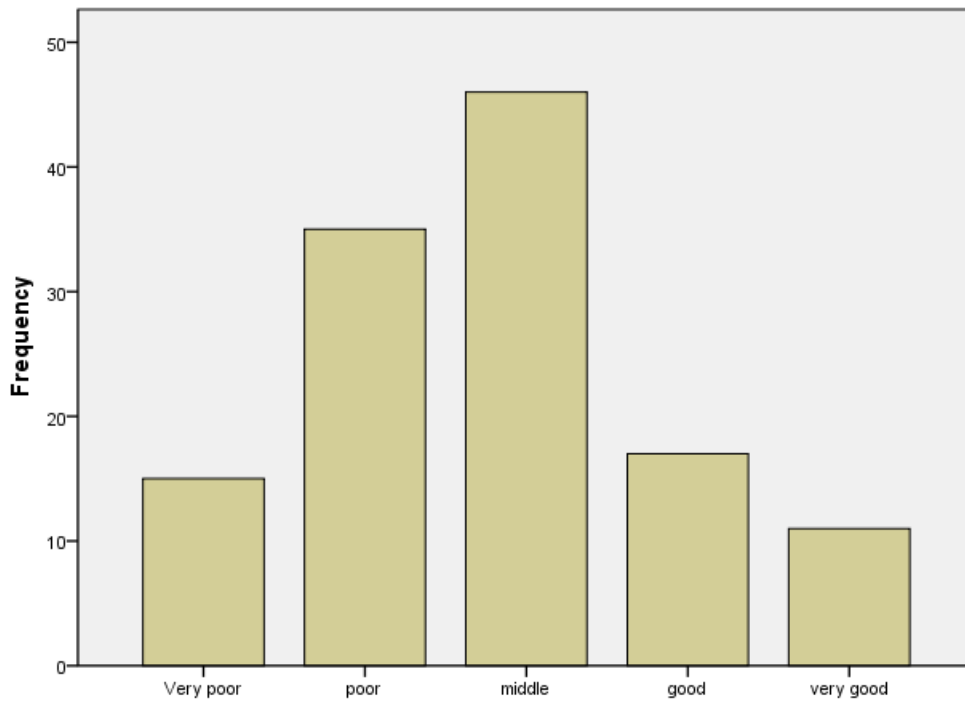
Figure 5.30: Frequency of Q24

Table 5.54 shows the mean of item "How do you evaluate the identification and documentation of the changes that occur to the design?" equals 2.79 (55.81%), Test value = -2.11, and P value = 0.018 which is less than the level of significance $\alpha = 0.05$. The sign of the test is negative, so the mean of this item is significantly less than the hypothesized value 3. We found that the respondents disagreed to this item.

Table 5.54: Means and Test values for Q24

Item	Mean	Proportional mean	Test value	P value (Sig.)
How do you evaluate the identification and documentation of the changes that occur to the design?	2.79	55.81	-2.11	0.018

5.2.3.9 The Means and Test values for Sub-Hypothesis B

Table 5.55: Means and Test values for Sub-Hypothesis B

No	Item	Mean	Proportional mean	Test value	P value (Sig.)	Rank
17	In the case of applying standards and conditions of Engineering Building Code, how would you evaluate its impact on (time, cost and scope of the project)?	2.77	55.32	-2.25	0.013	5
18	How do you evaluate the planning for designing stage, starting from the idea, then the initial and final design, production and the stage of using the scheme according to the principles of the Engineering Building Code?	2.78	55.65	-2.16	0.016	4
19	How would you evaluate the examination of every stage in designing phase and the confirmation of using safety standards of Engineering Building Code in the design?	2.69	53.87	-2.82	0.003	8
20	How do you evaluate the clarification of the responsibilities and powers of the executors of the design?	2.79	55.81	-2.11	0.018	2
21	To what extent do you evaluate the process of reviewing the designs at the appropriate stage?	2.72	54.35	-2.93	0.002	6
22	How do you evaluate suggestions solutions, in the case of evaluation?	2.81	56.13	-1.93	0.028	1

23	How would you evaluate the documentation of the results of the design on a special register for this purpose?	2.72	54.35	-2.82	0.003	7
24	How do you evaluate the identification and documentation of the changes that occur to the design?	2.79	55.81	-2.11	0.018	2
	All items of the field	2.76	55.16	-2.97	0.002	

Table 5.55 shows The mean of the field "The non-application of standards, requirements and specifications of building code" equals 2.76 (55.16%), Test value = -2.97, and P-value= 0.002 which is less than the level of significance $\alpha = 0.05$. The sign of the test is negative, so the mean of this field is significantly less than the hypothesized value 3. We found that the respondents disagreed to field of "The non-application of standards, requirements and specifications of building code".

Figure 5.31 shows the question with the maximum mean is question 22 at 2.81, while question 19 has the minimum mean at 2.69. It also shows the mean of the Sub-Hypothesis B is significantly less than the hypothesized value 3.
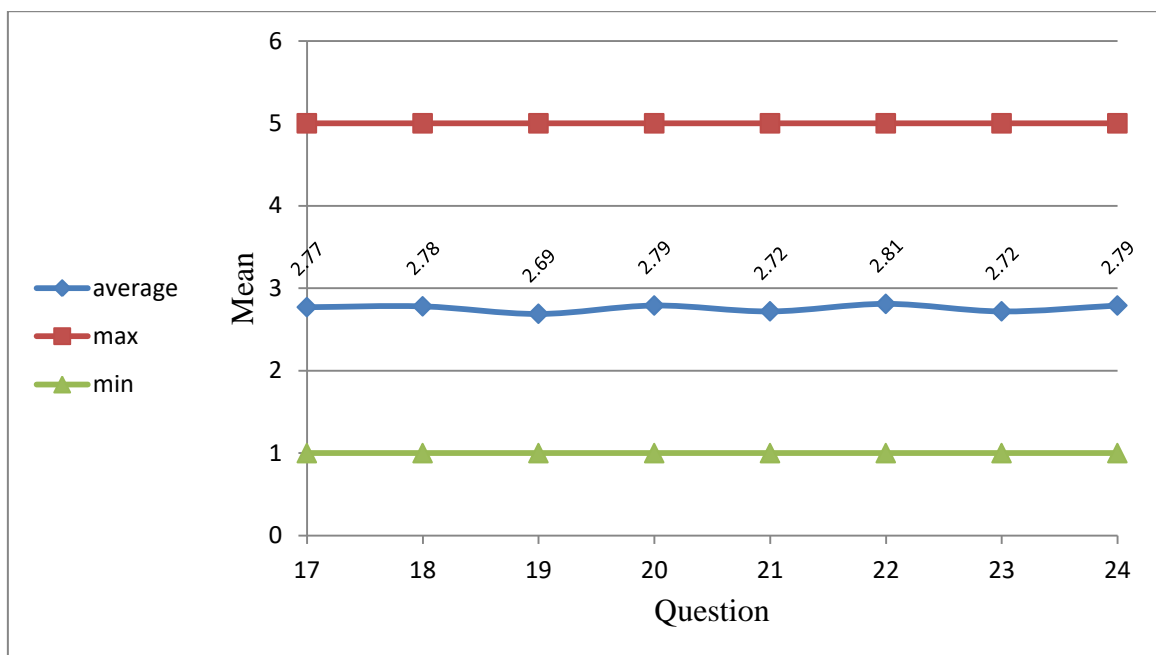
Figure 5.31: Mean of questions related to sub-hypothesis B

5.2.4 Analysis the Questions Related to Sub-Hypothesis C

The sub-hypothesis C is "There is a statistically significant relationship between failure to achieve goals and targets of customer or entrepreneurs and lack of success of the application of quality concepts in the implementation of structural projects" it is related to questions (25 to 32).

5.2.4.1 Analysis of Question 25

The analysis of question No 25 "How would you evaluate company's focus on customer satisfaction?" is as follows:

Table 5.56 shows the frequency of "very poor" is 16, the frequency of " poor" is 31, the frequency of "middle" is 42, the frequency of "good" is 27 and the frequency of "very good" is 8. Also Table 5.56 and Figure 5.32 shows the percent of "very poor" is 12.9%, the percent of " poor" is 25%, the percent of "middle" is 33.9%, the percent of "good" is 21.8% and the percent of "very good" is 6.5%.

Table 5.56: Frequency and Percentage of Q25

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very poor	16	12.9	12.9	12.9
	poor	31	25.0	25.0	37.9
	middle	42	33.9	33.9	71.8
	good	27	21.8	21.8	93.5
	very good	8	6.5	6.5	100.0
	Total	124	100.0	100.0	
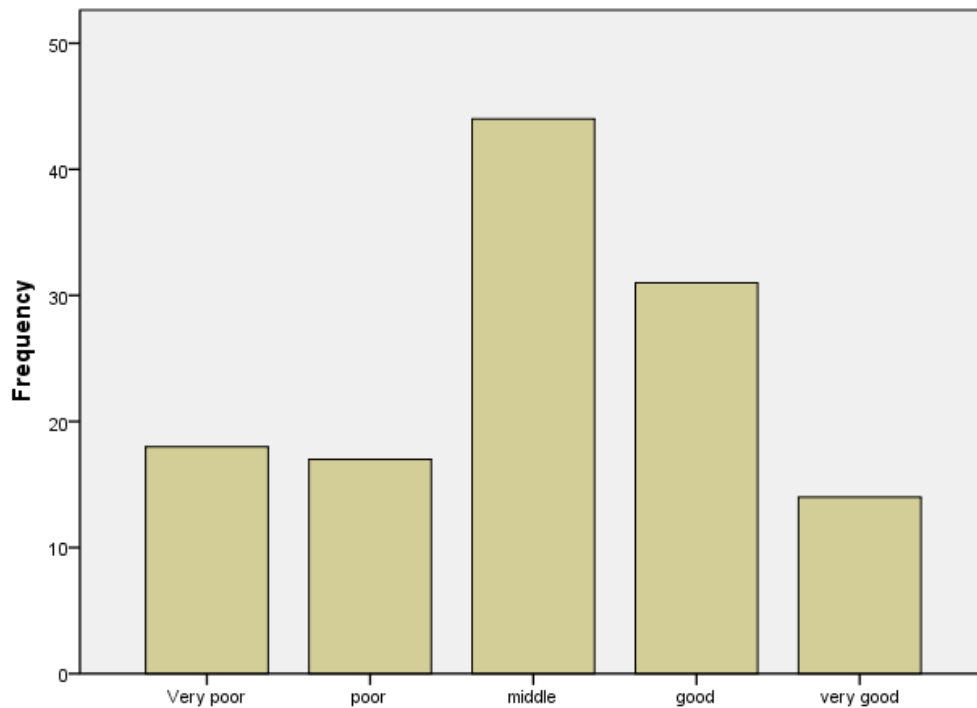
Figure 5.32: Frequency of Q25

Table 5.57 shows the mean of item "How would you evaluate company's focus on customer satisfaction?" equals 3.05 (60.97%), Test value = 0.45, and P value = 0.326 which is more than the level of significance $\alpha = 0.05$. Then the mean of this item is insignificantly different from the hypothesized value 3. We found that the respondents (neutral) to this item.

Table 5.57: Means and Test values for Q25

Item	Mean	Proportional mean	Test value	P value (Sig.)
How would you evaluate company's focus on customer satisfaction?	3.05	60.97	0.45	0.326

5.2.4.2 Analysis of Question 26

The analysis of question No 2 "How would you evaluate entrepreneurs' or (client's) satisfaction with the execution or planning the project according to the standards of Engineering Building Code?" is as follows:

Table 5.58 shows the frequency of "very poor" is 15, the frequency of " poor" is 31, the frequency of "middle" is 52, the frequency of "good" is 15 and the frequency of "very good" is 11. Also Table 5.58 and Figure 5.33 shows the percent of "very poor" is 12.1%, the percent of " poor" is 25%, the percent of "middle" is 41.9%, the percent of "good" is 12.1% and the percent of "very good" is 8.9%.

Table 5.58: Frequency and Percentage of Q26

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very poor	15	12.1	12.1	12.1
	poor	31	25.0	25.0	37.1
	middle	52	41.9	41.9	79.0
	good	15	12.1	12.1	91.1
	very good	11	8.9	8.9	100.0
	Total	124	100.0	100.0	
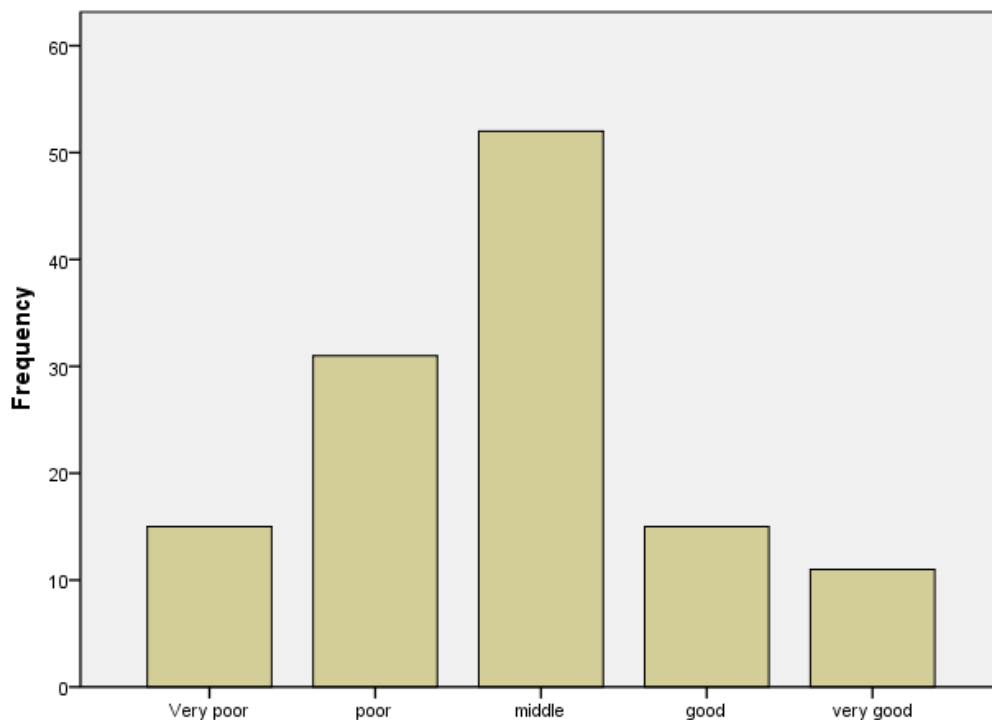
Figure 5.33: Frequency of Q26

Table 5.59 shows the mean of item "How would you evaluate entrepreneurs' or (client's) satisfaction with the execution or planning the project according to the standards of Engineering Building Code?" equals 2.81 (56.13%), Test value = -1.98, and P value = 0.025 which is less than the level of significance $\alpha = 0.05$. The sign of the test is negative, so the mean of this item is significantly less than the hypothesized value 3. We found that the respondents disagreed to this item.

Table 5.59: Means and Test values for Q26

Item	Mean	Proportional mean	Test value	P value (Sig.)
How would you evaluate entrepreneurs' or (client's) satisfaction with the execution or planning the project according to the standards of Engineering Building Code?	2.81	56.13	-1.98	0.025

5.2.4.3 Analysis of Question 27

The analysis of question No 27 "To what extent would you evaluate company's identification of the client's requirements, including delivery and after delivery requirements?" is as follows:

Table 5.60 shows the frequency of "very poor" is 15, the frequency of " poor" is 32, the frequency of "middle" is 45, the frequency of "good" is 17 and the frequency of "very good" is 15. Also Table 5.60 and Figure 5.34 shows the percent of "very poor" is 12.1%, the percent of " poor" is 25.8%, the percent of "middle" is 36.3%, the percent of "good" is 13.7% and the percent of "very good" is 12.1%.

Table 5.60: Frequency and Percentage of Q27

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very poor	15	12.1	12.1	12.1
	poor	32	25.8	25.8	37.9
	middle	45	36.3	36.3	74.2
	good	17	13.7	13.7	87.9
	very good	15	12.1	12.1	100.0
	Total	124	100.0	100.0	
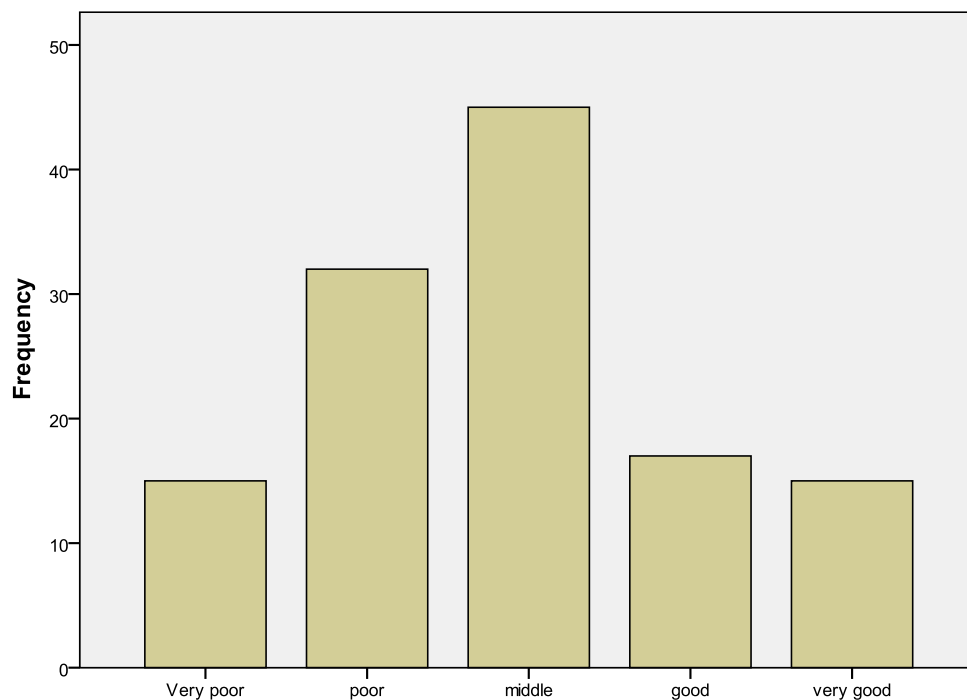
Figure 5.34: Frequency of Q27

Table 5.61 shows the mean of item "To what extent would you evaluate company's identification of the client's requirements, including delivery and after delivery requirements?" equals 2.88 (57.58%), Test value = -1.16, and P value = 0.125 which is more than the level of significance $\alpha = 0.05$. Then the mean of this item is insignificantly different from the hypothesized value 3. We found that the respondents (neutral) to this item.

Table 5.61: Means and Test values for Q27

Item	Mean	Proportional mean	Test value	P value (Sig.)
To what extent would you evaluate company's identification of the client's requirements, including delivery and after delivery requirements?	2.88	57.58	-1.16	0.125

5.2.4.4 Analysis of Question 28

The analysis of question No 28 is as follows:

Table 5.62 shows the frequency of "very poor" is 13, the frequency of " poor" is 38, the frequency of "middle" is 38, the frequency of "good" is 24 and the frequency of "very good" is 11. Also Table 5.62 and Figure 5.35 shows the percent of "very poor" is 10.5%, the percent of " poor" is 30.6%, the percent of "middle" is 30.6%, the percent of "good" is 19.4% and the percent of "very good" is 8.9%.

Table 5.62: Frequency and Percentage of Q28

|		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very poor	13	10.5	10.5	10.5
	poor	38	30.6	30.6	41.1
	middle	38	30.6	30.6	71.8
	good	24	19.4	19.4	91.1
	very good	11	8.9	8.9	100.0
	Total	124	100.0	100.0	
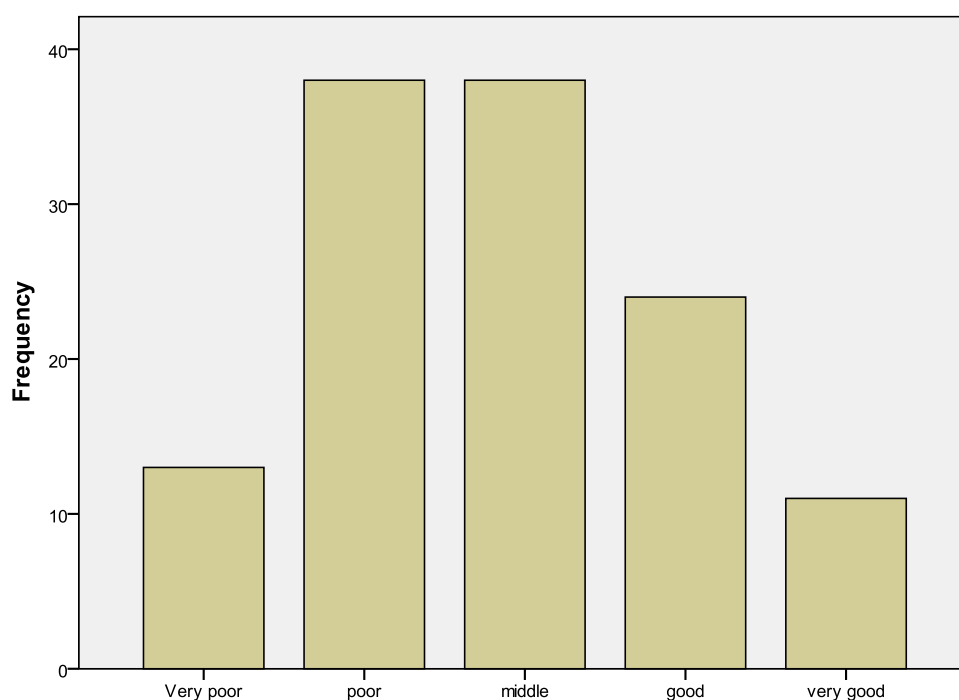
Figure 5.35: Frequency of Q28

Table 5.63 shows the mean of item "How do you evaluate company's identification of the client's non-specific requirements and convincing him with the necessity of using it?" equals 2.85 (57.10%), Test value = -1.44, and P value = 0.076 which is more than the level of significance $\alpha = 0.05$. Then the mean of this item is insignificantly different from the hypothesized value 3. We found that the respondents (neutral) to this item.

Table 5.63: Means and Test values for Q28

Item	Mean	Proportional mean	Test value	P value (Sig.)
How do you evaluate company's identification of the client's non-specific requirements and convincing him with the necessity of using it?	2.85	57.10	-1.44	0.076

5.2.4.5 Analysis of Question 29

The analysis of question No 29 "To what extent would you define company's specifications of the required obligations that are related to designing and execution, including the statutory and legal requirements?" is as follows:

Table 5.64 shows the frequency of "very poor" is 15, the frequency of " poor" is 26, the frequency of "middle" is 49, the frequency of "good" is 19 and the frequency of "very good" is 15. Also Table 5.64 and Figure 5.36 shows the percent of "very poor" is 12.1%, the percent of " poor" is 21%, the percent of "middle" is 39.5%, the percent of "good" is 15.3% and the percent of "very good" is 12.1%.

Table 5.64: Frequency and Percentage of Q29

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very poor	15	12.1	12.1	12.1
	poor	26	21.0	21.0	33.1
	middle	49	39.5	39.5	72.6
	good	19	15.3	15.3	87.9
	very good	15	12.1	12.1	100.0
	Total	124	100.0	100.0	
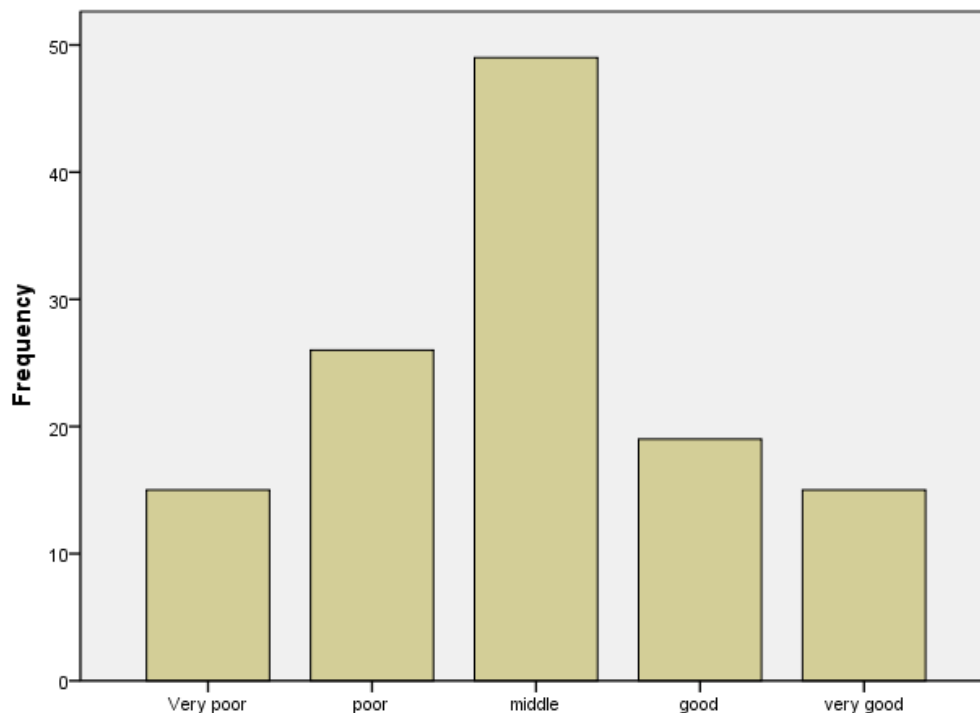
Figure 5.36: Frequency of Q29

92

Table 5.65 shows the mean of item "To what extent would you define company's specifications of the required obligations that are related to designing and execution, including the statutory and legal requirements?" equals 2.94 (58.87%), Test value = -0.54, and P value = 0.294 which is more than the level of significance $\alpha = 0.05$. Then the mean of this item is insignificantly different from the hypothesized value 3. We found that the respondents (neutral) to this item.

Table 5.65: Means and Test values for Q29

Item	Mean	Proportional mean	Test value	P value (Sig.)
To what extent would you define company's specifications of the required obligations that are related to designing and execution, including the statutory and legal requirements?	2.94	58.87	-0.54	0.294

5.2.4.6 Analysis of Question 30

The analysis of question No 30 is as follows:

Table 5.66 shows the frequency of "very poor" is 12, the frequency of " poor" is 27, the frequency of "middle" is 53, the frequency of "good" is 20 and the frequency of "very good" is 12. Also Table 5.66 and Figure 5.37 shows the percent of "very poor" is 9.7%, the percent of " poor" is 21.8%, the percent of "middle" is 42.7%, the percent of "good" is 16.1% and the percent of "very good" is 9.7%.

Table 5.66: Frequency and Percentage of Q30

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very poor	12	9.7	9.7	9.7
	poor	27	21.8	21.8	31.5
	middle	53	42.7	42.7	74.2
	good	20	16.1	16.1	90.3
	very good	12	9.7	9.7	100.0
	Total	124	100.0	100.0	
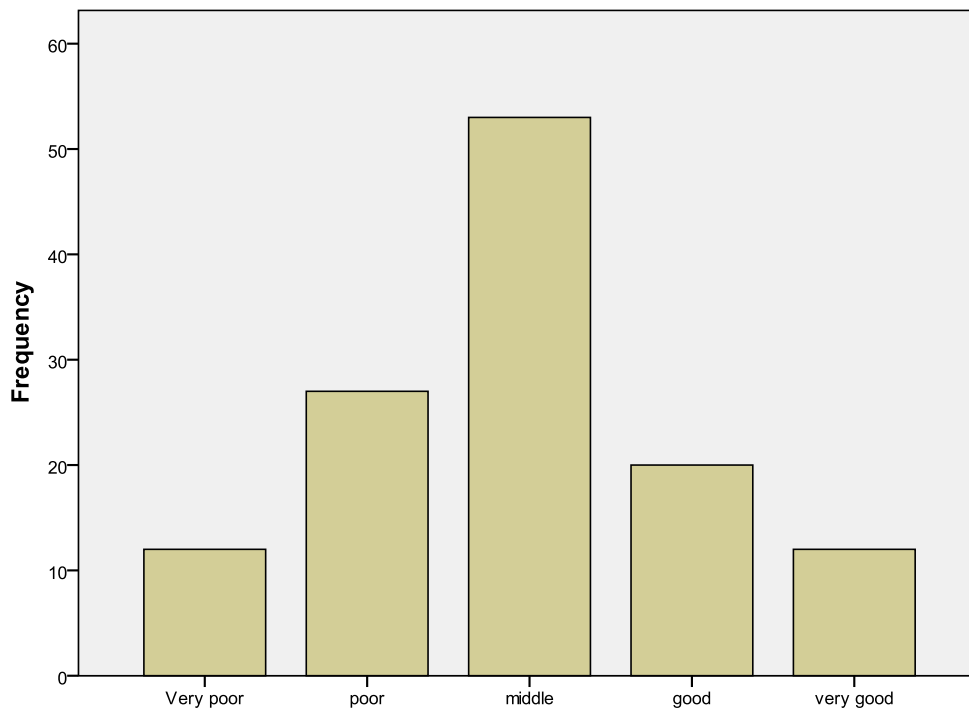
Figure 5.37: Frequency of Q30

Table 5.67 shows the mean of item "How do you evaluate company's review of every order to ensure the availability of the requirements for its implementation?" equals 2.94 (58.87%), Test value = -0.58, and P value = 0.280 which is more than the level of significance $\alpha = 0.05$. Then the mean of this item is insignificantly different from the hypothesized value 3. We found that the respondents (neutral) to this item.

Table 5.67: Means and Test values for Q30

Item	Mean	Proportional mean	Test value	P value (Sig.)
How do you evaluate company's review of every order to ensure the availability of the requirements for its implementation?	2.94	58.87	-0.58	0.280

5.2.4.7 Analysis of Question 31

The analysis of question No 31 is as follows:

Table 5.68 shows the frequency of "very poor" is 15, the frequency of " poor" is 26, the frequency of "middle" is 48, the frequency of "good" is 20 and the frequency of "very good" is 15. Also Table 5.68 and Figure 5.38 shows the percent of "very poor" is 12.1%, the percent of " poor" is 21%, the percent of "middle" is 38.7%, the percent of "good" is 16.1% and the percent of "very good" is 12.1%.

Table 5.68: Frequency and Percentage of Q31

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very poor	15	12.1	12.1	12.1
	poor	26	21.0	21.0	33.1
	middle	48	38.7	38.7	71.8
	good	20	16.1	16.1	87.9
	very good	15	12.1	12.1	100.0
	Total	124	100.0	100.0	

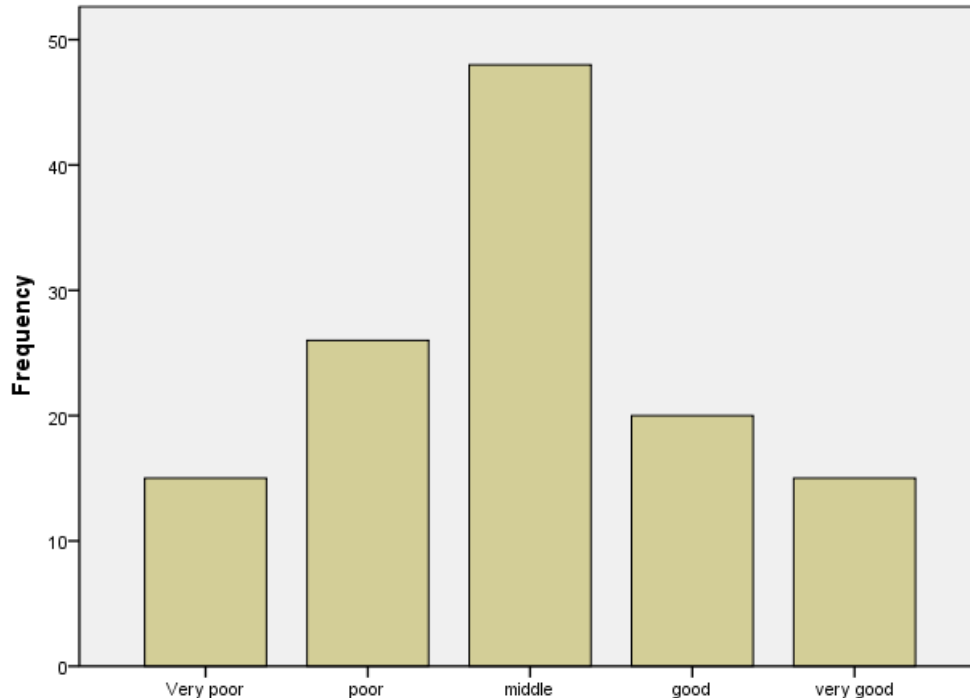**Figure 5.38:** Frequency of Q31

Table 5.69 shows the mean of item "How do you evaluate the process of presenting the new requirements on the concerned departments and units to seek their opinions before execution?" equals 2.95 (59.03%), Test value = -0.46, and P value = 0.322 which is more than the level of significance $\alpha = 0.05$. Then the mean of this item is insignificantly different from the hypothesized value 3. We found that the respondents (neutral) to this item.

Table 5.69: Means and Test values for Q31

Item	Mean	Proportional mean	Test value	P value (Sig.)
How do you evaluate the process of presenting the new requirements on the concerned departments and units to seek their opinions before execution?	2.95	59.03	-0.46	0.322

5.2.4.8 Analysis of Question 32

The analysis of question No 32 is as follows:

Table 5.70 shows the frequency of "very poor" is 18, the frequency of " poor" is 30, the frequency of "middle" is 41, the frequency of "good" is 21 and the frequency of "very good" is 14. Also Table 5.70 and Figure 5.39 shows the percent of "very poor" is 14.5%, the percent of " poor" is 24.2%, the percent of "middle" is 33.1%, the percent of "good" is 16.9% and the percent of "very good" is 11.3%.

Table 5.70: Frequency and Percentage of Q32

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very poor	18	14.5	14.5	14.5
	poor	30	24.2	24.2	38.7
	middle	41	33.1	33.1	71.8
	good	21	16.9	16.9	88.7
	very good	14	11.3	11.3	100.0
	Total	124	100.0	100.0	
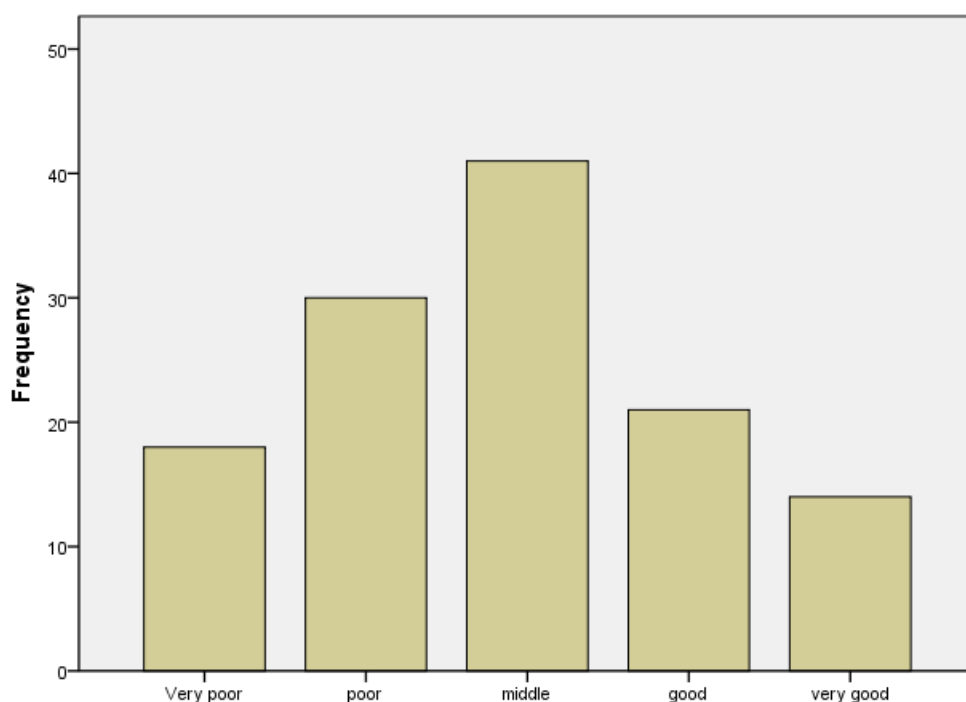
Figure 5.39: Frequency of Q32

Table 5.71 The mean of item "How do you evaluate the documentation of the results of reviewing orders, contracts and the consequent actions in a special record for this purpose?" equals 2.86 (57.26%), Test value = -1.27, and P value = 0.103 which is more than the level of significance $\alpha = 0.05$. Then the mean of this item is insignificantly different from the hypothesized value 3. We found that the respondents (Do not know, neutral) to this item.

Table 5.71: Means and Test values for Q32

Item	Mean	Proportional mean	Test value	P value (Sig.)
How do you evaluate the documentation of the results of reviewing orders, contracts and the consequent actions in a special record for this purpose?	2.86	57.26	-1.27	0.103

5.2.4.9 The Means and Test values for sub-hypothesis C

Table 5.72: Means and Test values for sub-hypothesis C

No	Item	Mean	Proportional mean (%)	Test value	P value (Sig.)	Rank
25	How would you evaluate company's focus on customer satisfaction?	3.05	60.97	0.45	0.326	1
26	How would you evaluate entrepreneurs' or (client's) satisfaction with the execution or planning the project according to the standards of Engineering Building Code?	2.81	56.13	-1.98	0.025	8
27	To what extent would you evaluate company's identification of the client's requirements, including delivery and after delivery requirements?	2.88	57.58	-1.16	0.125	5
28	How do you evaluate company's identification of the client's non-specific requirements and convincing him with the necessity of using it?	2.85	57.10	-1.44	0.076	7
29	To what extent would you define company's specifications of the required obligations that are related to designing and execution, including the statutory and legal requirements?	2.94	58.87	-0.54	0.294	4
30	How do you evaluate company's review of every order to ensure the availability of the requirements for its implementation?	2.94	58.87	-0.58	0.280	3

31	How do you evaluate the process of presenting the new requirements on the concerned departments and units to seek their opinions before execution?	2.95	59.03	-0.46	0.322	2
32	How do you evaluate the documentation of the results of reviewing orders, contracts and the consequent actions in a special record for this purpose?	2.86	57.26	-1.27	0.103	6
	All items of the field	2.91	58.23	-1.25	0.107	

Table 5.72 shows the mean of the filed "Failure to achieve goals and targets of customers" equals 2.91 (58.23%), Test value = -1.25, and P-value=0.107 which is more than the level of significance $\alpha = 0.05$. The mean of this field is insignificantly different from the hypothesized value 3. We found that the respondents (Do not know, neutral) to field of "Failure to achieve goals and targets".

Figure 5.40 shows the question with the maximum mean is question 25 at 3.05 while question 26 has the minimum mean at 2.81. It also shows the mean of the Sub-Hypothesis C is significantly less than the hypothesized value 3.
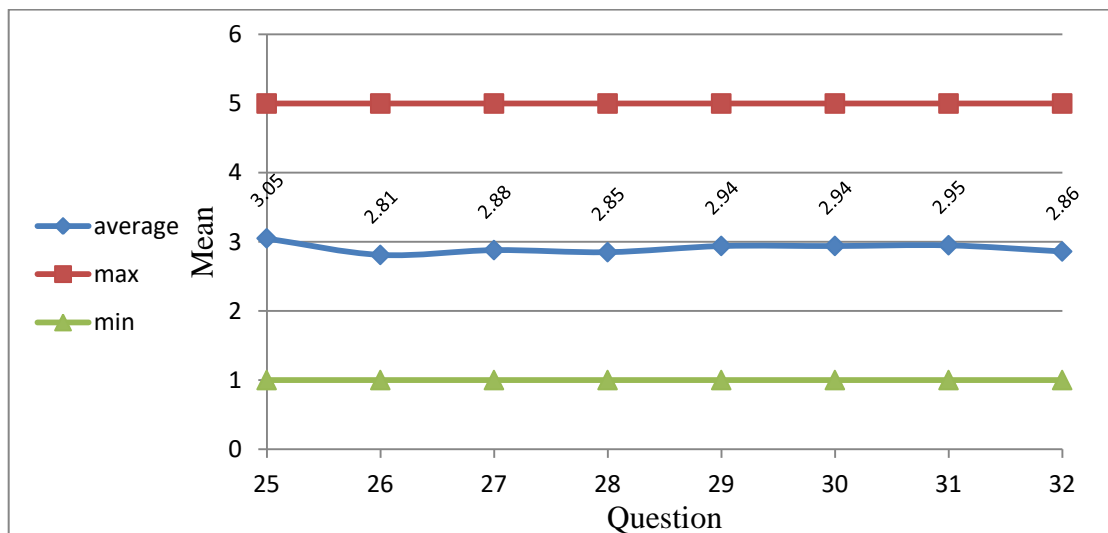

Figure 5.40: Mean of questions related to sub-hypothesis C

CHAPTER 6
CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

Firstly, the study shows that the majority of the respondents believe that there is a poor implementation of the Total Quality Management concepts in the execution of the construction projects, which is considered as the most influential factor that causes the poor Total Quality Management in the construction projects in Saudi Arabia. Moreover, the study indicates that there is imperfection in the work of the administration in improving the activities of the quality system the companies and there is a weakness in setting procedures and approaches for achieving an effective observation in order to ensure that Total Quality Management is applied in the construction projects, which proves the main hypothesis that is there is non- commitment of top management to the application of quality concepts in the construction projects.

Secondly, the study indicates that the majority of the respondents believe that there is a weakness in the companies in acquiring the needed administrative, scientific and technical competencies to apply the concepts of Total Quality Management in the construction projects. As the study indicates that there are no sufficient committees to observe Total Quality Management in the companies, which proves the first sub-hypothesis that is there is the absence of administrative, scientific and technical competencies that are needed for the application of the concepts of Total Quality Management in the construction projects.

Thirdly, the study indicates that there is imperfection in the application of the standards and requirements of the Building Code in the execution of the construction projects. Also, the study shows that there is imperfection in the auditing and in documenting the results of the designs in a special record in order to follow up with it to find solutions for the problem, which proves the second sub-hypothesis that is there is a weakness in the application of the standards and requirements of the Building Code in the implementation of the construction projects.

Finally, the study shows that there is a deficiency in meeting the demands and the needs of the clients. The study indicates that the companies do not adequately determine and define the implied costumer's needs, which proves the third sub-hypothesis that is the failure to achieve goals and targets of customers.

6.2 Recommendations

The following recommendations reduce the negative impact of the poor implementation of Total Quality Management in the construction projects:

1. The top management should pay attention to the organizations that execute construction projects via the effective implementation of Total Quality Management concepts.

2. The top management of the organizations that work in executing construction projects has to form a special committee to observe the Total Quality Management in the construction projects.

3. To determine the tasks and the responsibilities of each member of the company that is concerned with Total Quality Management program.

4. The top management of the organizations that work in executing construction projects should continuously look at the reports that are prepared by the committees which observe the Total Quality Management.

5. It is necessary for the top management of the organizations that work in executing construction projects to take the necessary measures and take the necessary actions to spread and to enhance the culture of Total Quality Management on the various administrative levels.

6. To provide the engineers and the employees with courses and workshops on Total Quality Management and its benefits.

7. To get the cadres and competencies that have scientific and practical experiences in executing construction projects.

8. To form a committee that observes the planning and the design of the construction projects according to the Building Code.

9. To provide the engineers and the employees with courses and workshops on the benefits of the application of the Building Code in achieving the concepts of Total Quality Management in the construction projects.

10. To update and to improve the Saudi Building Code and to find solutions for the reasons that made some companies unable to comply with it.

11. To observe and to document the execution process for each phase in the construction projects and to ensure that the standards of the Building Code.

12. To find out new ways and new methods that aim to satisfy the customers.

13. To clarify to the customer that meeting his / her demands and needs should be based on the engineering principles.

Ahcom, J. (2004). *A model for benchmarking contractors project management elements in Saudi Arabia*. King Fahd University, Saudi Arabia.

Alawa, S. (2002). *The basic concepts of quality*. King Fahd University, Saudi Arabia.

Aldery, A. (2011). *The Impact of Poor Planning on the Duration of Executing Construction Projects*. Arab British Academy of Project Management Department.

Al-Ghabary, A. (2000). *Recent Trends in the Internal Auditing and Its Importance in Determining the Future Trends*. Cairo University, Egypt.

Al-Jembaz, A. (2010). *Evaluating the Managerial Factors that are Delaying the Construction Projects*. The Arab Academy, Denmark.

Al-Sulaimi, A. (1995). *Total Quality Management and Requirements of Qualification for ISO*. Cairo: Dar Ghareeb for Printing, Publication and Distribution.

Al-Swafeery, F. (1997). *Internal Audit's Functions in the Light of the International Quality Standards Requirements (ISO 9000)*. Alexandria University, Egypt.

American Management Association (1994). *Survey on Change Management*, AMA, New York.

Fathi, A. (2014). *Total Quality Concepts and Engineering Code in Construction Projects in the Arab Countries*. The Arab Academy, United Arab Emirates.

George, D., & P, M. (2006). *SPSS for Windows step by step: A simple guide and reference*. Boston: Allyn and Bacon.

Goetsch, L., & Davis, S. (1995). *Implementing Total Quality*. New Jersey: Prentice Hall Ltd.

Goucher, J., & Coffey, J. (1993). *Quality in Healthcare from Theory to Practice*. San Francisco: Jossey-Bass Publishers.

Hakes, C. (1991). *Total Quality Management: The Key to Business Improvement : a Pera International Executive Briefing*. Pennsylvania: ASTM International.

Hean, A. B. (1994). *Practical approach to the application of total quality*. *Institute of Public Administration* (Vol. 34). Saudi Arabia.

Helal, S. (1974). *Management Auditing and Its role in Rationalizing the Managerial Decisions*. Cairo University, Egypt.

Henry C. Thode, J. (2002). *Testing for Normality*. New York: Marcel Dekker.

Hijazi, I. (1997). *Total Quality Management- Introduction to Improve Quality Product in Spinning and Tissue Industry in Arab Republic of Egypt*. Egypt: Dar El Thaqafa for Publishing and Distribution.

ISO 9004. (2000). *Quality Management Systems Guidelines for Performance Improvements*. New Zealand: Standards Australia International Ltd.

Joseph, R. (1991). *Implementing Total Quality Management*. Toronto: Pfeiffer & Company.

Juran, M., & Gryna, M. (1980). *Quality Planning and Analysis* (2nd ed.). New York: McGraw Hill Book Company.

Khedira, K. (2001). *Total quality management*. Amman: Dar Mesara for publication.

Koredy, B. (2012). *Quality Principles and Its Impact on Achieving the Priorities of the Competitiveness in Factories*. Qadisiyah University, Iraq.

Labeeb, K. (2002). Towards Reaching a Comprehensive Framework of Professional Efficiency Standards for the Internal Audit in Facing the Financial Corruption Phenomenon in the Business Industry. *Faculty of Commerce for Scientific Research, Alexandria University*, *1*(40).

Leebov, W., & Ersoz, C. J. (1991). *The Health Care Manager's Guide to Continuous Quality Improvement*. Schenectady: American Hospital Publishing.

Miozzo, M., & Ivory, C. (2000). Restructuring in the British construction industry: Implications of recent changes in project management and technology. *Technology Analysis and Strategic Management*, *12*(4), 17.

Moussa, A. (1996). The concept of total quality management in the private sector in Saudi Arabia. *Financial Studies and the Business*, *3*, 300–301.

Mustafa, A. (1998). *Production management industrial processes and services* (2nd ed.). Egypt: Dar John Wiley.

Pettigrew, A. M. (1987). Context and action in the transformation of the firm. *Journal of Management Studies*, *24*(6).

Seedy, O. (1999). *Introduction to Total Quality Management to Improve the Efficiency and Effectiveness of the Internal Audit Management*. Ain Shams University, Egypt.

Strebel, P. (1994). Choosing the right change path. *California Management Review*, *36*(2), 34–37.

Sulaiman, I. (2005). *Internal Audit Measurement to Meet the Needs of Total Quality*. Cairo University, Egypt.

Tartare, V. (2006). *Total quality management in institutions of higher education*. Jordan: Dar Al Massira.

Tawfik, A. M. (1998). *Planning and production of quality control*. Cairo: Dar El Thaqafa for Publishing and Distribution.

Teboul, J. (1991). *Managing Quality Dynamics*. London: Prentice -Hall International (UK) Ltd.

Yosof, B. (2007). *Total Quality Management and the Outstanding Performance*. University of Management and Economics, Algeria.

Zeyad, S. M. (2005). Improving the Quality of the Implementation of Construction Projects in the Government Contracting Companies in Iraq. *Journal of Tikrit Engineering Science*, *12*(4).

Zinedine, F. (1996). *Scientific approach to the application of total quality management in the Arab institutions*. Cairo: Dar Al Arab.

APPENDICES

APPENDIX 1

QUESTIONNAIRE

إســـتبيـــــان | Questionnaire

الاسم الشركة : ....Name of Organization

الاسم : .... Name

الايميل او رقم الجوال:..Email or Mobile No:

المرحلة التعليمية | Qualification

بكالوريس/ Bachelor .... ماجستير/ master .... دكتوراه/PhD ....

الوظيفة| Job

مدير شركة/Company manager .... مدير موقع/Site Manager .... مهندس موقع/Site Eng ....

المنظمة التي تمثلها | Organization

حكومية/Government .... استشارية/Consultant .... مقاول/Contractor ....

سنوات الخبرة | Experience

١-٥ سنوات/1-5 Years .... ٥-١٠سنوات/5-10Years .... اكثر من ١٠ سنوات/More than 10 years ....

No		1	2	3	4	5
		(1very poor 5 very good)				
1	How do you evaluate management statistical control on the accuracy of Total Quality Management?					
2	To what extent would you evaluate the division of quality responsibilities?					
3	How would you evaluate company's focus on achieving all standards of quality management?					
4	How would you evaluate management's efforts to inform the employees about the relationship between product's quality and costs?					
5	How do you evaluate the continuous improvement of the quality system?					
6	How would you evaluate the necessary measures to remove the causes of poor application quality management?					
7	How would you evaluate the corrective actions that prevent the recurrence of poor application quality management?					
8	How would you evaluate reviewing the corrective actions and documenting the results?					
9	How would you evaluate the practical approaches to achieve effective control and the efficiency of operations?					
10	How would you evaluate the application of practical approaches to quality management?					
11	How would you evaluate company's essential competencies (administrative, scientific and technical) for the application of Total Quality Management concepts?					
12	To what extent you evaluate the performance of the committee which monitors the application of quality concepts?					
13	How do you evaluate the level of expertise among committee members?					
14	How would you evaluate Committee's commitment to conduct sessions on time and its application of quality management concepts?					
15	How would you evaluate the courses for the scientific and technical cadres on the application of quality concepts?					
16	How would you evaluate the clarifications of Total Quality Management concepts to the labor and engineers?					
17	In the case of applying standards and conditions of Engineering Building Code, how would you evaluate its impact on (time, cost and scope of the project)?					
18	How do you evaluate the planning for designing stage, starting from the idea, then the initial and final design, production and the stage of using the scheme according to the principles of the Engineering Building Code?					
19	How would you evaluate the examination of every stage in designing phase and the confirmation of using safety standards of Engineering Building Code in the design?					
20	How do you evaluate the clarification of the responsibilities and powers of the executors of the design?					
21	To what extent do you evaluate the process of reviewing the designs at the appropriate stage?					
22	How do you evaluate suggestions solutions, in the case of evaluation?					
23	How would you evaluate the documentation of the results of the design on a special register for this purpose?					
24	How do you evaluate the identification and documentation of the changes that occur to the design?					
25	How would you evaluate company's focus on customer satisfaction?					
26	How would you evaluate entrepreneurs' or (client's) satisfaction with the execution or planning the project according to the standards of Engineering Building Code?					
27	To what extent would you evaluate company's identification of the client's requirements, including delivery and after delivery requirements?					
28	How do you evaluate company's identification of the client's non-specific requirements and convincing him with the necessity of using it?					
29	To what extent would you define company's specifications of the required obligations that are related to designing and execution, including the statutory and legal requirements?					
30	How do you evaluate company's review of every order to ensure the availability of the requirements for its implementation?					
31	How do you evaluate the process of presenting the new requirements on the concerned departments and units to seek their opinions before execution?					
32	How do you evaluate the documentation of the results of reviewing orders, contracts and the consequent actions in a special record for this purpose?					

التقيم (١ ضعيف جدا ـ ٥ مقبول جدا)							
٥	٤	٣	٢	١			
					تقوم الادارة بعمل رقابة احصائية على ضبط الجودة الشاملة	١
					يتضمن مفهوم الجودة في الشركة التركيز على رضا الزبون	٢
					يتضمن مفهوم الجودة في الشركة على تقسيم مسؤوليات الجودة بشكل محدد	٣
					يتضمن مفهوم الجودة في الشركة على تحقيق أساليب الجودة في كل شيء	٤
					تقوم الادارة بتوعية موظفيها حول العلاقة بين جودة المنتج والتكاليف	٥
					تقوم الادارة بتحسين فعاليات نظام الجودة بشكل مستمر	٦
					تقوم الادارة بإتخاذ الاجراءات اللازمة لإزالة متسببات عدم تطبيق الجوده	٧
					تتضمن الاجراءات التصحيحية إجراءات لمنع تكرار عدم تطبيق الجوده	٨
					تراجع الاجراءات التصحيحية المتخذة وتوثق نتائجها	٩
					تقوم الادارة بتطبيق مناهج عملية لتحقيق الرقابة الفعالة وكفاءة العمليات	١٠
					يدي تطبيق مناهج عملية للجودة إلى *تحسين الاداء*	١١
					تملك الشركة الكفاءات اللازمة (ادارية و علمية و تقنية) لتطبيق مفاهيم الجودة الشامله	١٢
					يوجد لجنة تحرص على مراقبه تطبيق مفاهيم الجودة	١٣
					يوجد اشخاص اصحاب خبره في اللجنة	١٤
					تلتزم اللجنة باوقات انعقادها و متابعه تبطيق مفاهيم الجوده	١٥
					يوجد دورات للكوادر العليمة و التقنيه عن مفاهيم تطبيق الجوده	١٦
					يتم شرح مفاهيم الجوده الشاملة للعماله و المهندسين	١٧
					يوجد تاثير على (الوقت و التكلفه و نطاق المشروع) في حال تطبيق مقاييس و شروط كود البناء الهندسي	١٨
					يتم التخطيط لمرحلة التصميم بدءا بمرحلة الفكرة ومرورا بمرحلة التصميم الاولي والنهائي والانتاج وإنتهاءا بمرحلة استخدام المخطط تحت اسس كود البناء الهندسي	١٩
					تتم المراجعة والتحقق لكل مرحلة من مراحل التصميم و تاكد على سلامة معاير كود البناء الهندسي في التصميم	٢٠
					تحدد مسؤوليات وصلاحيات منفذي فعاليات التصميم من قبل الشركة	٢١
					تتم مراجعة التصميم في مرحلة مناسبة لضمان التقييم في الوقت المناسب	٢٢
					يتم اقتراح الحلول ومتابعتها في حال كان التقييم سيء	٢٣
					توثق نتائج صحة التصميم بسجل خاص لهذا الغرض	٢٤
					يتم تحديد وتوثيق التغيرات التي تحصل على التصميم في سجل خاص لهذا الغرض	٢٥
					يرتبط رضاء اصحاب المشاريع (الزبون) بتنفيذ او تصميم المشروع تحت اسس و معاير كود البناء الهندسي	٢٦
					تحدد الشركة متطلبات الزبون بما في ذلك متطلبات التسليم وخدمات مابعد التسليم	٢٧
					تقوم الشركة بتحديد المتطلبات غير المحددة من قبل الزبون واقناعه بضرورتها في الاستخدام	٢٨
					تحدد الشركة متطلبات الالتزامات المتعلقة بالتنفيذ وتصميم بما فيها المتطلبات النظامية والقانونية	٢٩
					تقوم الشركة بمراجعة كل طلب تجهيز للتأكد من توفر مستلزمات تنفيذها	٣٠
					يتم عرض المتطلبات الجديدة من قبل الزبون على الدوائر والاقسام ذات العلاقة للوقوف على آراءهم قبل التنفيذ	٣١
					يتم تسجيل نتائج مراجعة الطلبات والعقود ومايترتب عليها من اجراءات في سجل يعتمد لهذا الغرض	٣٢

شكرا على تعاونكم

التوقيع