

**T.C.
ISTANBUL GEDİK UNIVERSITY
INSTITUTE OF GRADUATE STUDIES**



**TOTAL QUALITY MANAGEMENT OF CONSTRUCTION INDUSTRY IN
IRAQ**

MASTER'S THESIS

Rasha Abdulkadhim AL SALIHI

Engineering Management Master in English Program

MAY 2021

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**All my dedication to my lovely husband MOHANAD
And my sons moons Mustafa, Ahmad, and Saif.**

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FOREWORD

The thesis is presented to the rules and regulations of the University of GEDIK for the award of an MSc through research. During the study, some research results were reported before this presentation in referred conference papers (refer to the publish).

The investigator states that there is no part of the project refers to in this thesis to justify the request for a further degree of this or any other university or educational institution.

May 2021

Rasha Abdulkadhim AL SALIHI

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ABBREVIATIONS

TQM	: Total Quality Management
MBNQA	: Malcolm Baldrige National Quality Award
EFQM	: European Foundation for Quality Management
ISO	: International Standardization Organization
QHSE	: Quality, Health, Safety and Environment
PDC	: Production Development Contracts
PMBOK	: Project Management Body of Knowledge
QA	: Quality Assurance
QC	: Quality Control
QM	: Quality Management
CSR	: Corporate Social Responsibility

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TOTAL QUALITY MANAGEMENT OF CONSTRUCTION INDUSTRY IN IRAQ

ABSTRACT

The construction sector would be one of the primary industries in the evolution of the Iraqi industry. However, it is lacking in productivity, low quality, poor budgets, and prices are excessive. Better management can improve productivity by reducing quality problems and huge revenue savings. Total quality has become an important challenge facing the construction sector and can lead to reduced work costs, maintenance costs, and the life cycle value of projects reduced. To overcome these problems, Total Quality Management (TQM) is a better solution, and TQM was considered to be one of the more important constructing industry successes. The purpose of this current study is to provide the information necessary to better manage the quality of the construction sector in Iraq. The purpose of this study is to identify the current status and to highlight the main problems and barriers faced by construction companies in implementing TQM and to identify the success factors necessary for TQM to be implemented in the construction sector in Iraq. In this study, both qualitative and quantitative research methodology was used. As a data tool, the questionnaire was developed and used. Managers and executives constituted the sample population. Engineers at construction firms in the major cities of Iraq.

In order to conduct the analysis, a randomly selected group of 200 construction managers and engineers was selected to obtain views on the most obvious issues identified and performance challenges. From the responses of the respondents, the information on Quality and Quality Processes (QS) implementation are not adequate. More focus also needs to be paid to the current situation. Participation in these organizations' top management must also be reinforced. The key finding of this analysis is the implementation of TQM in Iraqi building companies a thorny issue. The findings of the study show that (political status for Iraq) and (Lack of education and training to drive and improve the TQM in the construction process). Furthermore, the main quality characteristics are (The quality control system lack of skills and resources), The poor of a clear strategy for quality management in the company, these keys are effective in Iraqi companies for the implementation of TQM. It is recommended for the organization of special seminars and training to raise knowledge of QMS. And contracting and consultancy companies need to build a QS. Furthermore, using the established solution as a tool to measure quality and identify weaknesses that lower and improve quality.

Keywords: *Total quality management; TQM elements key, TQM elements, barriers of TQM, TQM benefits*

IRAK İNŞAAT SEKTÖRÜNDE TOPLAM KALİTE YÖNETİMİ

ÖZET

İnşaat sektörü Irak sanayisinin gelişmesinde ana sektörlerden biri olacak. Bununla birlikte, üretkenlik, düşük kalite, düşük bütçeler ve fahiş fiyatlardan yoksundur. Daha iyi yönetim, kalite sorunlarını azaltarak ve gelirden önemli ölçüde tasarruf ederek üretkenliği artırabilir. Toplam kalite, inşaat sektöründe önemli bir zorluk haline geldi ve daha düşük işçilik maliyetleri ve bakım maliyetlerine yol açabilir ve proje yaşam döngüsü değerini azaltabilir.

Bu sorunların üstesinden gelmek için Toplam Kalite Yönetimi (TQM) daha iyi bir çözümdür ve Toplam Kalite Yönetimi, inşaat sektörünün en önemli başarılarından biri olarak kabul edilmiştir. Bu mevcut çalışmanın amacı, Irak'taki inşaat sektörünün kalite yönetimini iyileştirmek için gerekli bilgileri sağlamaktır. Bu çalışmanın amacı, mevcut durumu belirlemek ve müteahhit firmaların TKM uygulamasında karşılaştıkları temel sorunlara ve engellere ışık tutmak ve Irak'ta inşaat sektöründe TQM'nin uygulanması için gereken başarı faktörlerini belirlemektir. Bu çalışmada hem nitel hem de nicel araştırma metodolojisi kullanılmıştır. Bir veri aracı olarak anket, bir grup olarak geliştirilmiş ve kullanılmıştır. Yöneticiler ve yöneticiler örnek popülasyonu oluşturdu. Analizi yürütmek için, belirlenen en bariz sorunlar ve performans zorlukları hakkında görüş almak üzere rastgele 200 yönetici ve inşaat mühendisinden oluşan bir grup seçildi. Katılımcıların yanıtlarına göre, Kalite Süreçlerinin (KS) uygulanmasına ilişkin bilgiler yetersizdir. Mevcut duruma da daha fazla odaklanması gerekiyor. Bu kuruluşların üst yönetimine katılımı da artırılmalıdır. Bu analizin ana sonucu, çetrefilli bir konu olan Iraklı inşaat şirketlerinde TQM'nin uygulanmasıdır. Çalışmanın sonuçları gösteriyor ki (Irak'ın siyasi durumu) ve (inşaat sürecinde genel kalite yönetimini ilerletmek ve iyileştirmek için eğitim ve öğretim eksikliği). Ayrıca, temel kalite özellikleri (kalite kontrol sistemi, beceri ve kaynak eksikliği) ve şirkette kalite yönetimi için net bir stratejinin zayıflığıdır, bu anahtarlar Iraklı şirketlerde kapsamlı kalite yönetimi uygulamasında etkilidir. Kalite yönetim sistemi bilgisini artırmak için özel seminerler ve eğitimler düzenlenmesi tavsiye edilir. Ve müteahhitlik ve danışmanlık firmalarının da QS oluşturması gerekiyor. Dahası, yerleşik çözümü kaliteyi ölçmek ve kaliteyi azaltan ve iyileştiren zayıflıkları belirlemek için bir araç olarak kullanmak. Anahtar kelimeler: Toplam Kalite Yönetimi. Toplam kalite yönetiminin temel unsurları, toplam kalite yönetiminin unsurları, toplam kalite yönetiminin önündeki engeller, toplam kalite yönetiminin faydaları.

Anahtar Kelimeler: *Toplam kalite yönetimi; TKY unsurları anahtarı, TKY unsurları, TKY'nin engelleri, TKY avantajları*

1. INTRODUCTION

1.1 Research Background

Globalization development in the market and technological change converge in order to build alternative environments with different complexities and uncertainty that involve reorientation of organizational strategies. Customer emphasis is another strategic priority, along with quality, cost, distribution, and flexibility, to proactively adapt effective operational strategies to Environments Changing, (Boulton,2008).

Quality is considered a global phenomenon in today's world Organizations that pursue customer loyalty and high production quality globally to obtain competitive advantages, consistency, and stability, which allow them to compete in rapid changes of environmental variables both locally and globally.

Regardless of their efforts to improve their efficiency, managers in these environments are still faced with major challenges in executing such strategic measures for corporate excellence. Companies should always prioritize customer requirements. This resulted in value formation being practiced. Therefore, the principle of value has made consumer value a source of competitiveness that is sustainable. Companies have also implemented various value-generating platforms, such as total quality control (TQM). Companies must always make consumer requirements a priority. This resulted in the creation of value. Consequently, the concept of value has made market value a sustainable source of competition. Companies have also introduced different platforms for value creation like absolute quality management (TQM).

TQM, as a management approach based on the early participation of all project members in the early stages of the selection process, would also save a lot of time and resources to make the correct decision at the earliest point.

(Feigenbaum,1989) is typically applied to the overall quality management principles developed to improve quality and quality control in production and process engineering. This involves building in which principles are slowly being implemented because the construction industry understands these concepts. However, the competitive world business sector is characterized by the rapid growth of the construction industry, which has been revolutionized by globalization effects and different country trade agreements. As the global market and globalization have arisen, consumer demand for goods and services of high quality has risen, indicating growing competition at the highest levels, and customer demand has become a strategic factor in obtaining competitive advantages.

Companies have therefore taken different management techniques to solve existing or potential problems and some companies have adopted TQM as one of the management and organizational methods of Profitability, sustainability, and competition in the long run.

The introduction of TQM in the building industry gained public attention in different nations like the United Kingdom and the United States. The report by (Latham, 1994).

Egan's (1998) study and the Americas Associated General Contractors report (1993) have been published to help builders introduce and tackle TQM Controversial business problems. The government listed above reports highlighted the quality attitudes of an organization as demonstrated Partnership, team building, and empowerment of workers. However, even though this has happened There are still obstacles to the successful implementation of TQM in was a good start in the construction industry.

1.2 Statement of The Problem

Issue statement the current research focuses on the TQM in a building industry context. The key reason why this field of study should be chosen is the role played by the construction industry in developing every country and economy by providing and developing the infrastructure of the countries. In developing Iraq's infrastructure and economy, the construction industry was one of the most important industries.

TQM is assumed one of the most critical approaches to building market performance. Nevertheless, there is a lack of awareness of quality mechanisms to enhance not just the finished goods but also the procedures and the overall system in the construction industry. Quality needs to be implemented in the construction industry in different fields, including workmanship, processes, and materials. Bad results in any of these areas may lead to major problems across the industry. In addition, having prior experience and understanding of QM is a strong way to overcome the problems.

Related to the low quality of the Iraqi construction sector currently faced. It is therefore important to understand that offers a forum to address this problem. Furthermore, there are massive demands from consumers for improved work quality in an age of technological growth and globalization. Every business must grow by its capabilities and customer requirements to meet its customers. Each customer wants to Obtain the finished product in compliance with the specifications described above. Although these criteria can vary by the product design generally, they reflect the interests of the customer (Al-Musleh, 2010).

Therefore, contractors and consultants are liable in compliance with the contractual arrangement with their clients to do their utmost to comply with such conditions, otherwise the contract shall be deemed infringement. This study, therefore, poses some important issues relevant to the introduction of TQM in the Iraqi land construction industry. In the construction sector, quality is usually considered very expensive and only contractual specifications are used to create some construction enterprises. Manufacturing is different in construction than manufacturing; thus, quality aspects need to be given special attention. Particularly if the manufacturing (construction/installation) is not in order, the cost of remedying can be extremely high if the quality is not taken into consideration. IN this context, it is important to encourage all construction companies to be proactive in QM. This research aims at filling this void Successful TQM implementation in the Iraqi construction industry.

This analysis is focused on the fact that TQM was introduced. Some countries have tremendous benefits and are introducing them. Quality activities in the Iraqi construction industry will be strengthened and promote quality improvement and thus efficient QMS direct them in their goods, facilities and better quality the output of the company.

1.3 The Aim of Study

The main objective of the study is to identify the obstacles that face or prevent the application of quality management in the construction industry in Iraq to seek solutions to them and address them in reality. And strive to clarify the desired return from the application of quality management to the organizations and the buyer and thus at the level of the construction industry and promote it to a higher level through a commitment to comprehensive quality management and making it a concept, culture, and strategy adopted methodology.

1.4 Questions of The Study

- What are the challenges of QM building companies' implementation?
- What is the best solution to be used in Iraq Under its unique conditions?
- Perceive quality issues for contracting and consulting firms in different ways?
- Does the position of the respondent affect the ranking of quality Principal?

1.5 Methodology Overview

The research followed both quantitative and qualitative methods in three methods. A first method review of the literature on the topic of the study was conducted in the preliminary process.

The literature review covered the management of the construction sector, the principles of quality and TQM in the construction sector, and the application of TQM in the construction sector.

A second method was structured questionnaire was created based on the literature review to collect data on the QM activities and the effective implementation of TQM. Engineers from construction firms were the target respondents.

Data analysis is the third method. The data is analyzed using the Social Scientist Statistical Package (SPSS) and rating analysis for the implementation of TQM, which is the culmination of this review, the knowledge gained about the QM activities and the successful implementation of TQM was used. In chapters three and four of this study, the methods used as well as the questionnaire design and creation processes are detailed.

1.6 Importance of Study

On the findings of the study-based issue, a management model needs to be created to implement TQM and to determine the strengths and weaknesses of an Iraqi construction company about QM. Based on the results of the study, a management model should be built to incorporate TQM and evaluate an Iraqi construction company's strengths and weaknesses in terms of QM.

Quality is so important to treat the Lack of education and training to push and strengthen the TQM in the construction process so that it would be possible to manage the quality issues much better by recognizing the quality requirements and their impact factors.

Finally, the findings of this study will support future efforts to build and create a concrete TQM for the Iraqi construction sector.

1.7 Research Layout

The thesis is divided into eight chapters that contain sequence assignments to be completed. By shows, the means and generalizable findings and aims, the objectives, and the study respond to science's concerns the Appendix consists of questionnaires.

In addition to the terms of reference and the results, answers from the targeted sample Tables of review. The thesis layout itself is defined as follows:

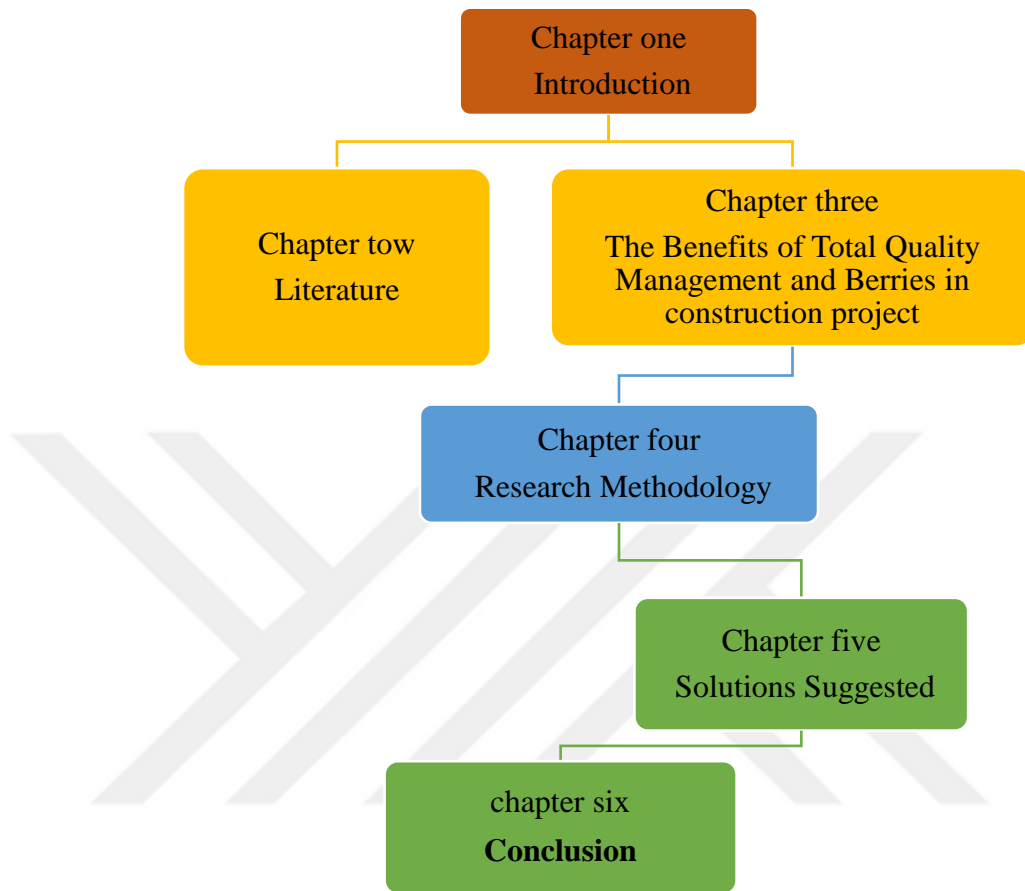


Figure 1.1: Framework for Research Stages

Source: Author

2. LITERATURE REVIEW

2.1 Quality Definition

Quality is the degree of fulfillment of a set of inherent characteristics (ISO 9000, 2015). For different individuals, consistency has multiple definitions. The quality description for the manufacturing, processes, and service industries is as follows,(Juran 1989):

- Customer satisfaction.
- Meeting the customer's need.
- Fitness conformity with requests
- Consistency is characterized as usefulness.
- Excellence degree at fair prices.

The Quality in construction projects is not only the quality of the product and equipment used in the construction of f Quality definition besides building projects differs from that of manufacturing or service industries, since the product is not repeated, but a unique part with specific requirements. That is the completion facility's overall management strategy. Building efficiency relies primarily on building control, which is the main responsibility of the builder.

Manufacturing output is regulated by several methods and quality management ranges from manufacturing to the building project. The quality for building projects is not only the quality of the goods and equipment that is used in the manufacturing process but also the overall management approach to the completion of the facility in compliance with the scope and the schedule defined for work for customer/owner satisfaction to achieve the definite objective of the owner. The essence of the contracts between the parties plays a dominant role in the project's quality framework and the required documents, therefore, need to define the responsibility for achieving these. The papers contain proposals, conditions, schedules, a

quantity declaration, etc. In building quality management, compliance with minimum requirements of materials and production generally includes ensuring that the project works according to specification. These basic requirements are included in the documentation.

2.2 Quality Assurance and Quality Control

The writers of the A Guide for the Project Management Body of Information (PMBOK 2000) describe the term project according to its distinctive features: "A project is a temporary endeavor to create a unique product and service." "Unique" indicates that the product or service is distinct from other related goods or services in any way. Initiatives are often important to the managing company's strategy.

At the beginning of the 20th century, quality management began. The industrial revolution created the system and defined the method involvement in quality systems. Pyzdek further. In the beginning, few industrial types used the modern statist approach. Efficiency began to develop since World War II. But the firms that did had positive results and the results have been publicized extensively in the mainstream and presence of the company. The Society of Quality Engineers (1945) began establishing interest groups throughout the world in 1946, the Quality Engineers Company was formed with other groups (ASQ). The Buffalo Society of Quality Engineering launched Industrial Quality Control in July 1944, the first publication dedicated to management.

According to Feigenbaum (1991), the concept in technical terms is a mechanism for delegating the management obligation and authority while maintaining the means of ensuring satisfactory performance.' He further notes that the process for achieving the industrial objective is therefore called quality control, as is the process for calculating output and cost objectives There are normally four steps:

- Setting guidelines. Standards. Determining the cost quality, efficiency, safety, and reliability requirements needed for the project.
- Conformity evaluation. Comparing the conformity of the product or service delivered to requirements.

- Intervention As Needed. Fixing issues and their causes across the entire spectrum of marketing, architecture, engineering, process planning factors that impact customer satisfaction.
- Improvements preparation. Develop a constant effort to increase the quality of expense, efficiency, protection, and reliability.

QC can be practiced during building and post-construction at various stages, such as preconstruction. The use of structural members produced under regulated conditions and close oversight should be promoted to the extent practicable. Finally, note that our quality assurance and quality management system is a live function that needs to facilitate a two-way stream of communication, as it needs to strengthen.

According to the ISO 9000, quality assurance is those planned and systematic actions needed to ensure that products or services meet the quality requirements" ISO 8402-1994 describes "all the planned and systemic activities carried out within the quality system and demonstrated as necessary to ensure adequate confidence that the entity will operate."

The third point of quality management saw the production and implementation of quality systems primarily for the manufacturing industry. This was because the following external climate had an impact on the production of quality systems. This was because of the effect of the following external environment on the production of quality processes at the moment. (Bubshait 1999).

Populations that develop and mature more significantly Intensifying competition These converging patterns have strongly added to the need for quality, affordable goods, and services. As a result, quality assurance technologies are identified as the only way to address this challenge (Bhattacharjee 2018).

Harold Kerzner (2001) defined quality assurance as a collective term for the structured activities and management processes to be planned and implemented to ensure the delivery of goods and services as necessary. quality level. Quality improvement also requires outside initiatives to provide input about these systems to

enhance organizational procedures. The quality assurance role ensures complete incorporation of the scope, the expense, and the time of the project.

Quality assurance is an activity to ensure that everyone involved has trust that quality-related operations are successfully carried out. All of these expected or structured measures are required to guarantee that a product or service fulfills its quality criteria. Quality assurance encompasses all operations, from planning, development, processing, fabrication, installation, and operation to reporting, and requires quality regulations for raw materials, assemblies, and components, manufacturing services and inspection procedures (Bubshait 1999).

Quality assurance of building projects involves all tasks carried out by the construction staff, builders and quality inspectors (supervisors) to achieve the particular owners' goals and to ensure that the project / service is working to the full satisfaction of the owners / end users. The degree to which the goods follow the required standard and limits set by the construction agency can be specified . (Bhattacharjee 2018).

Job quality depends primarily on the quality of materials to be used and assembled. The related materials/manufacturing specification in different IS codes is strictly adhered to for the completion of QA/QC. (Bubshait 1999).

2.3 Quality Standards

A standard often specifies how everything should be. Standardization is a document that is used to identify appropriate conditions or actions, and to provide a benchmark to guarantee the recognition of conditions or conduct. In certain cases, requirements specify minimum criteria; consistency of the world class achieves the standard level of results, by definition. Standards may be recorded or not, optional or required. Unwritten quality standards are normally not appropriate. The establishment of guidelines is one of the first challenges in the development of the quality management system as organisations increasingly rely on readily available standards instead of creating their own requirements. The following should be any standard:

- Clearly written in plain, unambiguous language
- Comfortable to understand
- Clearly setting what is planned

- Measurable so that the company knows whether it is met or not.
- Possible, i.e. the organization must have the tools to reach.

The Constructible standard. There are many organizations that produce standards; some of the best-known organizations in the quality field are:

1. International Organization for Standardization (ISO)
2. International Electrotechnical Commission (IEC)
3. American Society for Quality (ASQ)
4. American National Standards Institute (ANSI)
5. American Society for Testing and Materials (ASTM)
6. American Standards for Mechanical Engineering (ASME)
7. Institute of Electrical and Electronic Engineers (IEEE)
8. European Committee for Standardization (CEN)
9. European Committee for Electrotechnical Standardization (CENELEC).
10. American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE).
11. National Fire Protection Association (NFPA)
12. British Standard Institute.

These institutions produce standards that are globally recognized. These standards are set out in the contract documents creating products, systems, or services for use in the project. The designers specify these standards. They are also used to indicate the method of installation to be followed or the manufacturing activities to be done during building work.

In addition, numerous other national and internal quality systems standards have been introduced. These different standards have common characteristics and historical connections. However, in 1946 delegates from 25 countries met in London to establish a new international organization to facilitate international trade. The organization was aimed at facilitating the coordination and unification of industrial hard work on the international stage. The new organization, ISO, has therefore officially started its operation on 23 February 1947. ISO is a network of global curriculum bodies from 164 countries (as of December 2012), which coordinate the system on a single States Parties basis, in conjunction with a Central Secretariat in Geneva, Switzerland.

ISO is the world's leading international standards developer and publisher. It is an NGO that forms a bridge between the public and private sectors. ISO has over 19,000 standards worldwide. Of all the standards produced by ISO, ISO 9000 and ISO 14000 series are most well known. ISO 9000 is a worldwide benchmark of company quality requirements, and ISO 14000 seeks to at least achieve, if not more, organizations' environmental commitments. ISO 9000 and ISO 14000 families are known as “generic management system standards.” The ISO 9000 family is primarily concerned with “quality management.” This means what an organization does to fulfill:

- The customers' quality requirements.
- Applicable regulatory requirements, while aiming to enhance customer satisfaction.
- Continual improvement of its performance in pursuit of the objectives.

The ISO 14000 family deals primarily with “environmental management.” This means what organizations do to Minimize harmful effects on the environment caused by their activities and Achieve continual improvement of its environmental performance.

2.4 Quality Management

Quality control is a major element of the management of projects. The project consists of a four-step project (concept, development, implementation, and completion) with no variations from the project requirements. To facilitate this initiative, the required atmosphere must be based on quality practices, plans, processes, systems, and requirements. The quality control function guarantees, internally and externally (concerning the performing or service of the project), that all facets of the project and the outcomes of the project fully satisfy the needs and desires of the customer, members, and shareholders of the project. BS 4778 describes a framework of quality management as an organizational structure, tasks, operations, tools, and incidents that together, have coordinated processes and execution methodologies to ensure the enterprise can fulfill its quality needs (Griffith, 1990). Simply put, management is what determines and implements the Quality Policy aspect of the overall management function" (Hellard, 1993). The instinctive component of the construction phase must be quality assurance processes and quality

management. In the 1950s, Deming presented his theories about Deming's quality control "system" approach to creating a structure for a thorough examination of the company (Deming, 1986). Deming presented his ideas to Japanese factories using a schematic depiction of a production chain widely known as the Deming Flow Diagram (2-1). The flow map of Deming reflected his view of the processes and interactions related to the design and development of a product. Quality is the main driver for improving the competitiveness of organizations in the international economy (Singh 2008). A high level of quality ensures are dependent on providing consumers with superior product/service quality (Lai 2002). Arumugam observed that businesses are experiencing drastic shifts in the market climate, which are marked by increased customer perception of efficiency, faster technology transition, and globalization. Many organizations have entered the quality revolution in response to these problems and adopted numerous quality management programs as ways to boost productivity (Singh 2008).

2.5 Total Quality Management (TQM)

2.5.1 Authors to quality

To understand the roots of TQM, it is important to understand the thoughts of the quality gurus whose techniques are being used today (Beckford, 2010). Although many quality gurus did not use the word TQM, their contributions built the groundwork of understanding the development of TQM and the requirements for its implementation. The following subsections summarize the concepts, methods, and philosophies of TQM which have been advocated by some TQM luminaries.

2.5.1.1 William Edwards Deming

It is generally known that William Deming was the founder of the modern movement for quality in the industry (Beckford, 2010). Deming viewed TQM as a management process that motivates all employees to continuously improve products and services, and to find satisfaction in the process of change, all to ensure the longer-term viability of the company organization (Anderson et al, 1994 in Lawrence, 2000).

Although Deming is connected with the cyclical theory of Plan, Do, Check and Act (PDCA), some authors trace the provenance of this method to Walter Shewhart. Top

management must become closely acquainted with the organizational activities of their operations (Boaden, 1997).

Deming put the responsibility for quality management on managers and required them to encourage their workers to detect and remove errors and defects in their products and processes. The ultimate aim was to entice the buyer. Making workers report any concerns without any fear of being blamed is strongly encouraged. Quality management can be controlled by measuring statistics (Beckford, 2010).

Deming believed that quality was the most important, which is why every employee has an essential role in the business. Thus, no matter how much you prepare or design a product or service, quality should be the main focus (Boaden, 1997). D. Deming's management philosophy is outlined in the 14 concepts of TQM.

1. Achieve continuity in priorities and attempts to enhance product or service.
2. The new ideology needed for businesses to be competitive in the new economic age. Management is taken to getting the improvements that are required.
3. Rather than relying on mass inspections, put quality into the product or service.
4. Stop awarding a company to the lowest price and competition is the most effective way to rank people.
5. Starting on the job preparation.
6. To allow a process of continuous improvement, you must develop a framework to provide higher efficiency while minimizing costs.
7. Management is to be in the interest of individual human efficiency.
8. Eliminate the fear and build a positive atmosphere around working together for the benefit of the organization.
9. Break down barriers between departments that compete against each other by enabling science, design, development, and sales departments to communicate with each other.
10. Eliminate numerical objectives, exhortations, and slogans, which only help to alienate the workforce.
11. Instead of numerical targets, leadership should provide management by instance
12. Encourage people to feel pride in their jobs.

13. Offer the requisite knowledge and self-improvement courses.
14. Each employee of the company should be charged with bringing about the changes needed.

Figure (2.1) Edward Deming's Flow Diagram Supporting a System's View of Quality Management

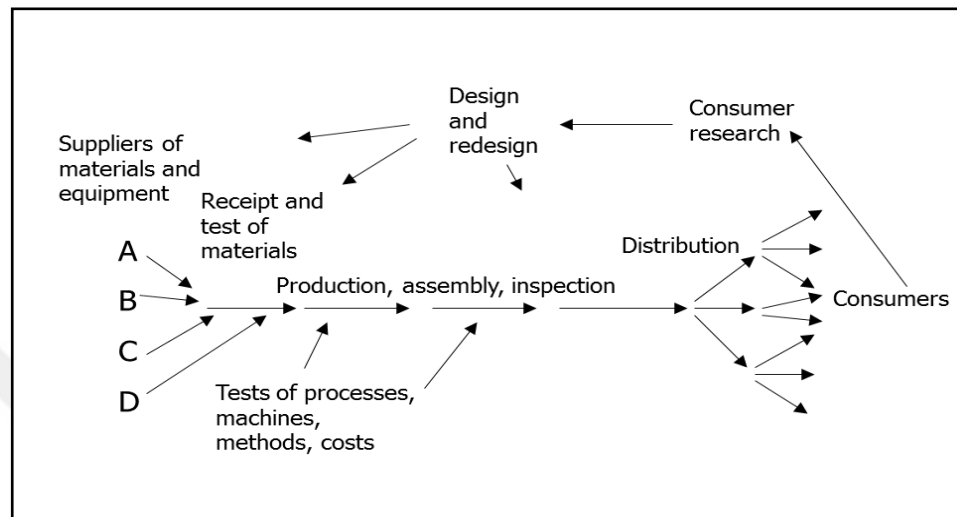


Figure 2.1: Edward Deming's Flow Diagram

2.5.1.2 Joseph Juran

Juran was born in 1904 and emigrated to the United States in 1909. Juran acted in the sector to enhance the quality control aspects. His research contribution started. In 1941, he discovered the work of Vilfredo Pareto, which introduced some assumptions. I defined "the vital few and the trivial many" in economics. the proportion of an issue is attributed to a certain percentage of the causes. Furthermore, Juran. According to Duhigg, quality control was applied by; teaching organizational skills and ways of thinking through the belief that. Resisting change is the number one reason quality issues arise. However, Juran's thoughts as well as monitoring quality efforts outside the US when he visited Japan, 1954 to give a series of seminars to teach on quality assurance Juran also contributed substantial details to the quality control body and claimed that the word quality has evolved. He published a 1952 quality management manual, considered one of the most widely-used books when it comes to quality analysis, and he published 14 other books, Martinez-Lorente et al (1998). In the 1980s, his systematic approach to total quality management was made more appropriate if senior managers considered that quality

management was impossible without introducing quality disciplines across the business, as Juran suggested 67 factors. In addition, when Juran published its Trilogy in 1986, he made a considerable contribution to quality control.

From a consumer viewpoint, Juran defines quality as "fitness for use." Quality must have two dimensions, goods and services, and more features that meet customer standards. This concerns product production and without or fewer defects facilities, Juran (1999).

He stressed the scientific dimensions of quality management in mathematical analysis, engineering methods, and quality economics in line with other early writers and an engineering context. In the first place. His work was also strongly controlled to set targets, schedule, organizational processes, and change, which is not only quality, but requires preparation.

Juran's Trilogy defines three management processes required to improve quality: quality planning, quality control, and quality improvement, as shown in figure (2.2).

A specific contribution from Juran to quality is to illustrate instead of needing or requiring the primary value of recognizing consumer needs. The focus is also on designers, advertisers, suppliers, and services. While he wishes only to represent surface features, he notes that consumer needs need to be defined more rigorously to ensure the product satisfies the needs and is in line with the intended intent.

His methodology focuses more on pragmatism than perfectionism, such as zero deficiencies.

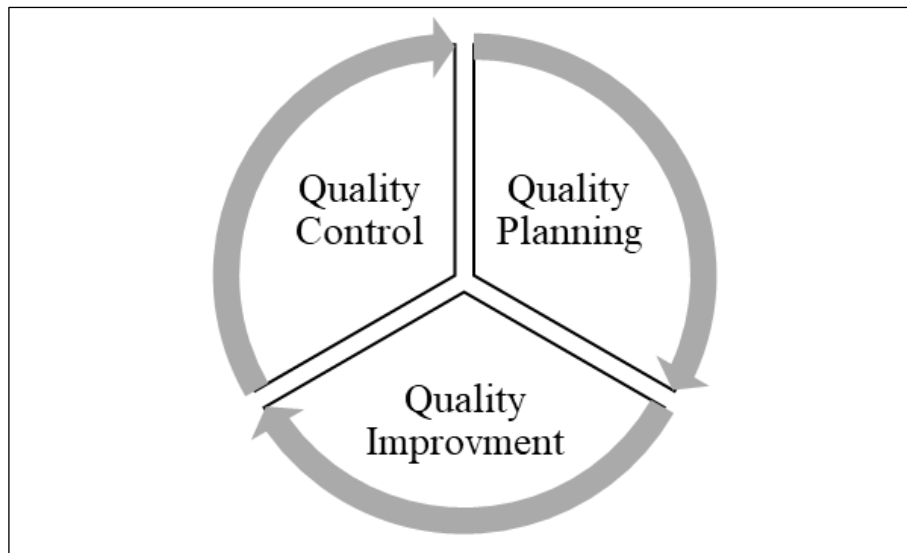


Figure 2.2: Juran's Trilogy

Source: Juran, (1999)

2.5.1.3 Kaoru Ishikawa

Kaoru Ishikawa, in recognition of his important contributions to inculcating quality in Japanese manufacturing in the 1960s, is regarded as the 'father of high-quality circles' (Bank,2000). Aole and Gorantiwar (2013) showed how Ishikawa has expanded the definition of quality into After Sales Service Excellence.

The standard of management, people, and the business itself was also stressed. Without employee involvement, TQM could not be accomplished for Ishikawa. He was persuaded that quality circles are important but also recognized the vital role that education played in achieving quality.

In his seven QC methods, therefore, he included universal education: (Ishikawa, 1985 cited in Aole and Gorantiwar, 2013).

- Check sheet.
- Process flow chart.
- Cause-effect diagram (Ishikawa diagram).
- Scatter diagram
- Control chart
- Histogram
- Pareto chart

2.5.2 Definition of TQM

The main role of senior management in initiatives for quality enhancement is embedded in the work. TQM's Whiteman concept (2002) for building firms states that "TQM is a continuous mechanism whereby the top management of building firms takes whatever steps are required to enable everyone within the organization, in particular construction sector supervisors and building staff, to develop and achieve standards in all their work on construction sites

The theoretical essence of the TQM Deming approach is to create an operational structure that promotes adjuvant lessons, since it enables the introduction of procedure management activities that in turn enhance procedures, produce, and purposes, as well as general fulfillment, in conjunction with nonstop changes (Anderson 1994).

(Deming, 1986) The tasks of pinnacle management were drawn after leading to shifting processes and structures. Leadership guarantees the effectiveness of professional administration, because a vision to shift the business towards performance development is a responsibility of the upper management. High management is responsible for the most issues with quality; it should provide workers with consistent expectations and the strategies to accomplish what is called suitable work. These involve a suitable working atmosphere and work-free environment without flaws, culpability or terror (W. E. Deming 1986).

It also stressed the appreciation of customer identification and excuse, the development of a supplier partner, the use of useful groups to identify and solve quality issues, raising of officer skills, staff sharing and work on non-stop improvements. The exorcism control theory behind the process of management Deming has flourished. They suggested that the usefulness of Deming management is beyond President's attempts to promote the adoption of process management activities at the time of a cooperative or learning enterprise, which then help buyers' fulfillment and corporate unison by sustained worker success or continuous enjoyment.

The means for imitating exorcism boost the ability to track then square buildings yet procedures. properly, or of the function on management responsibilities between stability achieving this. advocated methodological practices, including the use of specific tools and statistical methods in the design, management, and improvement of

process, which aim to reduce the Inevitable variance resulting in the development of "common causes" and "special causes." The "common causes" of variations are structural and many operators, equipment or goods share them. They include poor product design, incoming products that are not conforming and poor working conditions. These are the management's duties. "Special causes" include the lack, ability or output of expertise (W. E. Deming ,1986).

TQM is characterized as a management structure Hellsten's and Klefsjo's' (2000) consisting of three interdependent units, namely core values, techniques and instruments. In order to be part of a society it is important that fundamental principles are reinforced by strategies like process management, benchmarking, customer-focused preparation or improvement teams or by methods such as control charts, consistency map or Ishikawa diagrams in Figure (2.3).

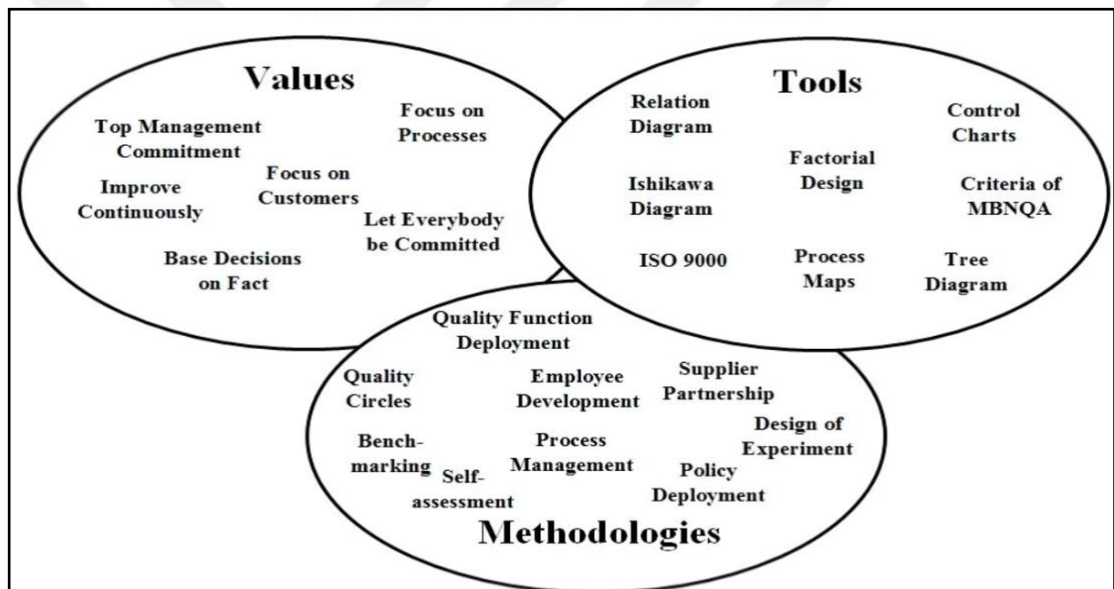


Figure 2.3: TQM Hellsten's and Klefsjo's'(2000)

TQM's aim is to maximize customer loyalty with decreased capital according to (Hellsten and Klefsjo, 2000). (Hellsten and Klefsjo, 2000) suggest that this description of the framework would promote awareness and application of TQM by organizations. The development work should commence by embracing the fundamental principles which should define the organisation's culture. The next step is to choose strategies that endorse the chosen principles continuously. Ultimately, effective methods must be defined and effectively used to help the selected strategies. The fundamental principles that should build the quality culture are the foundation of TQM.

According to (Brun 2011), "Total Quality Management is demanding that quality management standards be implemented at all levels, at all levels and in all departments of the organization. The thought about the management of attributes started to improve on initiatives so much attempted after employing entire staff to identify characteristics. (Rumane, 2010).

Quality that arose as a prevailing thought-given component became a big part of the traditional business provision that focussed on customer loyalty, recognized by its constitutive influences as the Overall Quality Control Longevity:

- Total: Organization-wide
- Quality: Customer Satisfaction
- Management: Systems of Managing

The need to succeed in the global market, which is important for better quality, lower prices, and faster growth, has motivated TQM. For any company to compete and not to claim to run the company, TQM is considered a basic necessity. It is a means that an operation in the process is organized, coordinated, and accepted and any needless actions made by an organization are taken. TQM is a theory that makes quality principles the engine behind management architecture, preparation, and improvement. It considers quality as a competitive goal and concentrates on continuously enhancing product, service, and cost processes to succeed on the global market by minimizing rework and maximizing revenues to gain market leadership and customer loyalty (Rumane, 2010). It is a strategy that guarantees customer loyalty in handling individuals and business processes. TQM requires everyone in the company to maximize customer loyalty and maintain superior product and service efficiency by continual improvement in quality (Rumane, 2010). The following is helped by TQM:

- Attain satisfaction of customers.
- Continuous improvement.
- Team development.
- Create a vision for employment.
- Setting employee expectations and priorities.
- Motivation developing inside the organization.

2.6 Total Quality Management in Construction Project

TQM construction ideas have drawn the project away from a crisis mode that has been around for quite a while and TQM's management strategy encompasses all the strategic and organizational policies the organization pursues. Management capacity and Employees are the core of a continuous quality management program to monitor their work processes, detect issues, track their root causes and enforce efficient solutions. In particular, all construction participants, top or top management, are important if the project is to Improve Efficiency. Performance. Companies that have a standard collection of quality tools and techniques are available. Language, clear approach to continuous improvement in quality. These tools vary from basic approaches such as brainstorming to a more advanced choice, including techniques for statistical process management, proven in many industries, and a powerful approach that enables individuals or teams to continue improving their work. Although data collection is the basis for the construction of a TQM program, each organization needs to choose these tools it functions for and prevents the processing of data as an end (Oakland, 1995). Architects, quantity inspectors, architects, contractors, and other building projects Within the Building ventures, architects, surveyors of quantities, engineers, contractors, and more in addition to their unique technical skills, all specialists have their trade or Customs and procedures professional. These can affect the building process Collectively or separately. Drensek and Grubb (1995) gave a few Total quality control benefits that can also be drawn from its potential the construction drawbacks and benefits led to the implementation of these techniques for developing TQM to boost the overall performance of the construction project.

2.6.1 Construction project

A project is an ongoing endeavor to develop a particular good, facility, or outcome (PMBOK 2017). Project management consists of the use of information, expertise, tools, and strategies to address project needs (Rumane, Quality Management in Construction Project 2018). Project management is achieved by implementing and incorporation the procedures defined for the project management. Project management encourages

organizations quickly and easily to undertake programs. Effective project administration serves entities, associations, and private and public bodies.

Better handling of transition Poorly managed projects or the absence of project management may result in (PMBOK 2017) Improved handling of transition Projects under management or lack of project management can lead to better management (PMBOK 2017) Deadlines missed, Run cost, poor quality, Rework, Uncontrolled project expansion, Loss of the organization's reputation

Projects are a vital way to generate market reputation and profits. With smaller budgets, faster deadlines, lack of capital, and fast-changing technologies, organizing leaders must be able to navigate today's market climate. The market climate is competitive and the pace of transition is accelerating. To be competitive in the global economy, businesses conduct project management to deliver market performance continuously.

2.6.2 Project management knowledge areas

Processes are also categorized by knowledge areas in addition to the process groups. The Knowledge Area is a project management area identified by its knowledge and defined in the processes, practices, inputs, outcomes, instrumentation, and techniques of its components. Although the fields of expertise are interrelated, they are described independently from the viewpoint of project management. Most projects use 10 areas of expertise listed in this guide. The 10 fields of knowledge mentioned in this guide are:

- Project Integration Management Includes processes and practices in the project management communities to classify, describe, merge, unify and organize the different processes and project management activities.
- Project Scope Management. Includes the procedures needed to ensure that the project includes all the required work and only the necessary work to effectively complete the project.
- Project Cost Management. Requires planning, forecasting, budgeting, financing, planning, administration, and managing costs to complete the project under the budget accepted.

- Project Quality Management. Includes steps to integrate the quality policy of the organization regarding project planning, management, and control, and product quality standards to meet the expectations of stakeholders.
- Project Resource Management Includes the processes to define, procure and maintain the required resources to complete the project successfully.
- Project Communications Management. Includes the procedures necessary to ensure the timely and effective preparation, selection, processing, transition, storage, retrieve, management, oversight, control, and ultimate provision of project information.
- Project Risk Management. Requires risk analysis preparation procedures, identification, review, reaction planning, response execution, and risk monitoring for a project.
- Project Procurement Management. Includes the procedures used for the procurement or acquisition of goods, assets, or outcomes required from outside the project team.
- Project Stakeholder Management. Includes the processes necessary to define the entities, associations, or organizations who may have an impact, to evaluate the perceptions and impact on the project of the stakeholders, and to create adequate management plans for successful participation of project and executive decision-makers.

The needs of a particular project can include one or more additional expertise areas such as financial planning, safety management, health management.

2.6.3 Quality management system (QMS)

Quality management systems (QMS) are defined as the organization's structure, procedures, processes, and resources necessary to ensure quality goods and services for an organization. Terminology, wording, and concepts used for the Quality Management System (QMS) in this Guide belong to the International Organization, and in specific ISO 9000:2005, TQM is a management theory and improvement initiative aimed at constantly developing market practices in order to improve the quality of personalized products. The Quality Management System (QMS) .

The TQM Foundation consists of eight QMS principles common to other management systems as well a scheme of procedures intended to please clients,

employees' expertise, higher wages and reduced costs. Principles set core quality policy priorities and activities. They explain why any move is justified and guided.

Principles may be the collection of metrics for the formation of relationships in the whole organization. They can also be presented in particular to staff in these organizations.

Quality management principles, which many theorists and practitioners have established today (Duffy G.L o. 2007).

2.6.3.1 Customer Focus

Companies rely on their customers and should thus be conscious of current and potential customer needs and seek to overcome their customer requirements (ISO; 2005). Action must be launched to consider the interests of clients and other stakeholders.

Methods of collaboration with the customer should be identified and the degree to which he is pleased with goods or services and competent to use this knowledge. To ensure that all consumer needs and desires are fulfilled and taken into account in the design of large projects, it is important to create a new mechanism for contact with customers. In partnership with the client, the knowledge about the organization, its goods and procedures should be accessible. The customer should have quick access to personnel and management (J.D, 2008).

2.6.3.2 Leadership

Leaders establish the organization's unity of goal and direction. You should establish and sustain the organizational atmosphere in which individuals can actively engage in achieving the goals of the organization (ISO; 2005). Leading individuals are the foundation of management of the modern enterprise.

The leadership in this sector is enormous. Leadership means that the primary management is the consistent way to establish the strategy, objectives, and directions of activity of the organization and he should also create and keep internal conditions, in which employees can fully commit themselves to the realization of the aims of the organization.

The leader should plan individual actions and support subordinates in their realization. Also establishing the right structure, responsibility, internal communication, and controlling activities to guarantee the permanent development are included in tasks of the management (J.D 2008).

2.6.3.3 Involvement of employ

The core of an organization is individuals at any stage and their complete participation allows their talents to be used to support the organization (ISO; 2005). One should plan to accept people who recognize the value of their commitment and the role of the organization and who are responsible for unlocking issues. These individuals see the personal goals of the organization as consistent.

They are constantly finding the ability to develop their expertise. As a consequence, creativity, and imagination are justified, hired, and connected with the organization (Dearing 2007).

This idea needs to be considered as one of the fundamental requirements for the consistency of acts and goods (except for professionalism, provision of shops, and the organization of jobs).

2.6.3.4 Process approach

When tasks and associated resources are handled as a process, the desired outcome is accomplished more effectively. The company relies on procedures and customer demands are seen to be the sum of outcomes in the process chain. Individual operations are specifically identified and organized, and the level of execution in connection with other organizations is assessed, investigated, and enhanced (J.D 2008).

2.6.3.5 System approach to management

Identification, awareness, and management of interrelated processes as a framework allow the company to accomplish its goals effectively and efficiently (ISO; 2005). Companies often function rather than a cohesive entity as a small group of kingdoms. The relations between divisions and processes must be established. The ties should be controlled and corrected. Division reports confirm the amount of input data for another system.

2.6.3.6 Continual improvement

The organization's continuous enhancement of its overall output should be a permanent goal (ISO; 2005). An improvement as a corporation can be understood to gain fringe benefits both for the organization and its clients. It can entail improving measures and goods. It should be a priority motive for all steps and processes to improve and grow the company as a whole.

The quality improvement process consists of the use of arrangements removed from audits, measurement outcomes, data interpretation, management assessment decisions, and corrective or preventive action.

There are continually developing methods and resources, like benchmarking, brainstorming, fluid diagram, cause-and-effect diagram, flowchart, control chart, histogram, Pareto chart, dispersing diagram, and so on.

2.6.3.7 Decision making

The successful decision is focused on data and knowledge interpretation (ISO; 2005). When making a decision, all available, existing, and checked knowledge should be evaluated. The decision stage depends on the quantity and quality of the data. For this reason, systems for collecting, registering, processing, and archiving various data, including statistical character should be developed (J.D 2008).

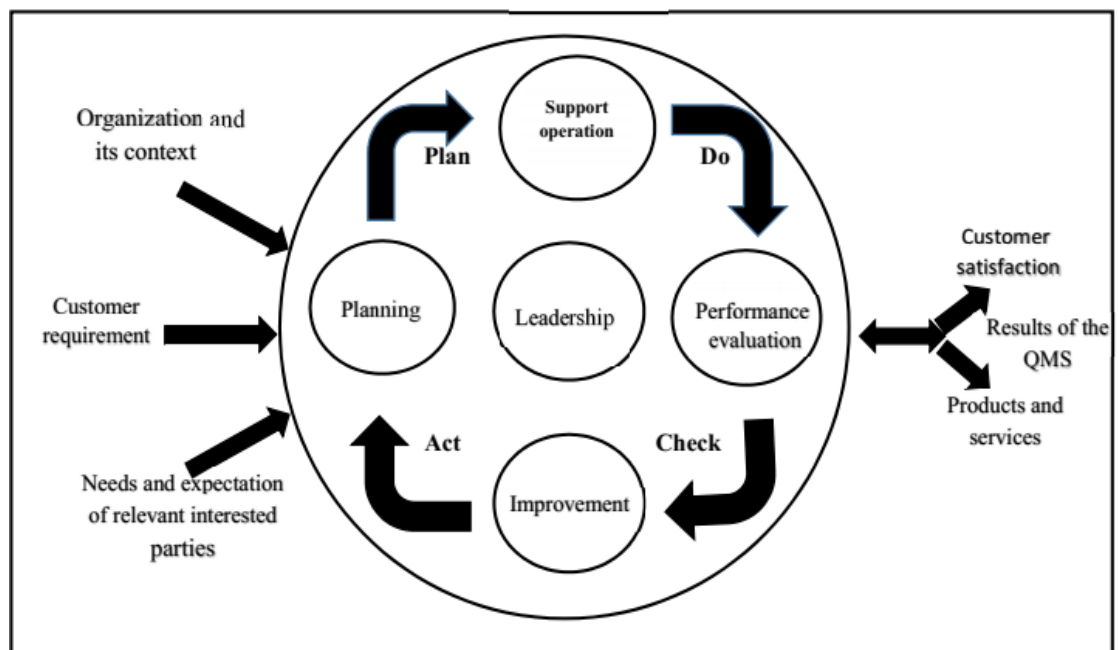


Figure 2.4: Quality Management System

Source: ISO 9001, (2015)

2.7 Process of (TQM) (PDCA) Cycle

The PDCA Cycle is a structured sequence of steps to acquire useful learning and expertise to improve a product or method continually. PDCA is a four-step iterative method of improving quality and improving efficiency, which is commonly used to enhance the business plan (Deshpande 2017) . The PDCA cycle is more successful than following a "first-time" approach. Execution of the PDCA loop means that progress is constantly being sought (W. E. Deming 1986). The PDCA loop is observed to do a job and handle a program more efficiently. The PDCA cycle ensures both temporary and permanent corrective acts

The cycle begins with the phase of the Plan. This includes the identification of an objective or intent or issue, a hypothesis, a description of performance criteria, and the implementation of a plan. These tasks are part of the Do process in which for instance in the plan are introduced, such as developing an object. Second, we analyze (study), where the findings are monitored to verify the validity of the strategy or issues and areas for improvement. The act completes the loop by incorporating the learning that can be used to accomplish the objective, modify the methods or even reformulate a theory. These four steps are repeated again and again as part of a quality improvement cycle, see figure (2.5). The stages of PDCA are :

- **Plan**

First, define the dilemma precisely. It can be found in resources such as Drill Down, Cause and Effect Diagrams, which will help you get to its source. Once you have done this, measuring the process might be suitable for you. Next, gather all other details you need to help you create solutions (Morgan 2007).

- **DO**

If the current situation is well understood and an improvement plan has been developed, the "Do" process is where the plan is first executed. Do not treat this process as just a "test run" or a trial. The "Do" process will reflect a recognition of what a team feels is a significant change relative to the current situation by taking the full-service learning from the "Plan" step; with the ability to learn more to make changes and then introduce much greater improvements in the "Check" and "Act" phases. The options selected are applied one by one. During this process, the people implementing the solutions must help the people involved to ensure that the solutions

are completely accepted and applied. Implement the change. Data compilation and recording. Problems with papers, surprising observations, learned lessons, and gains in skills (W. E. Deming 1986).

- **Check**

You observe how successful the pilot approach was in this process and gather some lessons from it that could make it even better. Based on the plane's observation, the number of areas you found, and the complexity of the whole initiative, you can plan to replicate the Do" and "Check" stages, adding additional improvements (Morgan 2007). If you are confident that the costs outweigh the advantages of repeating the Do-Check sub-cycle, you will introduce the final step.

- **Act**

Apply the approach now. And although the PDCA cycle use doesn't end there. As part of a quality management initiative, you use the PDCA or Deming Wheel, you need to circle back to Plan Process (Step 1) to figure out more places for improvement (W. Deming 1993).

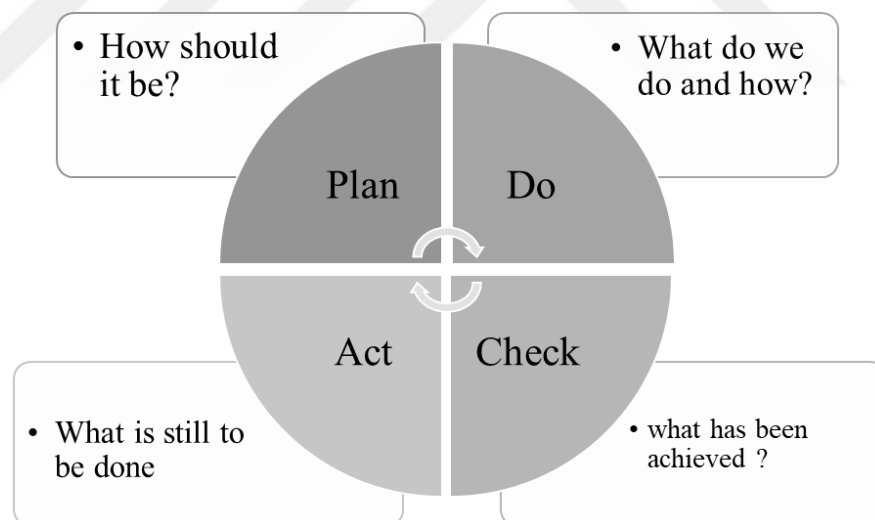


Figure 2.5: The PDCA Cycle

Source: Deming, (1993)

The PDCA cycle (Deming's circle) is more than just a quality tool. The PDCA cycle is a fundamental concept of continuous improvement processes embedded in the organization's culture. It is simple to understand and should be used by a large number of people in the company. The most important aspect of PDCA lies in the

“act” stage after the completion of a project when the cycle starts again for further improvement (Morgan 2007).

Deming 14 supportive points to help management are as follows: Create constancy of purpose for improvement of product and services.

1. Adopt the new philosophy.
2. Cease dependence on mass inspection
3. End the practice of awarding business on price tag alone
4. Constantly and forever improve the systems of production and services
5. Institute modern methods of training on the job
6. Institute modern methods of supervision and leadership
7. Drive out fear
8. Break down departmental barriers
9. Eliminate numerical goals for the workforce
10. Remove requirements for jobs and numerical quotas
11. Eliminate barriers to industrial identity
12. Institute a vigorous program of education and training for everyone
13. Create a structure in top management that will push every
14. day on the above 13 points.

DMM method is a circular procedure for planning and checking the improvement of activities before full start-up and before administering the enhancement. Where a new idea is identified, it is logical to control it initially on a little scale before its full implementation to approve its benefit. Meanwhile, employees have the best time and capability to accept any changed method or program on a small scale (W. Deming 1993). The Deming PDCA cycle supplies opportunities for continuous evaluation and improvement. The steps in the Deming PDCA or PDSA Cycle as shown in Figure (2.5).

2.8 Review of Quality Award Models

Many companies use these award systems to test and measure their TQM implementation. The common aim of the Quality Award is to encourage consistency in quality and full quality control in companies there are many Quality Awards worldwide, such as the Deming Prize in Japan, the European Quality Award in

Europe, the Malcolm Baldrige National Quality Award in America. These awards' general objectives are defined as follows (Ghobadian and Woo, 1996).

2.8.1 Deming application award

The Deming Prize was created in 1951 by the board of the Japanese Union of Scientists and Engineers. Its primary aim was to promote the quality gospel by identifying efficiency changes arising from effective company-wide or absolute quality management based on statistical quality control techniques (Ghobadian and Woo, 1996). The Deming Prize proved to be an important mechanism for expanding quality control practices through Japanese industries. Deming Application Award has ten key elements (Ghobadian and Woo, 1996). There's even a test to assess senior executives' results. This checklist stresses the importance of constructive involvement by senior management in quality management practices and recognizing the core criteria in quality assurance initiatives. The checklist also lists senior leaders what they intend to do.

2.8.2 Oakland's model of TQM

According to Oakland (2014), TQM generally consists of 3 Cs (culture, and Commitment communication) and 4 Ps (planning, performance, process, and people). The three Cs are referred to as "soft results," rather than the four Ps which are pointed to as "hard management necessities."

- Culture – this includes mainly all main facets of working culture, including transfer of decision-making power, compensation for success, coordination and engagement, job protection, equal incentives, and possession. Culture is primarily at the center of TQM (Oakland, 2014).
- Commitment: this component of the Oakland model (2014) ultimately suggests the need for business participation and management cooperation for a good TQM implementation.
- Connectivity: ample communication with the relevant target demographic remains a fundamental prerequisite for the smooth delivery and effective implementation of the TQM program (Oakland, 2014).
- Planning: this relates to the creation and execution of policies and plans that make the implementation of TQM essential. Planning also calls for sufficient

and necessary services and collaborations to assist in quality design (Oakland, 2014).

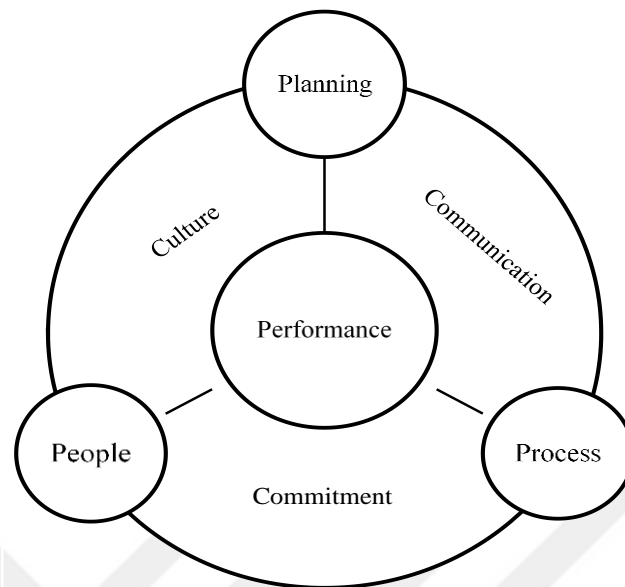


Figure 2.6: Oakland's Model of TQM

Source: Oakland, (2014)

- Processes: they apply to the comprehension, supervision, design, and redesign of the job and quality management processes. In addition, quality development is an integral part of the TQM processes (Oakland, 2014).
- People: since people are an essential resource, the handling of this crucial human resource is a central feature of TQM. This feature focuses mostly on collaboration, connectivity, creativity, and HR learning (Oakland, 2014).
- Performance: establishing a performance measurement framework and carrying out self-assessment exercises, audits, and reviews all remain the key to the success of TQM (Oakland,2014).

2.8.3 The European quality award

The European Rating Award was introduced formally in 1991. The prize's primary aim is to help, promote and recognize the creation by European companies of effective overall quality control. The European Premium Award model is split into two parts: enablers and performance.

Enablers include leadership, control of people, practices and tactics, tools, and processes. These five dimensions direct the business and make it easier to convert

inputs to outputs. The results are the happiness of the employees, consumer satisfaction, social effects, and market consequences that calculate the level of performance of the enterprise. The model consists of nine main elements further separated into a variety of secondary elements. The parameters EFQMNine are used for the assessment of entities using this model as defined in Figure (2.7).

From the hand side of the model, the five requirements are known "enablers": leadership, policy and strategy, staff, collaboration, and services and procedures. In the right hand of the model, the other four criteria are called "results" that include consumer loyalty, the satisfaction of workers, social results, and main results. The core idea behind It model that leadership, policy and strategy management, people, alliances and services and processes contribute to performance, consumers, staff, processes and community.

A model is intended to explain the basic elements of the TQM principles as it is based on the premise that end products expose organizational strategy, mechanism and competence as described by Ghobadian and Woo (1996).

Furthermore, it acknowledges the value of improved human resources, preparation, and capacity, and stresses that the exclusive indicator of success is not the financial outcome, stressing that management plays an important role in the quality assurance process. It implies that there is a critical link between financial reports and results such as customer loyalty and business acceptance (Evans, 2001).

Conti (2007) reports that businesses Have a TQM model that can be applied, an important tool for benchmarking, methods of self-evaluation, and a methodology for sharing good practice and experience with this model.

There are, however, certain limitations and model constraints in the absence of such critical components for quality management as research and innovation, strategic positioning, creativity, and promotion. However, the EFQM model is advantageous and plays an important role in helping businesses achieve efficiency and productivity.

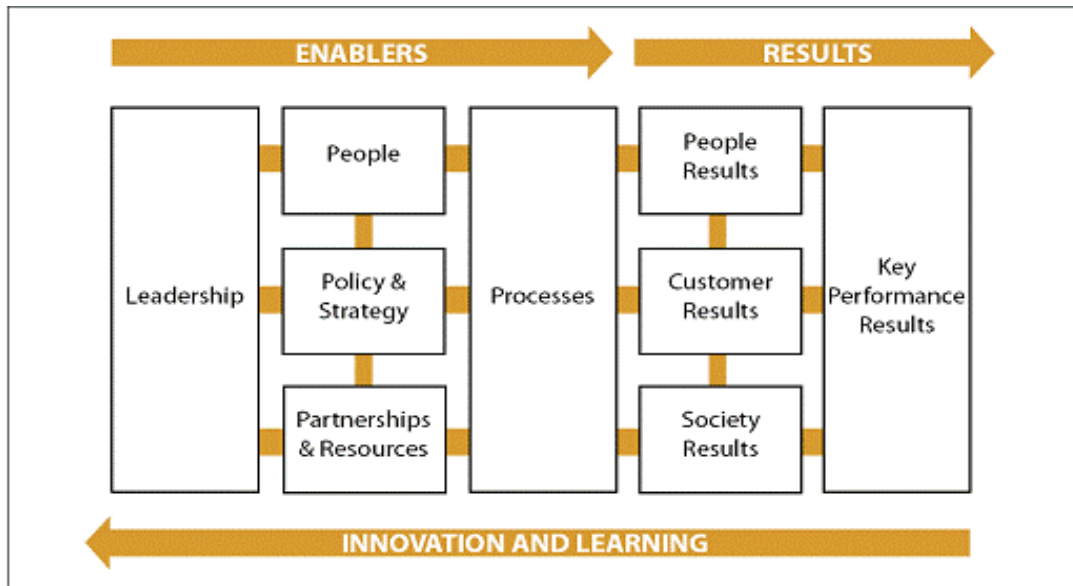


Figure 2.7: EFQM Excellence Model

Source: Oakland & Marosszeky, (2006)

2.8.4 Malcolm Baldrige National Quality Award (MBNQA) model

The Government of the United States defines the MBNQA model in seven parameters, as seen in Figure (2.8), for industrial and utility firms, large and small, health and training organizations as well as, who use and are considered to be exemplary (Evans & Lindsay, 2001). The seven criteria, will show in Figure (2.8) are:

1. Leadership; discusses how senior management set sustained values of excellence and discuss corporate obligations that guide all companies.
2. Strategic planning: discusses how a company creates and constructs strategic options, identifies and sets out key action objectives to produce successful results.
3. Consumer and business focus; explores the creation and continuation of good customer relationships in the organization.
4. Analysis of the data; explores data and information quality Support the operations and results of the big business.
5. Focus on human resources; discusses how the organization encourages and empowers its workforce to grow its capacity and the drive for workers to accomplish their goals.

6. Process management; discusses how organizations handle, design, enhance, and grow Relevant problems for management process, such as business processes, development processes, and process support.
7. Economic performance; analyses core success fields such as customer loyalty, consumer satisfaction, marketplace, employee, provider, the financial and organizational performance of the company.

The goal of the model is to foster understanding of quality and its impact Competitiveness, knowledge exchange on successful quality strategies and benefits resulting from the implementation of these techniques and recommending a set of standards which company, industry and government, and other businesses may use to determine their efforts to improve their efficiency (Porter & Tanner, 2004).

While organizations continue to make extensive use of the MBNQA in the design and implementation of quality improvement programs, there is no compelling evidence to date that the requirements used for the award apply directly to organizational results. No proof of the empirical testing of the Baldrige framework, considering the success of the model. The literature exists. The MBNQA system itself is not predictive. It proposes only a system It suggests which factors play a role in improving quality. However, the assumption is that businesses that are profitable the requirements will be competitive on the market.

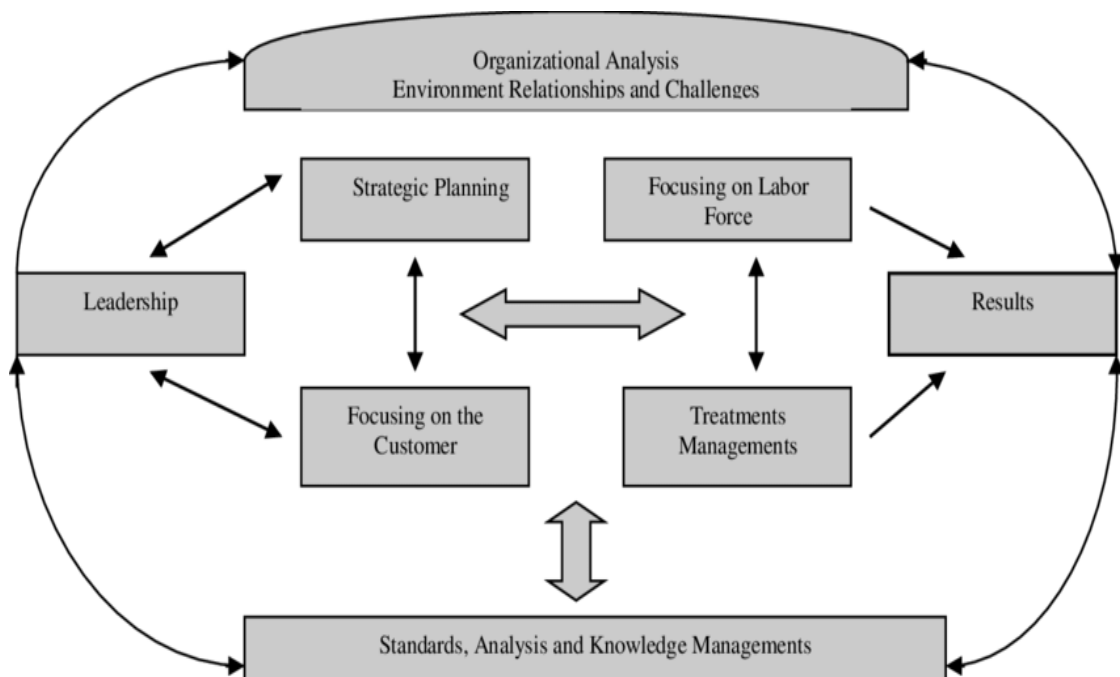


Figure 2.8: MBNQA Model

Source: Oakland & Marosszeky,(2006)

2.9 Integrated Quality Management (IQMS)

The IQMS is the incorporation and proper arrangement of quality technical elements to maximize performance and efficiency in the application and maintenance of the quality control processes of an enterprise to satisfy customer expectations and satisfactions. An IQMS is a part or operation which has a quality impact. Customer happiness is the goal of quality (AG 2011).

In the last three decades, several corporate development projects have been initiated. Programs like statistical process tests, different consistency tools, and TQM were developed in the 1980s. The ever-famous ISO 9000 came along in the 1990s, which led to increased ductility, a decrease in costs, enhanced time, greater efficiency, and customer satisfaction. Globalization and competitiveness meant companies had to continually improve and achieve the highest efficiency and competitive advantage. In the 1990s, modernization and re-engineering of all processes progressed quicker. In today's internationally dynamic world, companies face multiple obstacles as consumers are seeking better efficiency at competitive expenses. They find their future constantly in question in the global economy. Successful quality management is vital to drive competitive success. Processes and systems are essential for the performance and expansion of any organization. ISO 9000 is an excellent tool to develop a strong foundation for good processes and systems. The ISO 9000 quality management system is accepted worldwide, and ISO 9000 certification has global recognition.

The IQMS is a supplement to the ISO 9000 (Quality Management System), ISO 14000 (Environmental Management System), and OHSAS 18000 (Occupational Health and Safety Management) guidelines and requirements produced along with other contract papers. If a corporation has an accredited quality management system (ISO 9000), it will develop an IQMS system by incorporating environmental, health, safety, and other management system criteria specifications. The advantages of having an IQMS are:

- Reduced duplication and consequently costs
- Better division of capital
- Uniform process
- Removal of overlapping obligations and partnerships.

- Coherence.
- Enhanced connectivity.
- Risk-reducing and profitability rise.
- Promoting the production of training.
- Simplifying the maintenance of records.
- recording reduction.
- Ease of regulatory and other specifications control.

Construction projects are distinct, non-repetitive, and have quality criteria that can be established through the incorporation of project requirements and the quality control framework of the enterprise. Quality device manuals typically consist of instructions for designing a project quality management strategy taking into account work requirements.

Construction projects are distinct, non-repetitive, and have quality criteria that can be established through the incorporation of project requirements and the quality control framework of the enterprise. Quality device manuals typically consist of instructions for designing a project quality management strategy taking into account work requirements. that the construction is carried out following the specification details and approved COQP.

3.THE BENEFITS OF TOTAL QUALITY MANAGEMENT AND BARRIERS IN CONSTRUCTION PROJECT

The TQM is not unproblematic in an organization. Although much evidence of the successful implementation of TQM exists, many businesses in various types of industries have been challenged by TQM's reputation. This means that there are many hurdles to applying TQM.

Jacobsen (2008), says that it is a matter of urge policy makers to build strategies to enhance the prospects for the successful implementation of TQM, and thus to move towards market excellence. The key factors are to impede the implementation of TQM.

al-Khalifa and Aspinwall (2001) reported the capacity for TQM, which focuses on constantly enhancing its internal and external operations, to turn an organization from insufficient autocratic management and structural control into the atmosphere of teamwork. Ho (2011) states that TQM offers a systemic approach to enhancement of quality by integrating service and product specification with customer performance to make the requirements of zero defects simpler. Vouzas and Gotzamani (2005) reported that implementation of TQM played an important role in customer complaints reduction due primarily to the substantial increase in customer satisfaction due to the skill and efficiency of quality management systems (Tsim et al., 2002).

al-Khalifa and Aspinwall (2001) study their capacity to transform an organization from inadequate autocratic management and structural control into a coordination environment by continuously improving the Tqm's internal and external operations.

Ho (2011) points out that TQM provides a systematic approach to quality assurance by incorporating services and product specifications into customer results, to simplify zero defect requirements. Vouzas and Gotzamani (2005) claim that the application of TQM was an essential element in reducing customer complaints, mainly because the skill and efficacy of the quality management system significantly improved customer satisfaction (Tsim et al., 2002).

However, Moballeghi (2011) observed that while TQM could increase output effectively, various companies failed to achieve the associated benefits, while "quality confusion" is imprisoned. In order to prevent these ambiguities, the beneficial effects of TQM have been investigated.

Quality improvement of the business. Such an effort must consider the advantage of TQM theory. It would be acceptable. The following parts are therefore intended to discuss the key advantages and outcomes in the implementation of TQM in companies with an emphasis on the implications for enhancing the different aspects of TQM's success such as the improvement of customer satisfaction, Staff, financial and organizational performance and environmental performance. These contribute to overall results Future sustainability and development organizational changes.

3.1 The Benefits of Total Quality Management in Construction Project

The performance enhancement projects in an organization cannot be overlooked because they benefit directly from the outcome while offering a competitive advantage (Gharakhani et al., 2013). Several people are realizing the advantages that could be achieved by companies that collaborate with the adoption and application of TQM. Chin and Pun (2002, p.273), among others, argued that the introduction of TQM could lead to improvements in goods and services, decreased costs, happier customers and workers, and positive financial performance.

3.1.1 The benefits of The TQM to achieve competitiveness

Today's industrial environment is full of life worldwide. Competitive, complicated, and ever-evolving, and it is to win or remain in business Retain economic benefits. So TQM proved to be the successful one O'Regan and Globadian tactics for all sectors during the 1990s. There is There a strong consensus that TQM is an efficient way to treat Operations and ties of the company to boost overall performance For today's organization TQM is considered a basic theory because it Provides the requisite assistance for the entire sector. It will support private companies. Boost local and global competitiveness.

Mersha,(2000) claims companies in Urbanized countries have achieved a performance approach to the market share and increased overall customer performance Satisfaction, better morals, and increased efficiency for workers (Chew et al,2008).

State that resources alone are not adequate to achieve in the construction industry Competitive advantages and high efficiency, but entrepreneurs must make more use of them using available resources to pick their resource-based strategies Capability. Building organizations will then shape their strategies Competitive environments require. Thus, corporate success should be improved by creating a fit between available competitive resources Strategy. The rising impact of globalization has made foreign and local efforts more difficult. Businesses to increase their efficiency and then step on to quality management Cost reduction overall, flexibility increase, improved contact and supply management Rawabdeh chain effectively (2002). Competitiveness is the company place in the market against its rivals of higher quality Products and services that distinguish a company from its rivals, thereby improving the market share, profit and added value for the company. Competitiveness can also be achieved through enhanced profitability, sales growth and high quality production.

3.1.2 The TQM's benefit for improved return

Owing to the impact of globalization, intensified competition, creativity of the supply chain and the implementation of information technology, the construction sector has undergone major changes in the last half century. Industry professionals also know they need more effective performance management and techniques to retain or boost company value and profitability in order to succeed in this market climate. Profitability of the business may be calculated by internal return rate, net present value, And return on revenue or turnover. The internal return rate is the discount Rate that offers a net zero present value when applied to a variety of cash flows the net present value as investment and shareholder capital shall be described as all future discounted cash flows at an acceptable capital risk adjustment rate. In addition, The organization can calculate the return on turnover or sales when it is difficult to Measure assets in an organization (Zalewska & Grout A 2006).

By improving sales or reducing expenses, company performance can be improved. Improvements in internal quality can also increase efficiency and lower internal costs. which will indirectly contribute to a rise in profitability. In addition, increased performance Consumer satisfaction can be improved by quality to exceed customer requirements and in return, This increases customer satisfaction and loyalty and therefore increases potential sales And

retain competitive benefits. (O'Regan 2002) notes the strategic advantages of Better quality has been shown to contribute by increasing investment returns Sales.

3.1.3 The benefit of the TQM to improving market share

A medium and profitability market share can be regarded as the key predictor Long-term and one of the key organizational metrics Performance and determines an organization's market place. Enhancement Organizational advantage calls for a greater market share requiring consumers to become more loyal by improving service quality. However, profitability is not always the same as that seen by many businesses, which represents market or success in the company (O'Regan, 2002). Organizations can increase market share of goods and services in a variety of countries, minimize competition rates or even a combination of both. An increasing market share may be achieved if markets are not filled with the organization's products and services; increased economies of scale provide considerable competitive advantages; clients may be persuaded to buy more and fix the company's production or the distribution capacity. Failure to incorporate the required changes. The market loses to companies its market share. This may also be exacerbated by the fact that an irreplaceable reputation of an enterprise or an individual affects cheap imports (Finlay 2000).

3.1.4 The benefit of the TQM to improving quality services

Major elements are high-quality goods and services Competitiveness, which has recently been oriented more by companies as a way of differentiating their goods from others and enhancing competitiveness, Tsang and Antony (Escrig-Tena 2004). In addition, the process of enhancing quality of services starts with understanding of consumer anticipation. The quality of service varies from the quality of products, which is intangible. Increased organizational difficulties in interacting with customers and thus customers may find it difficult to determine quality. (Escrig- Tena ,2004) noted that in order to achieve quality of production, organizations should follow a TQM ideology, in particular, to enhance the services provided to all clients. Specifications There are no connections between enhanced results and

dedication to management. In addition (Wilson 2000) further analyzes have shown that there are no ties between leadership engagement, strategic planning and customer satisfaction through quality assurance. It was essential in its study (Johnson 2000) to manage each meeting to enhance the overall perception of quality of service. Service quality improvement is characterized by learning about the customer's needs. The process of managing better service quality begins with the anticipation of the customer. The concept of expectations/perceptions was expanded to integrate "desires" in the customer awareness of service quality (Wiele 2002).

3.1.5 TQM's positive environmental and social impacts

TQM must be used efficiently to streamline operations and procedures in a way that meets the necessary threshold in order to reach minimum compliance criteria. The fulfillment of these criteria is important because it forces businesses to work within appropriate environmental standards that are considered to benefit society. Continued TQM practiced effectively also allows businesses to strengthen compliance with the regulatory requirements for a sustainable, economic, and environmental future (Akpan et al., 2012).

Through TQM across organizations, it has a positive influence on such matters as Corporate Social Responsibility (CSR). In addition to helping businesses improve their profitability, which can increase the CSR capital, TQM even affects the CSR operation (Benavides-Velasco et al., 2014). Such CSR may include environmental measures such as recycling, natural ecosystem conservation or planning, and social education.

3.2 Total Quality Management and Barriers in Construction Project

Construction was the form of operations producing physical infrastructure, stable structures, and associated activities. The development on site of unique other objects, performed with temporary, multilingual teams, distinguishes it. The building is contract-based and high uncertainty exists (Ibrahim,2010).

Because unlike development where the product is usually moving, the product is organized, and the resources move in and out of the construction process. The construction industry is closely linked to the economies of

other countries' industries. It also addresses almost every human being's undertakings. The construction industry has been reluctant to embrace TQM and is based generally on quality assurance (Main,2004). Generally, quality control (QC) and quality assurance (QA) standards like ISO 9000 are confused by the TQM (Silvestro,2001).

In order to guarantee quality assurance under the conditions of contract qualification requirements in a particular category, some countries use ISO 9000 certification. Santos and Escanciano (2002) noted that the majority of EU legislation includes ISO 9000 certification. However, the analytical results are inconsistent. For example, most companies only apply the measure to get contracts without adjusting their standards of quality. Certification will provide a product with durability but does not guarantee satisfaction for customers (Magd 2008).

This includes the integration of TQM values. TQM is generally regarded as a contribution to good results following successful implementation in the manufacturing sector. This has led the construction to follow the TQM principles to address workplace complexities, obstacles, and changes (et al,2004). Various challenges in the application of TQM in the construction context are illustrated in the literature. Building barriers can be examined in three main features: working conditions, organization, and external stakeholders.

- Work environment: (Harrington,2012) said that the design of TQM has been impaired because of the lack of standardization and the multiple team activities involved in construction. In building, the industry is characterized by human supremacy, difficult conditions of labor, work uncertainty, fragmentation, hierarchical and adverse society (Loiy, 2012).

The sector comprises self-employed, SMEs, and large companies, with no single market leader (Tey,2014) identifying several barriers which impact the construction sector due to a lack of skilled workers, the poor way of awareness, and the communication between existing competencies.

- The TQM building inhibitors are illustrated by the organization: Haupt and Whiteman (2004), which is insufficient funding, lack of

planning consistencies, lack of sufficient workforce training, and limited opportunity for quality-oriented employees to undertake projects. Significant obstacles are unnecessary documentation, uninterested vendors and sub-contractors, difficulties in the testing of performance, transient staff, tight time-scales, and lack of respect by field officers for TQM. Once projects start, the aim is to complete them as rapidly as possible and to make the most profit.

After a product is completed, consistency is usually inspected. However, since its inception (McCollough 1993) consistency must be integrated into the product, highlighted five key building obstacles: the shortage of skilled labor, competition, inadequate preparation and specifications, insufficient attitude and lack of management. Bhat's study and (McCollough 1993) showed that the key obstacles to the TQM in Indian industries are: there is no other organization's benchmark, resistance to change by staff, bad planning, a lack of attention on consumers, a lack of resources.

Magd (2008) identifies as the principal impediments to the successful implementation in Egypt of the TQM's lack of high management commitment and the lack of skilled staff. This research investigates the utility of these obstacles in Iraq's building environment.

- External Stakeholders: In major building projects the construction industry shall organize diverse and varied arrangements involving clients, vendors, and subcontractors. In the case where changes in the vendors and subcontractors happen very late when customers pay and information is not transmitted accordingly, these are the variations.
- Subcontractors and suppliers are involved in the implementation of TQM construction based on low offers and costs (Haupt and Whiteman, 2004; Ankrah et al., 2009) In addition, the lack of foreign interest in TQM Programs stakeholders have been seeking to improve TQM projects (Loiy, 2012).

4. RESEARCH METHODOLOGY

4.1 The Introduction

The methodology is "analysis of particular methods used in a given study and justification for them." (Jankowicz,2002). The approach means how the study should be performed and what should be done to understand the target sample involve data processing for the disciplined collection and evaluation of data collected. by connecting companies a collection of details to their staff, customers, and suppliers Know their behavior (system) and determine their success and issues. Besides, analysis methodology defines the knowledge needed to design Data collection methods, data collection method control, performance interpretation, and connect the results and their effects (Proctor,2003).

The research methodology explains different methods employed by research to gather data to better understand the overall quality management system and to determine whether it is appropriate for all organizations to adopt them. The purpose of the study is also to assess the feasibility and extent of the concept of systematic quality management and the impediments to the implementation within the construction industry of the TQM. The research thus started with a general understanding of TQM output based on available secondary data.

Quantitative or qualitative data may be the primary data, according to (Malhotra,2006) and this study will be addressed later.

Researchers' views on the relative merits of Research quantitative and qualitative methods differ widely between those who consider the two strategies to be fully different and those who incorporate them into research projects.

Bryman (1998) and Best and Khan, for example (1989) Say that both approaches should be combined to achieve more accurate study results.

While Hughes (1997) claims that combining both methods underestimate validity policies that are linked to method choice. However, the use of interviews or findings in the analysis may be called qualitative Strategies, through questionnaires can be viewed as a quantitative approach. could be organized and quantitatively evaluated when collecting Numeric data or when non-numeric responses in the numerical form are classified and coded. Questionnaires can, on the other hand, allow open answers and contribute to an in-depth investigation of individual cases.

Green et al. (1989) claimed that the mixed method approach began in the 1980s when scholars started to raise questions about the mixed methods of qualitative and quantitative data without articulating defensible reasons. However, a mixed approach to research methodology helps researchers in their investigation approaches to be more integrative, versatile, and holistic, as they aim to answer a variety of specific research questions Powell et al (2008).

This research has also merged quantitative and qualitative data techniques to collect the requisite data through the hybrid survey (self-administered and managed). The approach followed for the previous analysis is discussed in this chapter. Includes study design knowledge, methods, The way the questionnaire is structured is also defined. It also has shown how the validity and reliability of the questionnaire have been assured

4.2 Objectives and Targets of Study

The approach includes the general investigative process from the theoretical (Collis, Hussey,2003) the data collection and analysis. It is important for the credibility of science that the study is carried out and clearly stated straightforwardly. A Fault Methodology may lead to invalid results. The methodology selected must therefore adhere to the research goals and be able to address the specific research questions.

Consequently, the study purpose and goals should be defined to select an acceptable methodology.

The main objective of this research is to contribute to the understanding of TQM in Iraqi construction companies and how it can be applied. Investigate whether the implementation of TQM is necessary and the barriers.

To achieve the research objective, two goals are addressed:

- To analysis whether any construction industry organizations, by studying and implementing TQM practices, and strengthen TQM implementation and control in Iraq's construction sector.
- Defining the barriers that influence the TQM implementation in the building industry.

4.3 Research Approaches

Three alternate approaches to analysis exist, namely inductive, deductive, and abductive. The inductive strategy seeks to establish a philosophy focused on data analysis (2016, Saunders et al,2016).

As seen in Figure 4.1 (Collis & Hussey, 2003; William, 2006), the inductive analysis continues by generalizing from based context-specific results.

This is often referred to as a bottom-up technique (William, 2006).

Therefore, the idea derives from the study of evidence through this method (Yin, 2014).

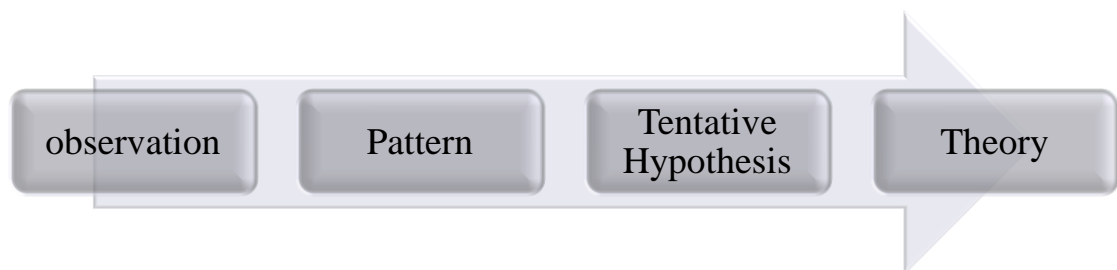


Figure 4.1: Inductive Research Approach

Source: William, (2006)

This analysis review would follow the mixture of deductive and inductive methods.

In constructing the original conceptual structure from the initial conceptual, a deductive approach would be used.

In Iraqi construction companies, the literature describes the main elements of TQM.

4.4 Research Strategies

A study strategy is a plan Researchers will use the source to answer basic research questions, using the data gathered and considered through data collection limitations such as location, time, data access, ethical problems and money, (Saunders,2003).

The methodology is also strongly rooted in empirical processes, whereas other methods like experimentation and theory are inductive. The study does not concentrate on the strategic approach., however, if the technique for addressing the research question is sufficient or not.

Saunders et al. (2008) classify six types of analysis strategies: Experiment, case study, grounded theory, interview, analysis into action, and Ethnographic.

As previously mentioned, some of these techniques refer to inductive design, Deductive nature whereas some. Some of these methods will then suit the Study, taking into account each strategy's advantages and disadvantages.

This is considered a classic deductive analysis, beginning with the experimental technique Build which is normally used to find relationships between various variables Identification of the theoretical theory within a few variables, and Measuring one or more variables adjust.

The second is situation Analysis and this technique is related to the inductive approach to science.

The Fall Analysis is a scientific technique that includes a specific empirical inquiry contemporary events use numerous outlets within their real lives Proof (Robson,2002). This approach will also have a good understanding within the research background and between every qualitative and quantitative method of data processing, however, is evaluated in this approach Instead of using samples, archival material is also not used in Study Research.

The Survey is the final analysis technique.

It is normally connected to the deductive Approach and therefore also details are collected by a questionnaire.

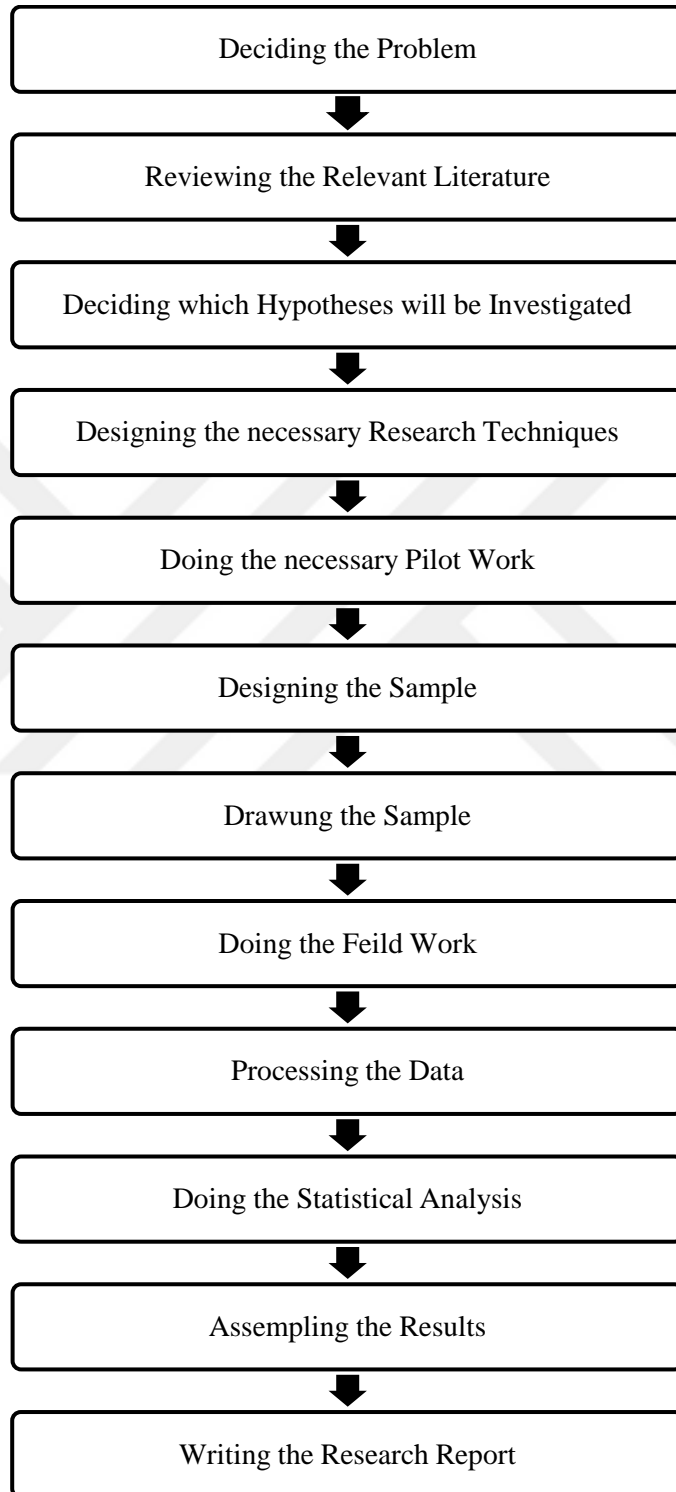


Figure 4.2: Research Design Stages

4.5 Data Collection

Sample of big technical government departments, builders, and engineers Offices engaged in the planning and development of the building industry in Iraq, which affects the techniques and efficiency of the project building industry Building.

Conducting an automated questionnaire to be answered online Website connect, the sample of the questionnaire by social media and emails, all responses returned in SPSS 22 program directly on Sheet. The electronic survey approach and These techniques help researchers gather a vast number of structured data from a huge population in a very economical manner.

The Questionnaire was in three sections:

- Section one was created to collect details about the respondents.
- Section two was developed to assess the actual extent of QM implementation in the Iraqi Building Industry.
- Section three was developed to any challenges that affect the execution of QM.

Section one of the questionnaire identifies the type of person who is finding information and indeed this to create the integrity of data. The specialization details in section 1 (civil, architectural, Mechanical, Electrician, and others), years of work experience.

Section two of the questionnaire was eighteen questions are used to test the Present stage of QM deployment in the Iraqi construction sector.

Section three of the questionnaire was eighteen equations, discusses the effect of barriers and Implementation of QM issues by eighteen questions.

Any of the questionnaires were received the same day Others were later received by the respondent. The collection of data time is 30 days.

A collection data concept is used to define a data preparation and collection process and the purpose details to keep records, to make of these processes' decisions on critical issues, and the sharing of information to others.

In everything, thirty-eight objects or questions have been generated and measured within Five points of the Likert 1-5 scale; see Table (4.1).

Table 4.1: Likert Scale

Item	Strong agree	Agree	Neutral	Disagree	Strong disagree
Scale	5	4	3	2	1

The survey was prepared as a questionnaire in both English and Arabic. seen in Appendix (A) and Appendix (B), to be recognized by all Respondents and to support in reporting this research.152 were returned out of the 200 questionnaires distributed. All questions are answered by the participant.

4.6 Data Analysis

The study of respondent data gathered Via questionnaires. Descriptive character about the data This inquiry provides quantitative insight and, the studies presented here are focused on demographic information from the respondent and QM experiences of the respondents' firms.

4.6.1 The Pilot of study

Pilot research is a small study conducted to validate a study before the study. The questionnaire, interview, checklist, or direct examination reduce the chance for respondents to have difficulty answering the questions (Saunders., 2016).

The purpose of carrying out the pilot study is to ensure the clarity of the Questions from a limited percentage of the selected community by getting feedback and suggestions, which is regarded as a small experiment intended to collect feedback and information before giving the researcher an idea about the problems or concerns, to a big analysis, And can occur with questions from the interview or questions from the questionnaire (Yates, 2004).

The pilot study for the study questionnaire was performed and carried out in the early phase, the first 30 responses out.

4.6.2 Response rate

The all Likert scale questionnaire (38) elements were completed, the response was Iraqi engineers belongs to the government and private

constructions company's, the rate was 152 from 200 requests according to this response the percentage of responses was 76% by applied equation (1). The Respondents who have decided to work together to fill out the questionnaire are Specified in detail in Table (4.2).

$$\text{Total response} = \frac{\text{total number of response}}{\text{total number of requests}} * 100 \quad (4.1)$$

Table 4.2: Questionnaire Respondents

Description	Number of respondents	Rate of response
Distributed questionnaires	38	100%
Total response	152	76%
Unusable questionnaire	48	24%

4.6.3 Specials of respondents

It can be seen from Figure 4.3 that 55% of the response rate were civil specials, 17% were Electrical specials, 10% were Mechanical specials, 9% were Architectural specials, and 9% other specials as shown in table (4.3) and figure (4.3).

Table 4.3: Specials of Respondents

		Frequency	Percent%	Valid Percent %
Valid	Civil	83	54.60	54.6
	Architectural	14	9.20	9.2
	Electrical	26	17.10	17.1
	Mechanical	16	10.50	10.5
	Other	13	8.60	8.6
	Total	152	100	100

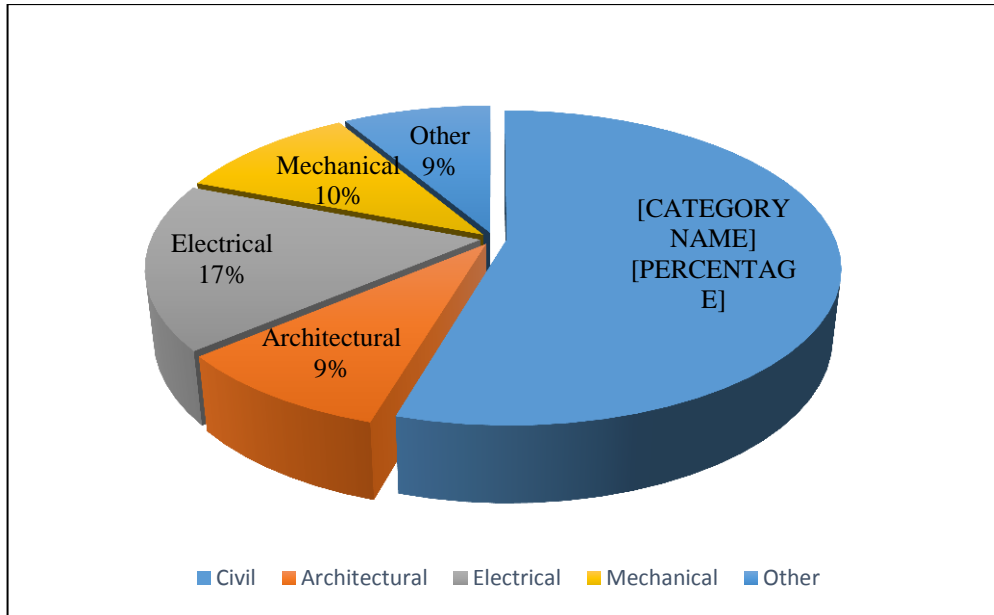


Figure 4.3: Response Specials

4.6.4 Responds experience

Greater comprehension of concerns and criteria for this segment is the experience of the respondent in this sector. The maximum response frequency was (more than 15 years) as shown in figure (4.4). Critically looking at table 4.4, 24% of the respondents have (10-15) years of experience, and 14% have 5-10) years of experience. This result is logical since the engineers that have been targeted are that of higher classification and broad experience.

Table 4.4: The Experience of the Respondents

		Frequency	Percent%	Valid Percent
Valid	0-5 years	16	10.50	10.5
	5-10 years	21	13.80	13.8
	10-15 years	37	24.30	24.3
	More than 15 years	78	51.30	51.3
	Total	152	100.00	100

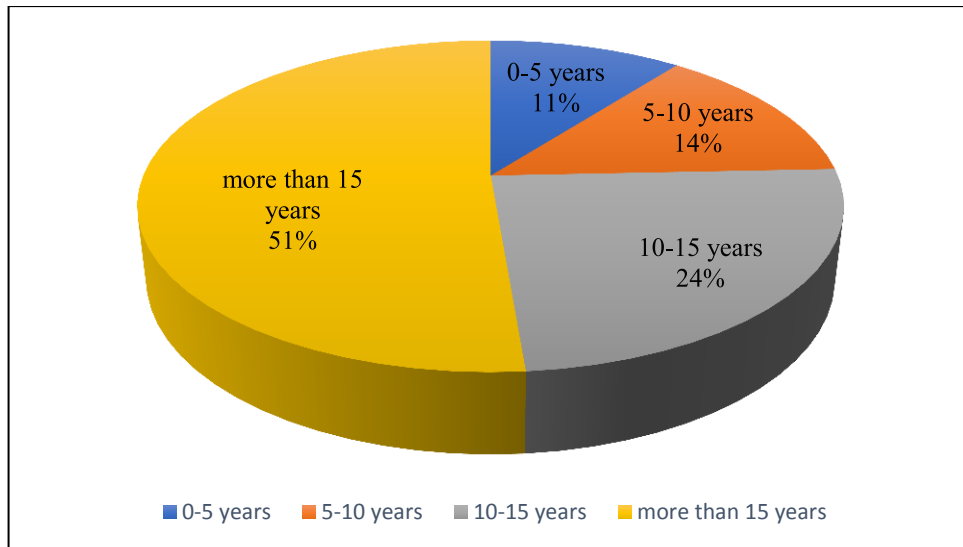


Figure 4.4: The Experience of the Respondents

4.6.5 Reliability

Reducing the risk of obtaining the wrong outcomes and improving reputation It is important to pay more attention to the validity and reliability of the data. Study Instruments Research Instruments (Saunders et al., 2016).

Reliability refers to how accurate the outcomes are the study is such that if a comparable study were to be done under a similar study, the situations will validate the conclusions of the current report. This is alluded to by as the 'goodness' of a metric, Sekaran (2003). Pilot studies help to determine the trustworthiness of Instruments for analysis by reducing prejudices. The alpha coefficient of Cronbach is rational, the equation (2) shown in.

$$\alpha = \frac{n}{n-1} \left\{ 1 - \frac{\sum v_i}{v_{test}} \right\} \quad (4.2)$$

n: number of questions

V_i: variance of scores on each question

V test: total variance of overall scores on the entire test

Indicator of the intrinsic accuracy of instruments that do not have valid or inaccurate label Schemes; therefore, scales such as scores may be used for questionnaires using (Black, 1999).

Uh, Light (2007) states that the alpha coefficient of Cronbach could be within the range of 0.70 to 1.00 to feel sure of the research's internal accuracy. In other terms, that is, if the alpha values of Cronbach are above the accepted lower limit of 0.7, suggesting that the alpha values are above the accepted lower limit of 0.7. The measurements used in the apparatus are accurate.

George and Mallery (2003) likewise have Different Cronbach alpha-test values, as shown in table (4.5).

In this analysis, the alpha coefficient of Cronbach was used to estimate the internal Consistency and questionnaire reliability.

It can be shown, based on the table (4.5) for each dimension of Cronbach's Alpha coefficient, the values were 0.95 for part two and 0.90 for part three of the questioners as shown in table (4.6).

Table 4.5: Cronbach's Alpha Value

Cronbach's alpha	Internal consistency
$\alpha \geq 0.9$	Excellent
$0.9 > \alpha \geq 0.8$	Good
$0.8 > \alpha \geq 0.7$	Acceptable
$0.7 > \alpha \geq 0.6$	Questionable
$0.6 > \alpha \geq 0.5$	Poor
$0.5 > \alpha$	Unacceptable

Source: George & Mallery, (2003)

The Analysis in Science, also, the Alpha coefficient of Cronbach's value shows the intrinsic integrity and consistency of Harmony of the sample questions and the findings of the methodological study in terms of objectivity.

Table 4.6: Statistics for Reliability (Cronbach’s Alpha coefficient) to Part Tow (The Benefit of Implementing TQM in Construction Organizations)

Reliability Statistics	
Cronbach's Alpha	N of Items
0.954	18

Table 4.7: Statistics for Reliability (Cronbach’s Alpha Coefficient) to Part Three (the Barratries of Implementation TQM in the Construction Industry)

Reliability Statistics	
Cronbach's Alpha	N of Items
0.900	18

4.6.6 Frequency

Frequencies and percentages for analysis answers of the research sample regarding section one that gives information about the respondents.

4.6.7 Mean and standard devensian

Means is one of the main trend indicators, and the standard deviation is one of the key trend measures. One of the dispersion steps to determine the degree of dispersion of the in the different questionnaire answers, respondents' responses.

4.6.8 Relative important index (RII)

The Relative Importance Index (RII) method is used to define the relative importance of the particular causes and effects depending on the probability of occurrence and effect on the project using the Likert scale of scales (Aibinu & Jagboro 2002) is according to (Aibinu & Jagboro 2002).

In addition, the higher value of the relative significance index (RII) is the portion of the critical cause or effect and is calculated by equation (4.3).

$$RII = \frac{\sum W}{(A * N)} \quad (4.3)$$

Where:

RII: Relative Importance Index

W: the weight is given to each factor by the respondents from 1, 2, 3, 4, and 5 for very low, low, moderate, high, and very high, respectively.

A: the highest weight (i.e., 5 in this case), and;

N: the total number of respondents.

The purpose of this segment is to present and evaluate the information gathered from the participants, Regarding the advantages that the enterprise could accomplish by TQM implementation. Using eighteen questions, focused on eighteen topics, the key advantages were outlined and calculated. The five points of the scale of Likert. Therefore, to endorse the findings, the investigator pursued a by using the mean values, standard deviation, and ranking, descriptive analysis.

Based Along with the highest mean value and the Relative Importance Index (RII), the highest proportion Agreement for every Statement is shown in table (4.8).

The paragraphs that were identified were coded with the code (BE) and statistical analysis of them was performed in the program (SPSS 22).

As shown in the figure (4.5) the chart of distributed all items of the benefit of implementing TQM in Construction Organizations means, which the lower limit of mean is 3.84 at the item (BE14, reducing construction costs) and the higher limit is 4.2 at the item (BE, Reduce defects of work process).

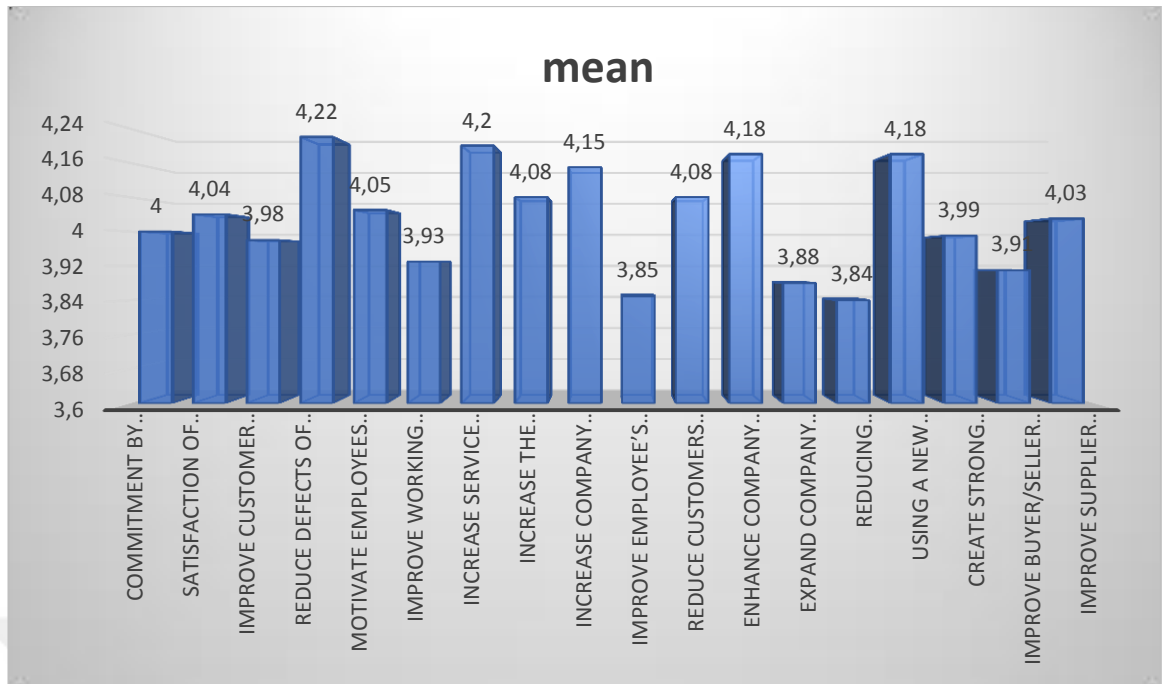


Figure 4.5: The Mean Value for The Benefit of Implementing TQM in Construction Organizations

In table (4.7), the static analysis frequency, standard deviation, the mean, relative important index (RII), and the rank for items for the benefit of implementing TQM in the construction organization.

According to the value of (RII) for items to explain the importance of items as shown in table (4.7), and the rank for the eighteen items. then after rearmament with (RII) value. When the items have the same value, so, depending on the lower value of standard deviation.

We show the benefits code BE4 (Reduce defects of work process) is the more important item according to the mean (4.22), RII (0.85), and SD (0.863)

Table 4.8: Statically Analysis of Benefits TQM

No.	Code	Item	Frequency	SD.	Mean	RII	Rank
1	BE1	Commitment by senior management and employees	608	0.899	4.00	0.80	13
2	BE2	Satisfaction of customers' requirements	614	0.837	4.04	0.81	9
3	BE3	Improve customer relations	605	0.785	3.98	0.80	11
4	BE4	Reduce defects of work process	642	0.863	4.22	0.85	4
5	BE5	Motivate employees on production	616	0.926	4.05	0.81	10
6	BE6	Improve working climate	597	0.957	3.93	0.79	14
7	BE7	Increase service quality	639	0.825	4.20	0.84	1
8	BE8	Increase the marketing of the company in the work market	620	0.768	4.08	0.82	6
9	BE9	Increase company performance	631	0.698	4.15	0.83	5
10	BE10	Improve employee's satisfaction	585	0.995	3.85	0.77	18
11	BE11	Reduce customers complaints	620	0.81	4.08	0.82	7
12	BE12	Enhance company reputation	635	0.839	4.18	0.84	2
13	BE13	Expand company activities globally	590	1.067	3.88	0.78	15
14	BE14	Reducing construction costs	586	0.959	3.84	0.77	17
15	BE15	Using a new technology and modern machines	635	0.847	4.18	0.84	3
16	BE16	Create strong relation with suppliers	607	0.834	3.99	0.80	12
17	BE17	Improve buyer/seller advance planning	594	0.93	3.91	0.78	16
18	BE18	Improve supplier satisfaction, quality and retention	617	0.754	4.03	0.81	8

The second important item is the benefit with code BE 7 (Increase service quality) according to the mean (4.2), RII (.84), and SD (0.825).

The benefit with code BE 12 (Enhance company reputation), according to the value of mean (4.18), RII (0.84), and SD value (0.839) in the third importance.

The rank of importance for all items of the benefits is arranged by the value mean, RII, and lower value for SD, as shown in table (4.9).

Table 4.9: The Rank of Importance for TQM

No.	Code	Item	Frequency	SD.	Mean	RII	Rank
1	BE4	Reduce defects of work process	642	0.863	4.22	0.85	1
2	BE7	Increase service quality	639	0.825	4.20	0.84	2
3	BE12	Enhance company reputation	635	0.839	4.18	0.84	3
4	BE15	Using a new technology and modern machines	635	0.847	4.18	0.84	4
5	BE9	Increase company performance	631	0.698	4.15	0.83	5
6	BE8	Increase the marketing of the company in the work market	620	0.768	4.08	0.82	6
7	BE11	Reduce customers complaints	620	0.81	4.08	0.82	7
8	BE18	Improve supplier satisfaction, quality and retention	617	0.754	4.03	0.81	8
9	BE2	Satisfaction of customers' requirements	614	0.837	4.04	0.81	9
10	BE5	Motivate employees on production	616	0.926	4.05	0.81	10
11	BE3	Improve customer relations	605	0.785	3.98	0.80	11
12	BE16	Create strong relation with suppliers	607	0.834	3.99	0.80	12
13	BE1	Commitment by senior management and employees	608	0.899	4.00	0.80	13
14	BE6	Improve working climate	597	0.957	3.93	0.79	14
15	BE13	Expand company activities globally	590	1.067	3.88	0.78	15
16	BE17	Improve buyer/seller advance planning	594	0.93	3.91	0.78	16
17	BE14	Reducing construction costs	586	0.959	3.84	0.77	17
18	BE10	Improve employee's satisfaction	585	0.995	3.85	0.77	18

4.7. The Analysis of Barriers Affects in Quality Management (QM) Implementation in Construction Companies in Iraq

Participants were asked if they faced any of the issues mentioned. based on the application of QM in the literature. They were asked to identify any difficulties of the implementation of QM that they see emerging if it is implemented. The following tables (4.10) reflect the data compiled from the first portion.

Table 4.10: The Analysis of Barriers Affects in TQM

No.	Code	Items	Frequency	SD.	Mean	RII	Rank
1	BR1	The difficulty in changing behaviors and attitudes related to quality	595	0.86	3.91	0.78	15
2	BR2	Lack of top management commitment to an understanding of quality issues	603	0.92	3.97	0.79	14
3	BR3	The employee's lack of understanding and resistance to quality programs	601	0.82	3.95	0.79	13
4	BR4	The lack of a clear strategy for quality management in the company	618	0.84	4.07	0.81	7
5	BR5	Lack of communication between projects parties (contractor and consultant)	603	0.78	3.97	0.79	12
6	BR6	Firms focus on short-term gains	623	0.92	4.10	0.82	4
7	BR7	Lack of education and training to drive and improve the TQM in the construction process	640	0.77	4.21	0.84	2
8	BR8	Lots of documents are required, which makes documentation difficult	574	0.82	3.78	0.76	16
9	BR9	Lack of expertise and resources in the quality management system	616	0.80	4.05	0.81	6
10	BR10	Loss of part of the productivity of works as a result of the effort in training	513	0.98	3.38	0.68	18
11	BR11	Lack of specifications and lack of clarity	558	0.91	3.67	0.73	17
12	BR12	Instability of the volume of work and the instability of the national economy	605	0.83	3.98	0.80	10
13	BR13	Insufficient attention to achieve quality by works in projects	628	0.76	4.13	0.83	3
14	BR14	Absence of rewards and appreciation of the achievements of employees and workers	608	0.83	4.00	0.80	11
15	BR15	Awarded the tender based on lower prices and not efficiency	623	1.02	4.10	0.82	5
16	BR16	The owner's lack of awareness of the importance of quality implementation in the project and imposing his unexamined views	614	0.93	4.04	0.81	8
17	BR17	Lack in using computing and computer software to effectively manage projects	609	0.87	4.01	0.80	9
18	BR18	political status for the Iraq country	652	0.86	4.29	0.86	1

As shown in figure (4.6) the chart of distributed all items of the barriers implementing TQM in Construction Organizations means, which the lower limit of mean is 0.68 at the item (BR10, Loos of part of the productivity of works as a result of the effort in training) and the higher limit is 0.86 at the item (BR, political status for the Iraq country).

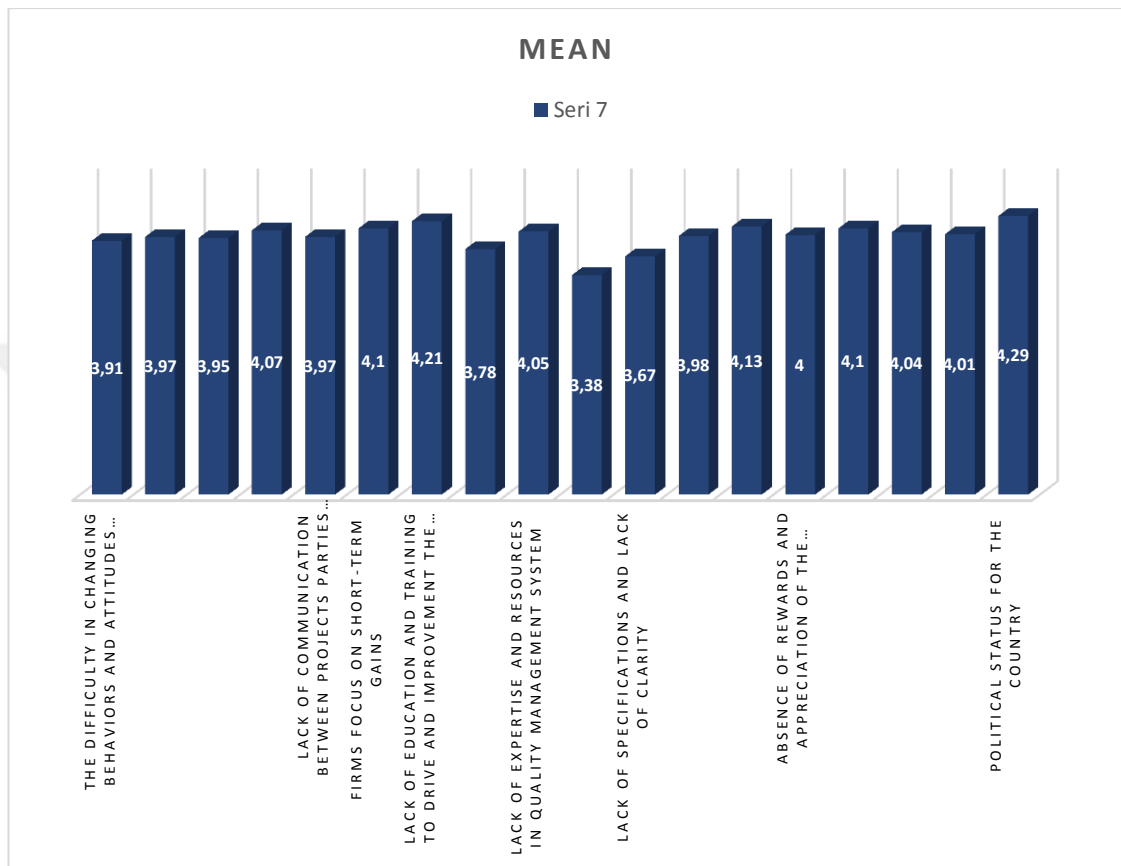


Figure 4.6: The Mean of Barriers Implementation of TQM

According to the value of (RII) for items to explain the importance of items as shown in table 4.11 and the rank for the eighteen items. then after rearmament with (RII) value. When the items have the same value, so, depending on the lower value of standard deviation.

We show the barriers code BE18 (political status for the Iraq country) is the more important item according to the mean (4.29), RII (0 .86), and SD. (0.863).

The second important item is with code BR.7 (Lack of education and training to drive and improve the TQM in the construction process) according to the value of mean (4.21), RII (0.84), and SD. (0.77).Table 4.10

The rank of importance for all items of the barriers is arranged by the value mean, RII, and lower value for SD.

Table 4.11: The Rank of Barriers Implementation for TQM

No.	Code	Items	Frequency	SD.	Mean	RII	Rank
1	BR18	Political status for the Iraq country	652	0.86	4.29	0.86	1
2	BR7	Lack the education and training on drive and improve the TQM in the construction process	640	0.77	4.21	0.84	2
3	BR13	Insufficient attention to achieve quality by works in projects	628	0.76	4.13	0.83	3
4	BR6	Firms focus on short-term gains	623	0.92	4.10	0.82	4
5	BR15	Awarded the tender based on lower prices and not efficiency	623	1.02	4.10	0.82	5
6	BR9	Lack in expertise and resources in the quality management system	616	0.80	4.05	0.81	6
7	BR4	The lack of a clear strategy for quality management in the company	618	0.84	4.07	0.81	7
8	BR16	The owner's lack of awareness of the importance of quality implementation in the project and imposing his unexamined views	614	0.93	4.04	0.81	8
9	BR17	Lack in using computing and computer software to effectively manage projects	609	0.87	4.01	0.80	9
10	BR14	Absence of rewards and appreciation of the achievements of employees	608	0.83	4.00	0.80	10
11	BR12	Instability of working volume and national economic instability	605	0.83	3.98	0.80	11
12	BR5	Lack of communication between projects parties (contractor and consultant)	603	0.78	3.97	0.79	12
13	BR3	The employee's lack of understanding and resistance to quality programs	601	0.82	3.95	0.79	13
14	BR2	Lack of top management commitment to an understanding of quality issues	603	0.92	3.97	0.79	14
15	BR1	the difficulty in changing behaviors and attitudes related to quality	595	0.86	3.91	0.78	15
16	BR8	Lots of documents are required, which makes documentation difficult	574	0.82	3.78	0.76	16
17	BR11	Lack of specifications and lack of clarity	558	0.91	3.67	0.73	17
18	BR10	Loos of part of the productivity of works as a result of the effort in training	513	0.98	3.38	0.68	18

5. SOLUTIONS SUGGESTED

From the previous chapter, many important and important were found Significant issues and factors necessitate the prevention, resolution, and execution of appropriate measures in order to make this effective construction industry more successful. Therefore, it is useful to search for some relevant highlights to be introduced in this sector to solve or avoid the most significant.

5.1 Problems and Efforts to Improve Performance

Therefore, the problem solutions presented in this chapter are barriers to avoiding. It will present procedures and model creation. Then a listing of solutions and a model to represent and summarize will be carried out. Suggested solutions to the ten most popular issues and obstacles graded QM implementation related. For the top, ten most significant problems and barriers that affect the previous chapter, the implementation of QM was addressed.

The collection of Suggested solutions has been introduced, attempting to solve such similar problems and barriers. For the top, the ten most significant issues connected with the related solutions implemented are discussed below.

5.1.1 Political status for the Iraq country

Security is the first and foremost issue in the Iraqi construction industry. It can be observed that security procedures are the most important factors that influence the construction period in Iraq.

The security problem in Iraq after the war has led to the large request for protection facilities. Attacks, assassinations, terrorism, and military destruction are daily risks to contracts of construction. There were also thousands of insurance requests by building staff for injuries suffered during

attacks. The availability of technicians who are not Iraqi experts. It is estimated that 25% of reconstruction funds have been used to provide construction workers and worksites with security. Terrorism has risen dramatically against everything in Iraq Construct facilities in terms of time, cost, and quality.

It should be considered a more reliable approach by the government of Iraq to Providing protection for construction companies and their workers.

5.1.2. Lack in education and training to drive improve the TQM in the construction process

Due to this rapid advent of data technological development, training, learning and education in general have become a problem during this decade. Today, administrators have to deal with new operating conditions, increased competition and the pursuit of greater market share.

This situation generates the need not only to enhance the skills of employees and upgrade their skills-technical, managerial, etc.-to allow them to meet the new requirements of their employment, but also to enhance their learning abilities at the same time as enabling them to develop their overall skills. These skills are transmitted to achieve the results through training; However, in the acquisition of such a system, the learning process often plays a very significant role. Capabilities; therefore, when training and education form part of the business, it is very necessary Strategy, to know how the process of learning takes place.

Depending on the one that would best serve their needs, the types of training offered to individuals will differ from one organization to another. Some of them believe in training by participation, while others use conventional board and chalk methods to apply taught training or, in modern times, the display and the keyboard. The various levels or hierarchies within the organization would also depend on them. For example, the company's strategic plan and priorities should be thoroughly understood by all participants from the top-down, known as regular training. Systematic training can also be characterized as the identification of the type of training required, the preparation of suitable training programs, the implementation

of training to ensure that staff have adequate assistance to achieve efficiency in learning the skills embodied in the training objectives and the evaluation of the efficacy of such training programs in order to enhance them in the light of experience. This form of training is illustrated in figure 1. This general systemic training method model is used in the ISO Standard 10015:1999.

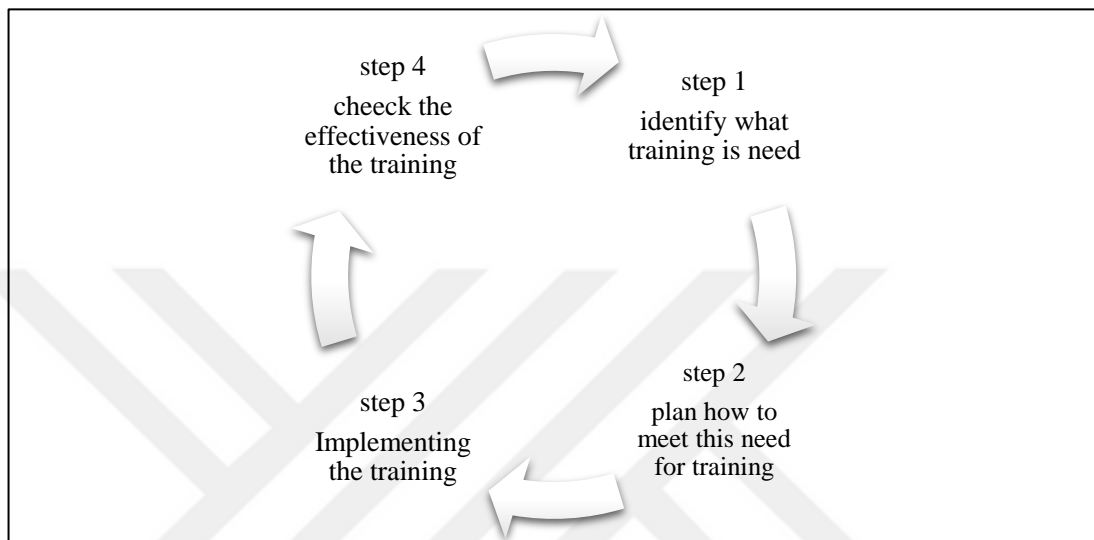


Figure 5.1: Systematic Training

Source: ISO Standard 10015, (1999)

5.1.3 Insufficient attention to achieve quality by works in projects

The success of a quality initiative like TQM begins with top management involvement. Often these quality models like Malcolm Baldrige National Model quality Often these quality models like Malcolm Baldrige National Model quality, have placed leadership and management engagement at its top (MBNQA) and the European Quality Management Foundation (EFQM) for productive purposes.

The top-level management engagement was a starting point and a strong basis for the successful implementation of TQM. These results are backed up by many previous studies including among other items, said that the highest management dedication contributes to corporate excellence (Kanji, 2001).

5.1.4 Firms focus on short-term gains

Those principles tend to be the long-term goals of the organization to understand the effects of high quality on the company's overall benefit, value for money and reputational importance. Discussions on efficiency in companies are also held significant problem to identify the better-quality impact the managers assume that the importance on quality increases although literature proves that it particularly reduces reworking costs and the cost of works refused. In this respect, it is important to provide special training courses and seminars for those businesses, to concentrate on COQ and to minimize rework if it is possible to do the right things firstly.

5.1.5 Awarded the tender based on lower prices and not efficiency

The tender will be awarded according to lower rates. In order to resolve this issue, the owner representative must carry out a full and accurate pricing analysis, determine the tender price correctly before the tender is tendered and award the bid for the nearest price thereof. The prequalification may also be conditional upon tenders' commissions Contractors to determine the suitability of contractors on the basis of the company's expertise, the availability of facilities, financial and management skills, credibility and business background. For example, before you invite eligible bidders to bid, create a list.

In addition, tendering commissions are advised to include receipt of all tenders' bids in two envelopes when bidding; the technical offer envelope and the quantity envelope are recommended to ensure technical bids, and that the best technical bids can then be contested in line with the prices provided. If the protocol is followed, the lowest and theoretically the best price will be awarded. Where the technical plan includes the technical aspects of the projects, including: time schedule, safety schedule, cash flow, declaration methods, related projects, organizations involved and the history of the bidder.

In addition, the offers should be directed to examining commissions Observe bid with reference to the best reviewed bids at the most suitable rates.

Taking the bidder's ability to confirm the necessary level of quality into account, conduct the project within the defined time and carry out the required work under the criteria and requirements.

The commission also requires, in compliance with the conditions and requirements, to ensure a moderation of the "the lowest price offer" The commission must furthermore be driven by the most recent costs, market prices and competitive forecasts, used in former transactions.

5.1.6. Lack the expertise and resources in the quality management system

In terms of strategies, quality management systems have become important. People require product or service quality to be consistent. Any deviation from their standards could lead to unhappiness, grievances and, ultimately, income loss. And smaller firms have to ensure that quality control processes are in place. This also refers to customer care.

For the establishment, implementation, and management of quality management systems, the ISO 9000 standards is important. Although enforcement and ISO 9001 certification are not compulsory, the global demand for quality uniformity has led to the sponsorship of thousands of businesses. Consequently, compliance with the standard leads to the reputation of trading partners. Business associates and consumers know that the organization has a globally accepted quality management framework strategy in place.

5.1.7 The lack strategy for quality management in the company

The study results and the fact that the majority of respondents assumed that such management of the building business had no long-term vision and can successfully enforce the TOM.

The survey found that management concerns had not been studied in order to understand the cause of these problems. TOM programs were deemed too complicated to learn and enforce. This lack of direction may be attributed to the inability to better consider its long-term strategies and priorities of the company, e.g.

the vision, mission and strategy. But no adequate organizational framework for implementing TOM has been developed.

A general model for the implementation of a total quality from the information and expertise collected while doing this research in the following phases, management structure in the construction sector has been outlined. The proposed structure (CDIA) consists mainly of four phases that support building construction. Industries get started and pass step by step toward the culture of TQM.

C-Conceive (Realizing the need for TQM).

D-Design (Flowchart the Process, Identifying Problems and Critical Success Factors).

I-Implementation (Forming TQM Steering Committee, Applying Tools and Technologies).

A - Assessment (Performance Measurement, Rewarding System).

5.1.8 The owner's lack of awareness of the importance of quality

Implementation and imposition of his unexamined opinions on the exaggerated involvement by the owner with project details is counterproductive to productivity, thus drawing an image of excellent results before the work starts the owner needs to mitigate project costs this adds to the weakness of the supervisor engineer.

In this respect, it is necessary to plan the finances of the project before any change is made and, because of the negative consequences of the work, it should be at the height of the owners' aims. The building method and productivity are used in many fields. On the contrary, it is very important to spread quality knowledge in all work, particularly for all general societal representatives, beginning with families and offices and developing it into a culture.

5.1.9 Lack in using computing and computer software to effectively manage projects

In order to achieve success in the implementation of TQM, individuals need to undergo sufficient training and be quite well knowledgeable in the principles and technologies relevant to TQM (means) and the successful use of the same technology

in order to achieve and sustain total quality (the objective). This use of technology has become a must for organizations to be able to fulfill their education needs.

It is also recognized that in a technical setting it is possible to shape persons with aspirations for change and development if it is understood that TQM does not mean dismissing employment and reducing organizations but, instead, it can generate new jobs that will require more information and training.

This is accomplished through preparation, which involves not only intra investment in the development of people but also a macro-level investment in the production of people infrastructure for training computer.

Notwithstanding the extent of dedication to training-learning, the need for staff training increased considerably over the years.

The rapid growth of technology, entrepreneurship, and globalization in particular. Using computers aims primarily at increasing performance and thereby minimizing running costs. education Complementing and improving training efforts, learning is the connection that makes all practices productive and successful.

5.1.10 Absence in rewards and appreciation in the achievements of employees

In a changing economic world, strategic decisions must be taken in able to obtain more employees working.

In several respects, excellent performers can be recruited and maintained as well as employee efficiency increases, from jobs to greater versatility. Employee awards and appreciation systems are becoming increasingly common because they encourage workers to improve their job and regular actions in order to benefit the organization.

Special compensation and praise to employers and employees by top management at businesses are important to prevent such an issue. In addition, contractors must conduct the necessary work in compliance with terms and requirements, and it is recommended to pay them incentives and gratitude if they do this carefully in time.

5.2 The Benefits of TQM Implementation

This section discusses the advantages of TQM in Iraqi construction. The survey found that five advantages were considered to be the most critical advantages of implementing the TQM. Hence, the research findings in this section. In view of the analysis of the literature, the advantages of TQM associated with the application of the TQM are discussed in detail. The advantages to TQM are:

5.2.1 Reduce defects of work process

Various defects or errors can be caused by staff, in most industries technology Environmental and resource approaches (Oakland, 2014). The findings of the main data analysis of the questionnaire have shown that the TQM company has improved its practices to reduce and eliminate waste and defects, particularly in the area of work, which result from its operations. The findings of the previous studies in the literature reviews are validated by these results.

Furthermore, the participants' views were consistent with key data from replying to the survey. In addition, the mean of these was (4.22).

The Likert degree (see Chapter 4, Table 4.1) is interpreted to give the participants a clear consensus on these declarations. Key data finding and answering the questionnaire was decided by (Burrill ,1998) that ways of quality enhancement related to the TQM waste should be held to a minimum as a way to add value. TQM focuses on the identification and successful intervention and measures to rectify the source of the dish, which does not add value to the player.

The work was centered on the implementation, work processes and possible improvements and the use of an effective TQM is also noted. Further attention was paid to the removal of errors, fault lines and problems. This is why it can be focused on the subject that disposal of waste and defects is one of the main benefits of implementing TQM.

5.2.2 Increase service quality

Customer satisfaction and services focused on consumers have been seen as the highest priority in several surveys.

The long-term success of the business depends on how well it consistently and daily concentrated on its customers. TQM implementation improved the purpose of meeting service quality through primary results in this segment and is a significant measure of business performance and an indicator of company success or failure. The results of questionnaire data supported this view analysis. It was seen that the respondents agreed with each assertion on the enhancement of the enhanced service business. In addition, the mean value for these statutes was 4.2. The TQM was built to allow both parties to recognize and deal with quality problems in the ultimate advantage of TQM. This is illustrated by the results of this report (Karthi,2004).

Concluded that each of the key objectives of implementation for TQM was to improve customer satisfaction, this argument is consistent with the results of the current study's respondents. Customers are the main target of every business and play an important role in TQM performance (Brah et al., 2002).

5.2.3 Organization performance (Enhance company reputation)

The analysis of the data revealed a strong association between leadership, strategic planning, and quality management processes and organizational success. Additionally, it was positively linked to customer attention and employee relations, but negatively related to supplier quality control.

The findings obtained are consistent with previous research in the literature review, which indicate that there is a strong correlation between an organization's organizational success and its Total Quality Management practices.

5.2.4 Using a new technology and modern machines

The technology plays a critical role in implementing TQM in an organization and has an impact on all ten TQM dimensions listed in this paper. The relationship between technology and TQM is actually mainly a

constructive one, as technology can facilitate the implementation of several TQM facets. However, the potential consequences, such as decreased job satisfaction, worker deskilling, and process inflexibility, should be considered and prepared for.

5.2.5 Increase company performance

These results agree with (Tari Molina,2007), Samson and (Terziovski ,1999) and (Eboch,2009). Additionally, this research confirms the findings of Easton and Jarrel (1998) that TQM activities benefit companies. This finding confirms (Hendricks,1996) contention that quality-award-winning firms perform better than non-TQM firms. Both studies imply that TQM activities are positively associated with a company's ability to achieve its objectives.

5.2.6 Increase the marketing of the company in the work market

The aim of this section is to ascertain opinions on the reasons behind the implementation of quality management systems by the construction organization.

The results of the survey show that out of 18 possible benefits (Enhance company reputation, using new technologies and modern machines, increase company performance, Increase the marketing of the company in the work market).

Increase the efficiency of the business, increase the promotion of the business in the job market scores with main value (4.18), (4.18), (4.15), and (4.08) respectively. Although these results show that construction organizations are highly conscious of the opportunity TQM has the advantages that TQM implementation offers in the construction industry. It has not been widely and effectively applied in Iraq's construction industry.

6. CONCLUSION AND RECOMMENDATION

6.1 Conclusions

The main TQM concepts, structures, and models were discussed in the detailed literature review of the TQM definition in chapter two.

The philosophy was also discussed in the building industry in Iraq and There are critical challenges. For the success of TQM, the popular one was created. Price, efficiency and length of projects, however, are the three parameters that have taken into account the ongoing problems of construction companies in Iraq. The advantages and obstacles of TQM were addressed in chapter three. The approach used in the analysis was discussed in chapter four. The study of questionnaires was discussed in chapter five. The findings and suggestions for this study were discussed in chapter six.

The results of this research showed the importance of TQM execution. It seems that TQM is a term that is difficult to summarize in a short time of description TQM is a constant method of progressive changes. It gives a strategic advantage to the company. Any company that lacks TQM is doing a disservice to itself. Several points can be inferred based on the analysis:

1. The challenges that Iraq faces and its war against terrorism have a direct impact on the stability of the construction sector and the inability to implement projects on time with the required quality.
2. The low standard of recently initiated construction projects in Iraq is not generally a case in point. This reasons for not implementing the complete quality principles are due to a simple degree of Failure to follow project management scientific methods in the processes executing engineering programs and, in the organizations, benefiting from these projects.

3. The contracting parties are unaware of such abig building's terminology. Thus, the importance of sensitizing the Training courses must be relevant terminologies and Publications.
4. Most of the current construction projects in Iraq are granted to entrepreneurs whose prices are the lowest. The financial state is the cornerstone of quality, nobody works for quality at the cost of losing his money.
5. Leadership and engagement in quality management of building companies in Iraq should be improved.
6. Training is an important component of TQM. Most workers in Iraqi construction firms have lacked sufficient preparation, no courses and no quality management trainings to explain the need for full engagement in training programs.
7. The importance of applying the principles of total quality in organizations engaged in project management engineering, in particular one depending on the excellence of the programs, these structures will benefit more from the use of total quality, Engineering with its considerable success in terms of the size of its usage and its age, extending of years.
8. The commitment of some Iraqi organizations employed in the field of engineering projects (in particular governmental ones) to the implementation of international quality standards in compliance with the criteria provided by the International Organization for Standardization (ISO) is considered to be a progressive step in the ISO 9000 series, leading the basis for the implementation of quality principles.
9. The implementation of the Total Quality Principles in the execution of engineering projects would make a major contribution to enhancing the quality of the execution of such projects by monitoring all the organizational and supporting activities of the engineering project, the scope, cost and time of the project can thus be effectively handled.

10. The approach to total quality in the organizations involved in the execution of engineering projects leads to the achievement for comparative precedence by improving all project management process categories and quality management and benchmarking with the most efficient organizations for these processes, in addition to offering a job environment that enables employees to work.
11. Total Quality Management is a philosophic paradigm with an integrated management approach to employees working on the implementation of engineering projects by making quality a strategic objective, while focusing on engineering project employees by inspiring and enabling them to perform more effectively.
12. The comprehensive and integrated quality strategy in the organizations involved in engineering projects helps to achieve Competitive precedent by improving all project management teams and developing them constantly, in addition to having a job environment that supports staff for these processes and trying to compare by the most productive organizations Initiatives to present.

6.2 Recommendations

1. The comprehensive quality approach in the organizations concerned with the implementation of engineering projects contributes to achieving competitive precedence by adjusting all project management process groups, and continuous improvement For these processes, and benchmarking with the most efficient organizations, in addition to providing a work environment that encourages workers to present their initiatives.
2. The necessity for the higher management of the organizations working in the implementation of engineering projects to take all measures
3. The necessary and practical practices necessary to spread and spread the culture of total quality in various administrative levels through the adoption and implementation of ambitious training plans that include

requirements for the effective implementation of the principles of total quality.

4. All organizations working in the field of implementing engineering projects in Iraq are required to obtain a certificate International quality during a specific period (a year, for example) and this is one of the requirements for applying for an Engineering projects implementation contract.
5. Require organizations working in the field of implementing engineering projects to use advanced special software Managing projects such as (MS Project) and Primavera, starting with your presentations for obtaining purposes On implementation contracts, as this software provides high accuracy in analyzing data related to project operations Engineering and thus serve as a solid base for quality execution.
6. Conducting research and studies related to the impact of adherence to each of the principles of total quality on the quality of implementation Engineering projects, in particular the motivation principle and the leadership commitment principle, as they have a direct impact on performance Staff and preparing them to contribute effectively to controlling and improving the implementation of the engineering project activities.
7. Establish and have a commission to ensure the quality of engineering project implementation Offices in all governorates tasked with following up the implementation of all engineering projects in Iraq.

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APPENDICES

Questionnaire

The main objective of the questionnaire is to determine whether the implementation of TQM is essential, to study and understand the barriers to implementing TQM to demonstrate high quality in the construction industry in Iraq.

Thank you for your participation.

Eng.Rasha A.Kadhim

الهدف الرئيسي من الاستبيان هو تحديد ما إذا كان تنفيذ إدارة الجودة الشاملة أمرًا أساسيًا ، ودراسة وفهم العوائق التي تحول دون تنفيذ الجودة الشاملة لإثبات الجودة العالية في صناعة البناء في العراق .

شكرا لك على مشاركتك
المهندسة رشا عبد الكاظم

Section (A): Personal Data

Engineering Specialization:

التخصص الهندسي

Electrical

Mechanical

civil

Others.

• Experience Years:

0-5 years

5-10 years

10-15 years

more than 15

years.

Appendice (A)

The Benefit of Implementing TQM in Construction Organizations

What of the following describe the results of the best implementation of TQM?

Please Mark the Appropriate Answer by (√), Where;

1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. strongly agree

No.	Item	1	2	3	4	5
1	Commitment by senior management and employees					
2	The satisfaction of customers' requirements					
3	improve customer relations					
4	Reduce defects of the work process					
5	Motivate employees on the production					
6	Improve working climate					
7	Increase service quality					
8	Increase the marketing of the company in the work market					
9	Increase company performance					
10	Improve employee's satisfaction					
11	Reduce customers complaints					
12	Enhance company reputation					
13	Expand company activities globally					
14	Reducing construction costs					
15	Using new technology and modern machines					
16	Create strong relationships with suppliers					
17	Improve buyer/seller planning					
18	Improve supplier's satisfaction, quality, and retention					

Appendice (B)

Barriers affect in Quality Management (QM) Implementation in Construction Companies in Iraq

What are the problems affecting Quality Management (QM) implementation in construction industry in Iraq?

1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. strongly agree

No.	Item	1	2	3	4	5
1	the difficulty in changing behaviors and attitudes related to quality					
2	Lack of top management commitment to the understanding of quality issues					
3	The employee's lack of understanding and resistance to quality programs					
4	lack of a clear strategy for quality management in the company					
5	Lack of communication between project parties (contractor and consultant).					
6	Firms focus on short-term gains					
7	Lack of education and training to drive and improve the TQM in the construction process					
8	A lot of documents are required, which makes documentation difficult					
9	Lack of expertise and resources in the quality management system.					
10	Loos of part of the productivity of works as a result of the effort in training					
11	Lack of specifications and lack of clarity					
12	Instability of the volume of work and the instability of the national economy					
13	Insufficient attention to achieve quality by works in projects.					
14	Absence of rewards and appreciation of the achievements of employees and workers					
15	Awarded the tender based on lower prices and not efficiency					
16	The owner's lack of awareness of the importance of quality implementation in the project and imposing his unexamined views					
17	Lack in using computing and computer software to effectively manage projects					
18	political status for the Iraq country					

Appendice (C)

Analyses of questioners by SPSS program

Frequency Table

Engineering Specialization					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Civil	83	54.6	54.6	54.6
	Architectural	14	9.2	9.2	63.8
	Electrical	26	17.1	17.1	80.9
	Mechanical	16	10.5	10.5	91.4
	Other	13	8.6	8.6	100.0
	Total	152	100.0	100.0	

Experience Years					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-5 years	16	10.5	10.5	10.5
	5-10 years	21	13.8	13.8	24.3
	10-15 years	37	24.3	24.3	48.7
	more than 15 years	78	51.3	51.3	100.0
	Total	152	100.0	100.0	

Statistics						
		Commitment by senior management and employees	Satisfaction of customers' requirements	Improve customer relations	Reduce defects of work process	Motivate employees on production
N	Valid	152	152	152	152	152
	Missing	0	0	0	0	0
Sum		608	614	605	642	616

```
FREQUENCIES VARIABLES=BE1 BE2 BE3 BE4 BE5 BE6 BE7 BE8 BE9
BE10 BE11 BE12 BE13 BE14 BE15 BE16 BE17 BE18 /STATISTICS=SUM
/ORDER=ANALYSIS.
```

Frequencies

Notes

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	Cases Used	Statistics are based on all cases with valid data.
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	Elapsed Time	00:00:00.01

Statistics

		Improve working climate	Increase service quality	Increase the marketing of the company in the work market	Increase company performance	Improve employees satisfaction
N	Valid	152	152	152	152	152
	Missing	0	0	0	0	0
Sum		597	639	620	631	585

Statistics

		Reduce customers complaints	Enhance company reputation	Expand company activities globally	Reducing construction costs	Using a new technology and modern machines
N	Valid	152	152	152	152	152
	Missing	0	0	0	0	0
Sum		620	635	590	583	635

Statistics

		Create strong relation with suppliers	Improve buyer/seller advance planning	Improve supplier satisfaction, quality and retention
N	Valid	152	152	152
	Missing	0	0	0
Sum		607	594	612

Frequency Table

Commitment by senior management and employees

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Extremely disagree	3	2.0	2.0	2.0
	Disagree	5	3.3	3.3	5.3
	Neutral	28	18.4	18.4	23.7
	Agree	69	45.4	45.4	69.1
	Extremely agree	47	30.9	30.9	100.0
Total		152	100.0	100.0	

Satisfaction of customers' requirements

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	8	5.3	5.3	5.3
	Neutral	26	17.1	17.1	22.4
	Agree	70	46.1	46.1	68.4
	Extremely agree	48	31.6	31.6	100.0
Total		152	100.0	100.0	

Improve customer relations

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Extremely disagree	1	.7	.7	.7
	Disagree	5	3.3	3.3	3.9
	Neutral	27	17.8	17.8	21.7
	Agree	82	53.9	53.9	75.7
	Extremely agree	37	24.3	24.3	100.0
Total		152	100.0	100.0	

Reduce defects of work process

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Extremely disagree	1	.7	.7	.7
Disagree	7	4.6	4.6	5.3
Neutral	16	10.5	10.5	15.8
Agree	61	40.1	40.1	55.9
Extremely agree	67	44.1	44.1	100.0
Total	152	100.0	100.0	

Motivate employees on production

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Extremely disagree	4	2.6	2.6	2.6
Disagree	3	2.0	2.0	4.6
Neutral	28	18.4	18.4	23.0
Agree	63	41.4	41.4	64.5
Extremely agree	54	35.5	35.5	100.0
Total	152	100.0	100.0	

Improve working climate

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Extremely disagree	5	3.3	3.3	3.3
Disagree	5	3.3	3.3	6.6
Neutral	30	19.7	19.7	26.3
Agree	68	44.7	44.7	71.1
Extremely agree	44	28.9	28.9	100.0
Total	152	100.0	100.0	

Increase service quality

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Extremely disagree	3	2.0	2.0	2.0
Disagree	2	1.3	1.3	3.3
Neutral	15	9.9	9.9	13.2
Agree	73	48.0	48.0	61.2
Extremely agree	59	38.8	38.8	100.0
Total	152	100.0	100.0	

Increase the marketing of the company in the work market

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Disagree	5	3.3	3.3	3.3
Neutral	24	15.8	15.8	19.1
Agree	77	50.7	50.7	69.7
Extremely agree	46	30.3	30.3	100.0
Total	152	100.0	100.0	

Increase company performance

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Neutral	27	17.8	17.8	17.8
Agree	75	49.3	49.3	67.1
Extremely agree	50	32.9	32.9	100.0
Total	152	100.0	100.0	

Improve employees satisfaction

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Extremely disagree	5	3.3	3.3	3.3
Disagree	6	3.9	3.9	7.2
Neutral	40	26.3	26.3	33.6
Agree	57	37.5	37.5	71.1
Extremely agree	44	28.9	28.9	100.0
Total	152	100.0	100.0	

Reduce customers complaints

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Extremely disagree	3	2.0	2.0	2.0
Disagree	1	.7	.7	2.6
Neutral	23	15.1	15.1	17.8
Agree	79	52.0	52.0	69.7
Extremely agree	46	30.3	30.3	100.0
Total	152	100.0	100.0	

Enhance company reputation

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Extremely disagree	3	2.0	2.0	2.0
Disagree	2	1.3	1.3	3.3
Neutral	18	11.8	11.8	15.1
Agree	71	46.7	46.7	61.8
Extremely agree	58	38.2	38.2	100.0
Total	152	100.0	100.0	

Expand company activities globally

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Extremely disagree	6	3.9	3.9	3.9
Disagree	14	9.2	9.2	13.2
Neutral	18	11.8	11.8	25.0
Agree	68	44.7	44.7	69.7
Extremely agree	46	30.3	30.3	100.0
Total	152	100.0	100.0	

Reducing construction costs

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Extremely disagree	4	2.6	2.6	2.6
Disagree	8	5.3	5.3	7.9
Neutral	36	23.7	23.7	31.6
Agree	65	42.8	42.8	74.3
Extremely agree	39	25.7	25.7	100.0
Total	152	100.0	100.0	

Using a new technology and modern machines

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Extremely disagree	3	2.0	2.0	2.0
Disagree	2	1.3	1.3	3.3
Neutral	19	12.5	12.5	15.8
Agree	69	45.4	45.4	61.2
Extremely agree	59	38.8	38.8	100.0
Total	152	100.0	100.0	

Create strong relation with suppliers

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Extremely disagree	3	2.0	2.0	2.0
Disagree	2	1.3	1.3	3.3
Neutral	29	19.1	19.1	22.4
Agree	77	50.7	50.7	73.0
Extremely agree	41	27.0	27.0	100.0
Total	152	100.0	100.0	

Improve buyer/seller advance planning

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Extremely disagree	6	3.9	3.9	3.9
Disagree	3	2.0	2.0	5.9
Neutral	28	18.4	18.4	24.3
Agree	77	50.7	50.7	75.0
Extremely agree	38	25.0	25.0	100.0
Total	152	100.0	100.0	

Improve supplier satisfaction, quality and retention

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Extremely disagree	3	2.0	2.0	2.0
Disagree	2	1.3	1.3	3.3
Neutral	17	11.2	11.2	14.5
Agree	96	63.2	63.2	77.6
Extremely agree	34	22.4	22.4	100.0
Total	152	100.0	100.0	

FREQUENCIES VARIABLES=PR1 PR2 PR3 PR4 PR5 PR6 PR7 PR8 PR9 PR10 PR11
PR12 PR13 PR14 PR15 PR16 PR17 PR18 /STATISTICS=SUM /ORDER=ANALYSIS.

Frequencies

Notes

Output Created	16-JAN-2021 18:48:20		
Comments			
Input	Data	C:\Users\Toshiba\Desktop\Rasha\Rasha	
		2.sav	
	Active Dataset	DataSet1	
	Filter	<none>	
	Weight	<none>	
	Split File	<none>	
	N of Rows in		152
	Working Data File		
Missing Value Definition of	Missing	User-defined missing values are treated as missing.	
Handling	Cases Used	Statistics are based on all cases with valid data.	
Syntax	FREQUENCIES VARIABLES=PR1 PR2 PR3 PR4 PR5 PR6 PR7 PR8 PR9 PR10 PR11 PR12 PR13 PR14 PR15 PR16 PR17 PR18 /STATISTICS=SUM /ORDER=ANALYSIS.		
Resources	Processor Time		00:00:00.02
	Elapsed Time		00:00:00.01

Statistics

		PR1	PR2	PR3	PR4	PR5	PR6	PR7
N	Valid	152	152	152	152	152	152	152
	Missing	0	0	0	0	0	0	0
Sum		595	603	601	618	603	623	640

Statistics

		PR8	PR9	PR10	PR11	PR12	PR13	PR14
N	Valid	152	152	152	152	152	152	152
	Missing	0	0	0	0	0	0	0
Sum		574	616	513	558	605	628	608

Statistics

		PR15	PR16	PR17	PR18
N	Valid	152	152	152	152
	Missing	0	0	0	0
Sum		623	614	609	652

PR1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	11	7.2	7.2	7.2
	Neutral	30	19.7	19.7	27.0
	Agree	72	47.4	47.4	74.3
	Extremely agree	39	25.7	25.7	100.0
	Total	152	100.0	100.0	

PR2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	13	8.6	8.6	8.6
	Neutral	27	17.8	17.8	26.3
	Agree	64	42.1	42.1	68.4
	Extremely agree	48	31.6	31.6	100.0
	Total	152	100.0	100.0	

PR3

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Disagree	9	5.9	5.9	5.9
Neutral	28	18.4	18.4	24.3
Agree	76	50.0	50.0	74.3
Extremely agree	39	25.7	25.7	100.0
Total	152	100.0	100.0	

PR4

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Disagree	8	5.3	5.3	5.3
Neutral	25	16.4	16.4	21.7
Agree	68	44.7	44.7	66.4
Extremely agree	51	33.6	33.6	100.0
Total	152	100.0	100.0	

PR5

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Disagree	7	4.6	4.6	4.6
Neutral	27	17.8	17.8	22.4
Agree	82	53.9	53.9	76.3
Extremely agree	36	23.7	23.7	100.0
Total	152	100.0	100.0	

PR6

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Extremely disagree	3	2.0	2.0	2.0
Disagree	7	4.6	4.6	6.6
Neutral	18	11.8	11.8	18.4
Agree	68	44.7	44.7	63.2
Extremely agree	56	36.8	36.8	100.0
Total	152	100.0	100.0	

PR7

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Disagree	6	3.9	3.9	3.9
Neutral	14	9.2	9.2	13.2
Agree	74	48.7	48.7	61.8
Extremely agree	58	38.2	38.2	100.0
Total	152	100.0	100.0	

PR8

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Disagree	11	7.2	7.2	7.2
Neutral	39	25.7	25.7	32.9
Agree	75	49.3	49.3	82.2
Extremely agree	27	17.8	17.8	100.0
Total	152	100.0	100.0	

PR9

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Disagree	7	4.6	4.6	4.6
Neutral	23	15.1	15.1	19.7
Agree	77	50.7	50.7	70.4
Extremely agree	45	29.6	29.6	100.0
Total	152	100.0	100.0	

PR10

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Extremely disagree	1	.7	.7	.7
Disagree	31	20.4	20.4	21.1
Neutral	50	32.9	32.9	53.9
Agree	50	32.9	32.9	86.8
Extremely agree	20	13.2	13.2	100.0
Total	152	100.0	100.0	

PR11

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Extremely disagree	4	2.6	2.6	2.6
Disagree	11	7.2	7.2	9.9
Neutral	39	25.7	25.7	35.5
Agree	75	49.3	49.3	84.9
Extremely agree	23	15.1	15.1	100.0
Total	152	100.0	100.0	

PR12

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Disagree	12	7.9	7.9	7.9
Neutral	18	11.8	11.8	19.7
Agree	83	54.6	54.6	74.3
Extremely agree	39	25.7	25.7	100.0
Total	152	100.0	100.0	

PR13

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Disagree	6	3.9	3.9	3.9
Neutral	17	11.2	11.2	15.1
Agree	80	52.6	52.6	67.8
Extremely agree	49	32.2	32.2	100.0
Total	152	100.0	100.0	

PR14

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Disagree	9	5.9	5.9	5.9
Neutral	25	16.4	16.4	22.4
Agree	75	49.3	49.3	71.7
Extremely agree	43	28.3	28.3	100.0
Total	152	100.0	100.0	

PR15

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Extremely disagree	2	1.3	1.3	1.3
Disagree	16	10.5	10.5	11.8
Neutral	12	7.9	7.9	19.7
Agree	57	37.5	37.5	57.2
Extremely agree	65	42.8	42.8	100.0
Total	152	100.0	100.0	

PR16

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Extremely disagree	2	1.3	1.3	1.3
Disagree	12	7.9	7.9	9.2
Neutral	14	9.2	9.2	18.4
Agree	74	48.7	48.7	67.1
Extremely agree	50	32.9	32.9	100.0
Total	152	100.0	100.0	

PR17

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Extremely disagree	1	.7	.7	.7
Disagree	12	7.9	7.9	8.6
Neutral	14	9.2	9.2	17.8
Agree	83	54.6	54.6	72.4
Extremely agree	42	27.6	27.6	100.0
Total	152	100.0	100.0	

PR18

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Extremely disagree	1	.7	.7	.7
Disagree	6	3.9	3.9	4.6
Neutral	16	10.5	10.5	15.1
Agree	54	35.5	35.5	50.7
Extremely agree	75	49.3	49.3	100.0
Total	152	100.0	100.0	



RESUME

Summary

I have more than 15 years professional experience in Teaching field, infrastructure engineering, designing, industrial structures, project management, able to using Auto CAD, and general software such as MS office.

Skill Highlights

- Lecture
- Decision maker
- Engineering solution
- Trainer
- Project management
- Designer

Experience

Lecture - 09/2009 to 05/2019

Iraq, Basra-Technical Institute

- Mathematic Course for the first and second stages.
- Computer application for the first and second stages.
- GPS application and science of navigation.
- Quality controlling and Quality Assurance.

Quality Manger - 12/2003 to 08/2009

Iraq, Basra- National Center for Construction Labs.

- Evaluation of construction materials.
- Conducting studies and research related to construction materials.
- Training students of colleges and institutes on construction tests.
- Conducting laboratory and field building tests, soil investigations and investigations, road checks, and building and construction assessments.

Education

Bachelor of Science: **Civil Engineering - 2002**

College of Engineering /Basra University

Certifications

- Certificate on QC/QA.
- Certificate on H&S Awareness
- Certificate on Auto CAD program
- Certificate offices application