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# QUALITY MANAGEMENT SYSTEM IN CONSTRUCTION COMPANYS

**THESIS**


**Mohammed Resan Kareem**

**ID :**

**Engineering Management**
**Program**

**Advisor: Prof. Dr. Gozde Ulutagay**


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**TABLE OF CONTENTS**

**ABBREVIATIONS**

| | |
|---|---|
| **ISO** | **International organizations for Standardization** |
| **CHF** | **Cooperative Housing Foundation** |
| **CPM** | **Construction Project Management** |
| **PM** | **Project Management** |
| **PMI** | **Project Management Institutional** |
| **PMPOK** | **Project Management Body of knowledge** |
| **QMS** | **Quality Management System** |
| **TQM** | **Total Quality management** |

## LIST OF TABLES

## LIST OF FIGURES

## ABSTRACT

Now that the construction sector is poised to become a key driver of national economic growth, it's imperative that it maintain and improve its quality while simultaneously competing on the global stage. To remain competitive in the global building business, ISO 9001-based quality management systems (QMSs) are critical. Quality in construction is widely regarded as a key challenge. However, having an ISO 9001 certification does not always mean that the company has a well-run Quality Management System (QMS) that is capable of meeting the needs of customers and project end-users.

There is a strong association between the culture of a firm and the quality performance of its contractors, according to the literature analysis. Despite the large number of scholars that have worked on this project, there is still a paucity of data directly relevant to the Iraq scenario. This is the first time Quinn's Organizational Culture Assessment Instrument (OCAI) has been used in conjunction with the contractor's ISO 9001 processes. It was therefore decided to conduct a study on the culture profiles of Iraqi construction organizations, as well since the existing adoption of ISO 9001 and their effectiveness in adopting QMSs, as information in these areas has had a substantial impact on the poor effectiveness and low profitability of Iraq's building companies.

In order to assess the success of their QMS implementation, where the aim target of the research into indicating how important the referred system is, to investigate if engineers working in buildings construction fields are aware of the essential ingredients of achieving QMS in Iraq, and to indicate what is the challenges to achieving QMS implementation. Surveyed firms' QMS implementations were also examined to see whether there were any current issues with the systems. OCAI-based questions were included in the questionnaire to assess Iraqi construction businesses' organizational culture characteristics.

Actually, based on this clarification and the outcomes of the previous data gathering, developed to support Iraqi construction organizations in enhancing their capacity to achieve construction projects, thereby contributing to or enhancing their competitive benefit on the regional, governmental, and international sector.

After that, a questionnaire of (103) participation of the Iraqi engineers was undertaken. The findings of the research reveal (12) The focus of discussion on the benefits of achieving this system in buildings companies and their opinion regarding the importance of these ingredients to achieving the concept and ensuring the implementation of QMS in Iraq as the first part, and then their opinion what is a real challenge to achieving QMS in Iraq as the second part.

**Keywords**: *Project Management, Quality Management System, Construction project.*

# 1. INTRODUCTION

## 1.1 Over View

High-quality products and services are increasingly sought after by clients in today's environment. As a result, firms must constantly strive to meet or surpass their customers' expectations. Retaining current customers is another big difficulty that firms all over the world confront while offering high-quality products and services. Customers expect high-quality products and services, and a system that ensures this is needed to meet these expectations.

Several sectors throughout the globe have developed various techniques to assure greater customer satisfaction and to get a competitive edge in the marketplace. However, despite this, construction in Iraq commercial and residential sectors continues to increase swiftly in order to satisfy the country's expanding population and to stay pace with worldwide progress. As a result of Iraqis success, it's critical to thoroughly research and plan out every aspect of the project.in order to get the finest outcomes and to assist in advancing in the correct direction how to go about setting up the long-term objectives.

Benjamin Franklin said “The difference between failure and success is the difference between doing something almost right and doing something \right”. It is through this understanding that the optimum approach to apply project management in construction projects will be discovered, as well as an entirely new era in which the construction sector will derive great benefit.

As a result of these circumstances, the researcher decided to investigate how Iraqi construction firms handle their projects and what the primary aspects and challenges are that impact the industry of construction, that adapts to the changing needs of the building sector and the rising concerns of other emerging countries to assist managers in planning and implementing construction projects in the most efficient and effective way possible, so that they may achieve success with high quality and minimize risks.

## 1.2 Research Questions

The Iraqi modern needs a new construction management framework backed by proper legislation, control and pricing systems with efficient designs that are suited for the current

scenario material that can assist project managers in leading their projects in a highly competitive environment and make a difference environment.

To use it, the following questions must be addressed:

- In Iraq, how do projects get managed?
- What are the most typical causes of project failures in Iraq?
- Will there be a projects management program in place in Iraq?

This thesis aims to provide answers to these and other related concerns in order to help the Iraqi construction sector improve its project management capabilities.

### 1.3 Research Purpose and Targets

This thesis's major goal is to provide an in-depth examination of the subject. Assist project managers progress their organizations to success and achieve an impact in a strongly competitive world by establishing a usable framework that is knowledge-based.

The following are the study's aims:

- An investigation of the Iraqi construction industry, as well as a definition of management in the sector, and how it contributes to the entire economic and social life.
- In order to reinforce the existing demands and identify the present difficulties and constraints in Iraqi building projects.
- In order to make use of the findings of this research in order to help the public and commercial sectors better their work and prevent issues.

### 1.4 Methodology

In order to address the research objectives, this thesis began by studying the project management system and identifying the current challenges in the construction sector.

- a comprehensive examination of the literature, including books, papers, websites, and electronic journals, was conducted in order to develop and assess competence models.
- Design inquiries that will aid the researcher in his or her comprehension of the project management process in the building industry.
- Perform a preliminary research with proposed field pioneers and solicit their comments on the topics and their perspective.

- After conducting a pilot research to gather data, make any required adjustments to the questions.
- Thematically analyze the data gathered.
- Develop a conclusion and a set of proposals.

### 1.5 Summary of Chapters

There are six major sections to this dissertation, as follows:

- Chapter One: Introduction

The purpose of this chapter was to provide an outline of the study's primary goals, difficulties, and objectives.

- Chapter Two: Literature review

Basic understanding of construction project management is the focus of this chapter's overview management philosophy and principles.

- Chapter Three: Quality Management Systems in Construction.

This section explains the challenge and implemented Quality Management System (QMS).

- Chapter Four: Methodology.

This chapter explains the research methods employed in order to meet the goals of the study.

- Chapter five: Results and analysis

For the purpose of gathering information and providing context for the current situation, a survey of engineering-related businesses was performed. this chapter's discussion and analysis.

- Chapter six: Conclusion and Recommendation

Here, in this chapter detailed the challenges of project management and the roles of each stakeholder. For sustainability, a set of conclusions and suggestions were made industry of the building.

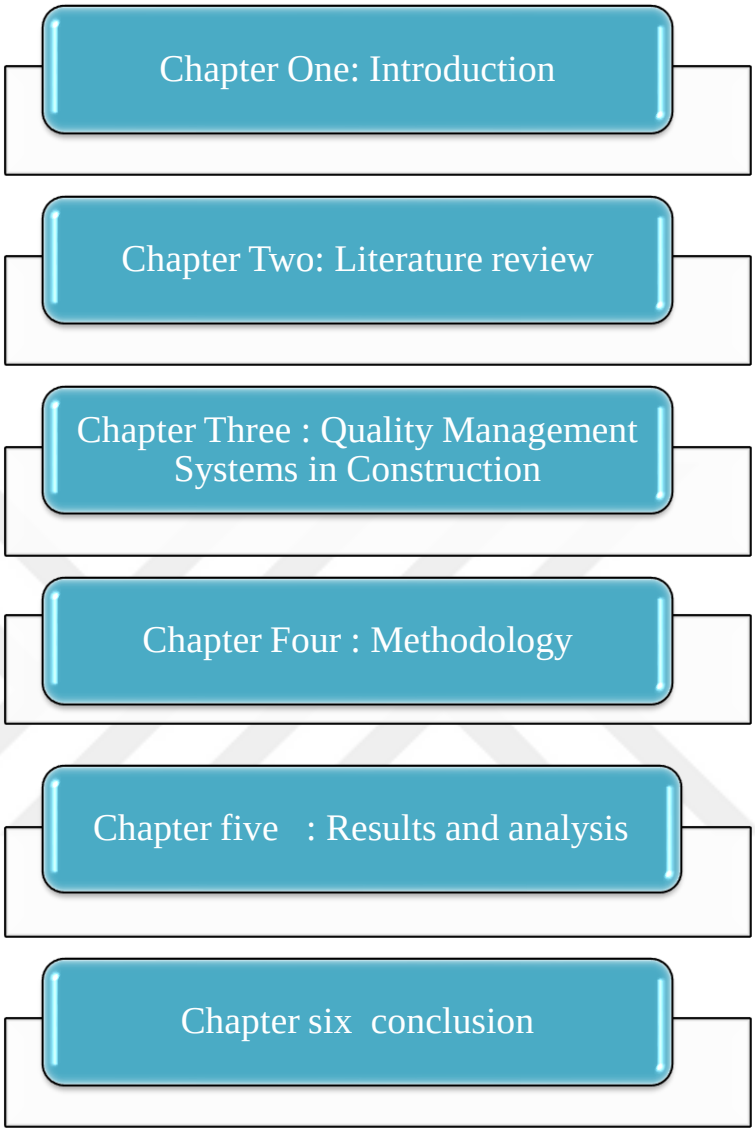


**Figure 1.1:** Framework for Research Stage

Source: Author

## 2. LITERERATURE REVIEW

### 2.1 Over View

Construction is really a critical part of the economy in any country. The construction business must be dynamic in order to adapt to the ongoing changes that occur in the globe, as well as to the social, economic, and technical difficulties that influence all industries. Construction prospects and challenges are vastly different than they were a century ago.

The expectations of clients, businesses, and employees vary over time, and as a result, the construction industry's vision is always evolving; management must adapt as well. This thesis will satisfy the growing demand for project management skills development in Iraq, which will aid in the formulation of future objectives.

The principle of quality management systems is presented, followed by a discussion of successful QMS techniques and the obstacles associated with their implementation in the worldwide construction sector. The article provides an overview of current Iraq construction company practices regarding their quality management systems. The chapter discusses how government rules affect the adoption of quality management systems (QMSs), the motivations for establishing QMSs in Iraqi construction enterprises, and the existing impediments to efficient QMS application.

The discussion of the relevance of organizational society in construction businesses is also included, as is a discussion of the use of (Cameron and Quinn's ,2006) organizational culture model for constructing intrinsic culture typologies of organizations. Additionally, the review discusses changes in society and research results organization relationships between organizational culture and efficient management systems.

It also discusses construction performance is the result of an effective organizational culture and successful quality practices. The shortcomings in QMS research at the Iraqi construction field are recognized as a result of these conversations.

### 2.2 The Quality in Construction

Quality difficulties in the construction sector frequently need the definition and discussion of three basic words. This includes the definition of quality, the importance of quality management systems (QMS), and the definition of total quality management (TQM).

The term "quality" has really no specific or singular meaning, although “ISO DIS 9000:2000” describes it a "the degree to which a collection of inherent qualities fulfills criteria," citing quality experts like "Deming", "Juran", "Feigenbaum", "Taguchi", et al (Tricker,2008).

When all parties engaged in a project, such like consultants, contractors, project customers, or any other connected stakeholders' demands are met, it looks that quality has been accomplished at the construction fields. It is vital for a construction business to comprehend the fundamental ideas of quality before it can successfully adopt a "quality management system" (QMS) as a strategically management instrument.

If you're in the construction industry you'll want to know what Lam, (Low and Teng 1994) describe as "quality management" and "quality system" in the context of construction, respectively.

According to Hoyle (1997), it is impossible to produce desirable quality goods without the usage of a quality system as the management suite in order to satisfy all of the stated quality objectives. Thus, the basis of comprehending "quality in construction" refers to the adoption of a quality management system in order to improve the performance of the construction industry (QMS).

Quality management systems (QMS) are defined by (Thorpe and Sumner, 2004) who state that they are a formal declaration of a company's enterprise policy and management obligations, as well as its procedures and controls, that reflect the more productive and expedient methods to satisfy (or exceed) the goals of those it provides while also attaining its own business targets.

### 2.3 Project & Management

Whenever it comes to managing a project, Kerzner says that "Project management is the planning, arranging, directing, and regulating of firm resources to achieve a very short-term aim." To make use of the systems approach, project managers assign members of the functional hierarchy (the vertical hierarchy) to particular projects (the horizontal hierarchy).

Regrading to figure 2.1 as shown in below, the project management is meant to regulate the essential parts that give useful data for attaining project goals utilizing the company's

resources in a way that is efficient in terms of time, cost, and quality. A fourth key can be helpful. Contact with clients (Kerzner, 2006).

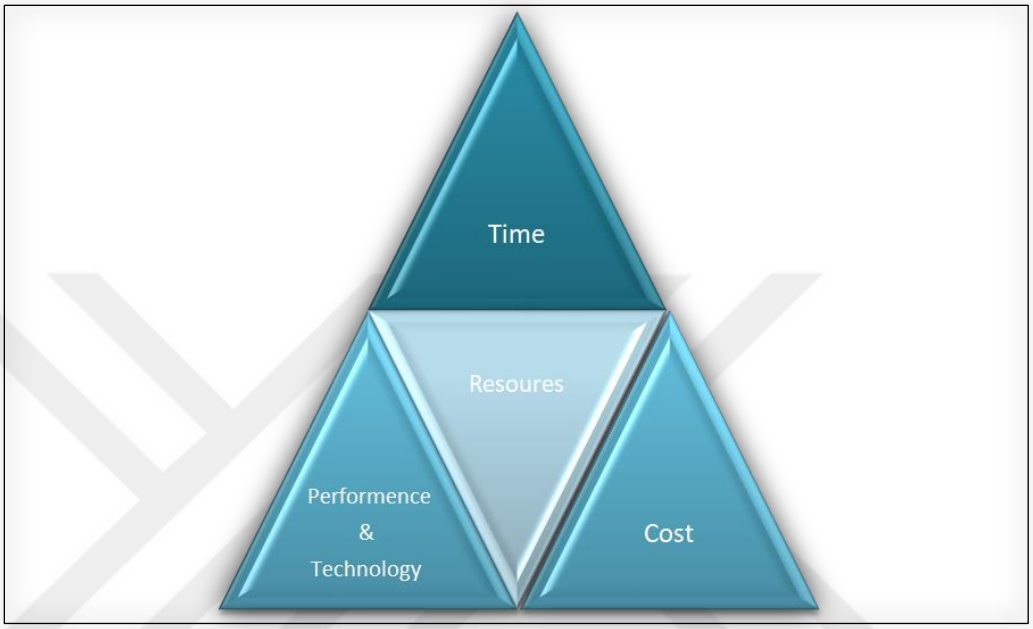


**Figure 2.1**: Over view of project managemt

**Source:** (Johnson ,2002)

## 2.4 Significance of Project Management

Project management is aimed to regulate of most critical variables which give practical information for attaining project purpose in a timely manner. "

According to (Walker,2007) “Project management is the utilization of resources inside the organization to accomplish an objective within the constraints of budget and time. “Good customer relations” is a crucial fourth aspect. In addition to time, money, and performance, Walker emphasized customer relations as a fourth consideration. However, we still need to know what the most crucial factors are for organizations to succeed in this highly competitive market.

But in Iraq there are certain success elements that must be explored; Iraq has distinct qualities that make it different from other areas, and this study will take in consideration on those and

emphasize the failure indications in managing construction projects on West Bank lands in this study (Johnson ,2002).

Keys to project management include duration and money with an acceptable degree of performance, according to (Kerzner, 2006). To simple terms, Project Management Body defines it as "the application of knowledge, skills, tools and methods to project activities such that stakeholder's requirements and expectations from a project are met or exceeded" (PMBOK, 2006).

This is up towards the organization's requirements and ambitions to define what it means. Project management and strategic management are sometimes mistaken since they both require a purpose, vision, and goals. What makes project management distinctive is the fact that it must be done in a short period of time; this necessitates the development of new methods and mechanisms to assure success. goals. When it comes to decision making, the strategic management approach encourages teamwork. using an infinite timetable for brainstorming and planning organization at all levels (Ahuha,1994).

Although the primary goals of construction project management (CPM) are the same as those of project management (cost, time, and performance), the scope of CPM may be expanded to include a broader variety of individuals and the necessity of working with others. customer satisfaction in project management is a crucial factor in project success. success, as well as the company's own aims and aspirations.

## 2.5 The Cycle of a Project

Cycle of a project the basic structure of all project life cycles is the same, despite their many labels. There may be a variety of names for each phase or stage. a project's life cycle is "the series of phases through which the project will develop." (Wideman,2004).

Although some authors believe there are more than four stages in the project life cycle, these are the ones that the majority of projects go through. These are the phases:

1.Initiation phase.

2. Planning phase.

3. Executing phase.

4. Closing phase.

Managing and observing the project is considered to be the fifth stage of this topic by some authors; nevertheless, the researcher feels it is a method that should be implemented throughout the whole project life cycle, not only at the end.

### 2.5.1 Stage of Beginning

During this phase, the consumer or provider expresses their requirements, and the project team is formed using the project chart. This period is referred to as the project's inception, or the beginning of its development. the project description documents and identifying requirements are all often included in this phase, (Wideman**,** 2004).

The group has a series of crucial tasks to complete and prepare for at this stage, including:

- A means of collecting information from the customer, or other interested parties.
- Organizing and conducting research to gather all of the necessary data for the project's different phases.
- Preparation of all necessary documentation, such as feasibility reports, conceptual designs, and flowcharts.
- Assembling and thoroughly analyzing all of the necessary standards, laws, and guidelines in order to accomplish the project (Wideman, 2004).

The project may still be plagued by issues such as these at this beginning period, Frustration over the project's inability to get started on schedule. Funder or shareholder unable to keep their end of an arrangement. This stage is all about putting together the proper team with the right individuals, which is both challenging and vital. A project might be ruined before it even begins if there are opposing viewpoints among the management, stakeholders, subcontractors or clients. Visualizing the project's final aim, which is an extremely vital creative phase, was not clear. The top management should ask and answer questions in order to establish a cohesive team and pave the way for the project's goals to be met (Anzalone,2000).

### 2.5.2 Planning phase

The most difficult and time-consuming part of any endeavor is the planning step. Many issues and misunderstandings may be avoided later on if the project is effectively planned from the start. The following elements are included in this phase:

- Requirement analysis and analysis.
- Examining the project's budget, schedule, and start and end dates, as well as the many tasks that make it up.
- Preparation for and availability of the resources required.
- Using a work breakdown structure, determining the specific sort of work required.

Designers create work breakdown structures (WBS) to assist in precisely organizing the scope of the project, by utilizing a hierarchical framework that allows us to split the project down into smaller chunks at each level. An efficient way to allocate resources, assign duties, and maintain control over the project is through the use of a work breakdown structure.

WBS is utilized in project planning as a result of the reasons aids the project manager in keeping track of the project's progress, risks, expenses, and schedule (Dunham,1989).

Managers and planners should construct a thorough project plan diagram that functions as the overall project's strategic plan. Outline of the project's activities and tasks that must be completed by a given date, while taking into account the resources required, needed and the milestones; it informs the project manager throughout the whole process his progress, or signals that some changes have occurred method.

Moreover, Kerzner (2006) cleared, if the project is substantial, additional resources may be required, multiple plans should be drawn up, describing the resources, finances, quality, and communication strategy, in order to save the project, a risk plan must be in place.

### 2.5.3 Execution phase:

It is also known as the procedure or implementation phase in the third phase. Construction of the project's core is completed in this phase. It's a great deal of work because it's long and has a lot of information. During this stage, a variety of procedures, such as:

#### 2.5.3.1 Time management

A team's ability to complete a task on time is referred to as "time management." Having all of this information handy will allow the manager to keep track of what has been accomplished, how long it took, and when it began and ended.

By comparing the amount of time allocated for a task to the amount of time spent actually carrying it out, time management may also aid in the process (Kerzner, 2006).

#### 2.5.3.2 Quality Management

Such approach is required at this time to verify that the group's production corresponds precisely to what the client or customer agreed upon. It's important to focus on quality throughout the whole project, not just at this phase. At this point, it's critical to confirm that the public's expectations of our work are in line with the original design (PMBOK,2006).

#### 2.5.3.3 Change management

It is important to keep track of all the modifications that need to be made during a project. It's possible to document, examine, approve, and study any changes that come about as a result of sound change management practices. This can assist project managers in keeping track of and controlling the consequences of changes, ensuring that necessary changes are easily implemented and beneficial to the project (PMBOK,2006).

#### 2.5.3.4 Cost management

Cost management is an important aspect of project management. Maintaining a record of the project's expenditures and comparing it to its projected budget helps keep the project on track. In order for the manager to be aware of all expenditures, this procedure is used (Wideman, 2004).

#### 2.5.3.5 Software Management

Even though layouts for the majority of charts, schematics, and reports are readily accessible in software of that kind as “Microsoft Project (MS Project)” and “Primavera” , The subscriber is able to arrange various kinds of project management and scheduling tools like “GANTT” charts, “PERT charts”, and other types of charts after entering the data.

Charts and CPM charts are included in this. The WBS forms may also be created using software, which can assist the user in creating accurate records and reports, such as the schedule. monitoring a project is made easier by the availability of information such as project costs and timelines (Anzalone,2000).

#### 2.5.3.6 Risk management

Risk management is the practice of identifying and preventing potential issues before they arise. Management of risk assists in assessing and quantifying risks, as well as determining their influence on the project and the steps that must be taken to mitigate such risks and avoid negative outcomes.

All phases of the project require risk management. In order to reduce the uncertainty, careful management is needed. (PMBOK, 1996).

### 2.5.4 Closing phase

This is the final step of a project's life cycle, and it's called the closure phase. At this point, the project has been completed and is ready to be closed.

- Ownership or client delivery of the project.
- Provide the client with all of the appropriate paperwork, as well as all of the information they need to make an informed decision.
- providing the stakeholders with detailed information on the project's personnel and equipment releases.
- After the project is completed, determine which activities and duties should be ended and which should be continued, as well as how long they should be continued for.
- Closing all contracts with provider and determining if the project was completed within its scope, on time, and within expense.
- Documenting all stages of success, rejection, and achievement in order to leverage the lessons learnt in future initiatives (Wysocki,2003).

Project management entails the planning, coordination, and monitoring of resources in accordance to achieve specific project aims and targets. The process of managing a project takes technique requiring the participation of several individuals and one that is effective.

## 2.6 The Construction Industry in Developing Countries

When taken a look at developing countries world, the building industry is widely seen as a primary source of economic growth. It is critical in the development of physical infrastructure and the provision of jobs in a variety of sectors.

The World Bank classifies "developed countries" according to their GNP (Gross National Product) (Wilson,2004). Low-income countries, with a per capita income of less than $975. Lower-middle income ranges from $976 to $3,855, while upper-middle income is from $3,865 to $11,905. High income, at least $11,906 per capita. Many elements of developing nations are shared. While their climates, cultures, religions, and economic situations vary, they share several characteristics, including the following:

- Industry and basic commodities are their primary resources of foreign income.
- Income discrepancy: In emerging nations, a significant amount of unfairness can be observed, with the wealthy individuals outnumbering a poor.
- Generally, the underdeveloped world lacks infrastructure and fundamental services. Resources for improving and maintaining existing infrastructure, as well as modernizing the construction sector, are frequently in short supply ( Sultan,2005).
- The defining quality of developed countries is a large population with a high pace of population increase, along with a high rate of unemployment, which adversely affects the country's overall living standards.

However, emerging nations have the world's densest populations and the highest proportion of people living in poverty.

- The majority of the poor experience political instability inside their governments or are embroiled in internal political warfare.

These issues have a bearing on regional growth and cause investors to reconsider investing in such areas (Sultan,2005).

## 2.7 The building industry's major features in developing countries

- Human resource ability, worker training, and technical innovation, all of which are crucial in the construction business, are undeveloped in developing nations.
- Limited budgets and poor domestic output, developing countries Infrastructure improvements and huge projects should be financed by outside sources. Due to low financing, this dependency hampers management.
- In the industry, fluctuating workloads
- The government industry's dominance as the primary owner of work. The majority of work is governed by government regulations imposed by external financing requirements (Sultan,2005).
- As the theory says, there is a significant benefit in developing nations; A developing economy is always replete with untapped resources, whether human or natural; such unknown skills in developing countries may help construct and innovate a great history if they are employed effectively.

## 3. QUALITY MANAGEMENT SYSTEMS IN CONSTRUCTION

### 3.1 Over View

Companies will compete to ensure their continued existence. Due to the fact that consumers have options for the products and services they seek, manufacturers have challenges in satisfying the ever-growing demands of consumers. As the number of stakeholders and their accompanying interests, impacts, and requirements expand, so do the operational performance parameters. In response to these difficulties, a number of concepts, methods, tools, and strategies have been developed in order to preserve the growth and competitiveness of businesses.

The idea of quality is one of these various conceptions. The simplest definition of quality notion is "meeting the needs of consumers." Therefore, the quality of manufactured goods has become one of the most influential variables on local, regional, and worldwide commercial and economic trends in recent times (Aggelogiannopoulos, et al., 2007).

Throughout the years, a number of quality standards have been created and implemented. A quality management system is one of the ISO management systems that have been created and used globally. In order to recognize and properly satisfy the wants of clients, a corporation must have a system to ensure.

- System that makes it very apparent who is responsible for what aspects of doing specific tasks.
- Representation of an organization's ability to perform business procedures in an effective and efficient way.
- Recognition of standards such as ISO 9001, which give good recommendations.
- System that works because individuals are committed to it because they feel like they have a stake in the outcome.
- In an effort to make continual improvements, a system that is regularly and formally reviewed.

Building construction organizations can utilize these guidelines to design and implement their “QMSs” in a method that allows them to adopt a comprehensive and systemic approach to

quality management, as advocated by the theory of “Total Quality Management (TQM)” of Deming (1986)” and others.

The concept of “Total Quality Management (TQM)” is often regarded as a higher degree of strategic success than the “QMS”.

As per studies of McGregor and Palmer (2002) ,they see “TQM” As a method for ensuring that the whole organization contributes to the production of high-quality results in whatever they do, the company practices total quality management; secondly, to enhance the ongoing application of quality assurance; and finally, To achieve the concept's core purpose, which is to ensure client satisfaction.

TQM- driven values are also needed for service providers in order to develop qualified operations and achieve the intended outcomes based on these objectives and recommendations for continuous improvement in quality management in construction businesses.

The ideas of “QMS” and “TQM” are found to be at the same level in various academic papers, such as (Farooqui and Ahmed ,2009).

In order to improve quality and productivity, some construction businesses have used a TQM strategy.

However, some construction companies who were believed to have implemented TQM really applied the eight fundamental QMS aspects of ISO 9001. Companies that are interested in adopting the TQM strategy should begin by building a Quality Management System (QMS) as the primarily stage on what (Grossman and Helpman ,1989), among others, have referred to as the "quality ladder."

The study of QMS and TQM was prompted by the fact that these two quality concepts are not always fully understood by Iraqi construction firms. Some local contractors are aware of QMSs, but are unsure about TQM's concept. National-level contractors that have effectively implemented QMS end up aiming for TQM as their ultimate goal for complete quality.

Figure 3.1 illustrates the relationship between the TQM and QMS ideas in a straightforward manner.

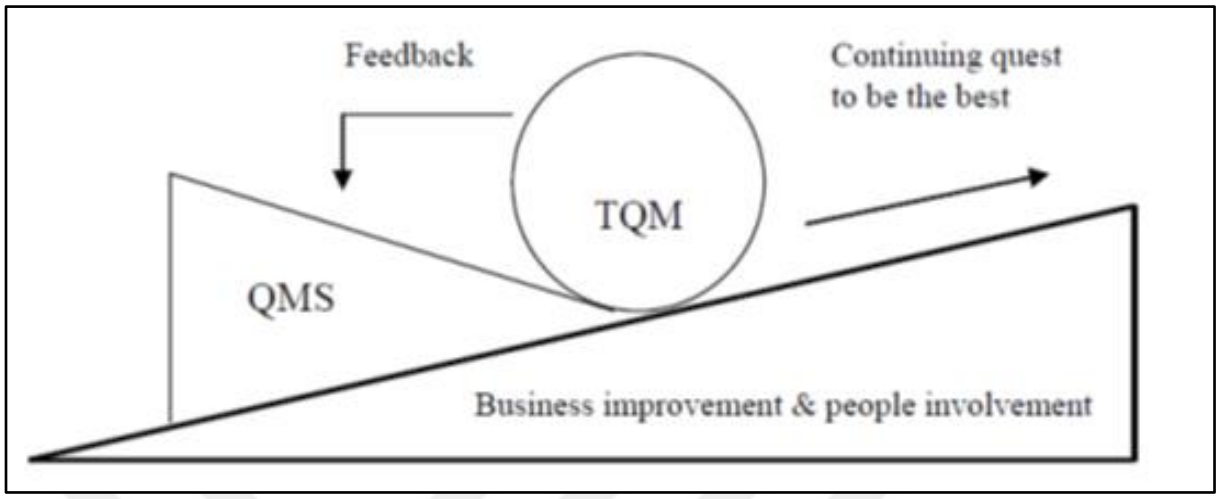


**Figure 1.3**: Illustration of Relationship of QMS and TQM

Source: Thorpe and Sumner (2004)

### 3.2 The ISO 9001 Quality Management System

From nuclear and military standards in the United Kingdom, BS5750:1979 was adopted by the manufacturing industry in 1979 to implement quality control systems. Construction companies in the United Kingdom did not use the systems until much later (in the 1980s and early 1990s), when corporations were required to have certified quality management systems in order to compete for government contracts (Thorpe and Sumner, 2004).

Following the quality movement, the "ISO 9000" series has turn into the standard model for implementing effective management and process control in a wide range of businesses and fields (Tricker ,2008)somas and (Vouzas ,2010) The construction sector, in particular has largely used this concept.

International Organization for Standardization-Technical Committees (ISO-TC 176) produced the first series of "ISO 9000" in 1987, which was upgraded in 1994 and 2000. The newest version of this standard is "ISO 9001" in 2008. Because there were no significant changes from the 2000 version to the 2008 edition, quality papers do not need to be rewritten to conform to the most recent version (Vianna ,2011).

Construction organizations and its projects benefit greatly from the general nature of the ISO 9001 standard since it can be used across many different subcontractors and suppliers on a variety of different projects.

QMS-ISO 9001 has five major components and twenty-three subclasses, each of which contains requirements that must be properly executed to reap the full advantages of the system. 9001:1994, the first version of ISO 9001, is based on the 20 principles. In place of these parts, there are now five clauses that ensure excellent processing. In spite of this, the ISO 9001:2008 process-based methodology clearly identifies the twenty aspects of the standard (Watson and Howarth, 2011). A wide range of quality-related tasks are covered by the twenty-element framework.

The construction-related organizations' quality management systems (QMS) in order to meet the project's organizational and compliance standards. The ISO 9001 standard's quality management ideas are derived from the collective experience and knowledge of ISO-TC 176 members across the world. These ideas may be used by management to improve the overall performance of a company (Tricker ,2008). Quality management is guided by these eight principles:

### 3.2.1Customer focus

"Customer focus" is the top-quality management concept, and it is also one of the most important components in running a successful company. This concept is described as follows in the international standard ISO 9004:2009 (ISO, 2009): "Organizations rely on their customers and, as a result, should understand current and future customer demands, should satisfy customer requirements, and should aim to surpass customer expectations." This specification identifies three important advantages of adhering to this concept: increased profits and market share achieved through attentiveness and speed in reacting to market chances, increased efficiency in the usages of the organization's reserves to enhance customer satisfaction, and enhanced customer loyalty resulting in increased repeat corporate. The company's primary focus is on fulfilling the needs of its clients. The "Customer Focus" This concept can prompt to significant improvements in knowledge and study of customer requirements and expectations, guaranteeing that an organization's targets are linked to client requirements and expectations, interacting customer requirements and expectations across all

of the organization, satisfying customers and dealing on the results, methodically managing client relationships, and guaranteeing a balanced strategy (ISO, 2009).

As defined by quality standards, a customer is a person or organization who gets a product or a service. Let's take a look at this statement one more time. An end-user, retail customer or client, as well as inputs to the internal process and beneficiaries are all examples of customers. When it comes to the structure of the organization, it is possible for its clients to be both internal and external, depending on their position in the organization.

### 3.2.2 Leadership

This strategy to quality management is crucial for the long-term performance of all companies, including regional banks. To comprehend the core of leadership, we must first attempt to describe it precisely, which is not an easy or straightforward operation. Leadership is such a multifaceted notion that there is no single term that encompasses its essential. However, it’s been the most-discussed and-written-about issue, the recurring question continues. What exactly is leadership? is an issue that continues to arise. This is best demonstrated by the absence of a thorough, exhaustive, and conclusive explanation for this occurrence, and there are hardly none. Perhaps this is due to the fact that everyone has their own perspective on leadership, just as they do with democracy, respect, and compassion (Northouse, 2008).

Leadership is a success-driving force whose effectiveness is primarily dependent on leaders' capacity to "bestow their dreams" on others and to control their own and others' emotions. Leadership is, in reality, the skill of inspiring others to be unselfish and passionately pursue their shared ambitions. Such freed and creative energy, when controlled and employed correctly and efficiently, always produces specific effects and frequently leads to the achievement of predetermined objectives. Scholars have identified a number of crucial elements that may be used to examine and describe leadership exhaustively and holistically. Each of these characteristics are organically interconnected and interconnected, and they all come back to the fact that leadership is a practice, that it exerts impact, that it arises within the framework of a community, and that it involves goal achievement.

On the basis of these assertions, leadership may be described as "the process through which one individual inspires a group of others to attain a common objective." (Dent, 2006).

Implementation of the leadership concept is required for an organization to achieve sustained success, as it results in a number of positive outcomes, including consideration of the needs of all stakeholders, including customers, owners, staff, financiers, regional communities, and society overall. In addition, it relates to the establishment of an evident vision of the institution 's future, the configuration of objectives, the existence and maintenance of common values, holiness, and ethical approaches at all levels inside its structure, the eradication of worry, and the provision of the assets, training, and freedom required for employees to behave responsibly and accurately. The concepts of leadership may successfully encourage, encourage, and appreciate the accomplishments of others, which is essential for achieving sustainable accomplishment (ISO, 2009).

Encouragement, energy (extensive desire for progress, ambition, effort, dependability, trust), identity (believing in one's own values), perceptual abilities (capabilities to endorse, process, and perceive a great agreement of information), innovation (originality), and a desire for leadership are all necessary for achievement (willingness to become a leader), and flexibility are typical characteristics of leaders (ability to adapt to various situations). In addition to these characteristics, leaders possess a number of others that are uncommon among regular individuals.

Those are the motivations to persevere in achieving goals: a voracious desire to result and manipulate persons, integrity, which implies the interest in putting words into intervention, self-esteem, which inspires confidence in others, intelligence, which typically contains of the ability to process documentation, solve issues, and find alternatives, and particularly emotional and experiential intellectual ability.

The highest level of management should foster and develop teamwork while avoiding "suffocating" originality, innovation, and uniqueness. Always remember that team management relies on synergy and teamwork, which is a potent force and source of energy for achieving and maintaining success. A situation in which all parties' wants and desires are met is always better to one in which just some parties benefit. There are a number of businesses in which leadership is merely a formality, and they eventually find themselves in a losing position.

### 3.2.3People involvement

Employees are most essential success component and the essence of an organization. Only total employee participation ensures a secure road to achieving sustainable success. The responsibility of the organization's management is to exercise their responsibilities professionally, conscientiously, and responsibly, as well as to discover how to involve its employees in making crucial decisions, so that they accept them as their own and feel a greater sense of responsibility and obligation to carry people out. For contrast, an economic strategy cannot be effective if it excludes workers, nor can an education program be successful without students, teachers, and students. In other words, there can be no active success without the active and constructive engagement of people who have a life interest.

It is crucial that all employees in an organization are skilled, empowered, and committed to delivering value. This significance is expressed so that the organization's team is knowledgeable, empowered, and motivated to produce value. Effective and effective management of an organization necessitates the participation of all employees at all levels in all work activities. Recognition, empowerment, and the advancement of skills and knowledge encourage the participation of individuals in attaining organizational objectives.

### 3.2.4 Process approach

In accordance with the global standard “ISO 9001:2015”, the company must create, execution, maintain, and continuously enhance a quality management system, including the required procedures and their interactions. The organization must create and implement the processes required for a quality management system throughout the whole organization.

It must identify the needed inputs and expected outputs from these processes, as well as their order and mutual interactions, as well as the criteria, techniques, measures, and performance indicators required to verify that the performance of these processes and their management are effective.

The organization is responsible for allocating and ensuring the availability of required resources, determining responsibilities and authorities in these processes, identifying risks and opportunities in accordance with the quality management system requirements, and planning and pursuing suitable measures for their resolution.

A procedure is a set of linked or interacting actions that turns inputs into outputs. Consequently, each action or combination of activities that accepts inputs and turns them into outputs is a process. Organizations must identify a multitude of interconnected and interdependent processes in order to operate effectively. Typically, the inputs of a process are the outputs of other processes. When operations are described and controlled as interconnected processes operating as a unified system, it is more effective and efficient to record consistent and predictable outcomes. Understanding the system's operations, resources, management, and interrelationships allows an organization to optimize its performance. Figure 3.2 depicts the process-based paradigm of quality management systems. Managed as a process, project activities and their associated resources.

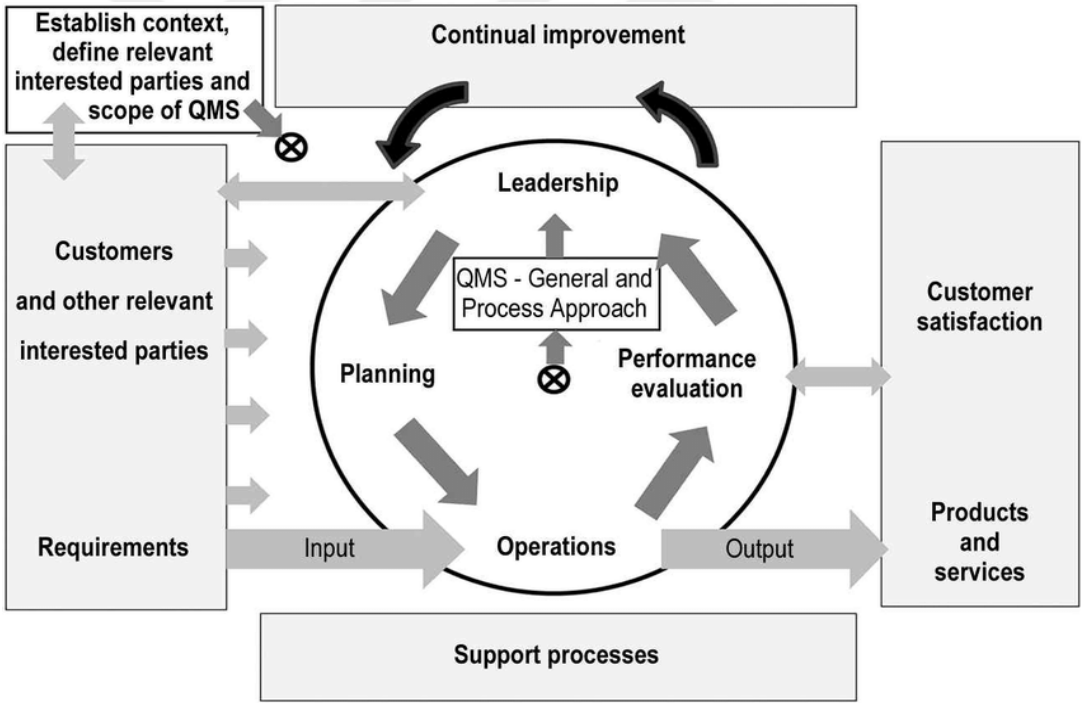


**Figure 3.2:** Quality management system approach

Source: ISO 9001

Customers play a crucial role in determining the inputs that an organization must meet across all phases of its quality management system.

Additionally, the expectations and requirements of other relevant interested parties may play a role in determining these criteria. Monitoring customer satisfaction necessitates evaluating information on the customer's assessment of whether or not the organization has satisfied these demands. Using the PDCA technique, every individual process and the system as a whole can be managed.

Process approach utilizes systematic process definition, process management, and their interrelationships to achieve desired results in accordance with the quality policy and strategic direction of the organization.

Plan – Do – Check – Act (PDCA) is an approach for process and system management that focuses only on "risk-based thinking" and the prevention of undesirable outcomes. When incorporated into a quality management system, process approach offers a variety of advantages, including the ability to comprehend requests and ensure consistency in their fulfillment, analyze processes in terms of value added, determine its effective performance, and improve processes on the basis of valuing data and information (ISO, 2015).

### 3.2.5 Improvement

This concept is described as follows by the international standard ISO 9004:2009: "Continuous improvement of the organization's overall performance should be a permanent aim of the organization." The same standard identifies three important benefits of this principle: enhancing performance through enhanced organizational capabilities, harmonizing improvement initiatives at all levels in accordance with the organization's strategic objectives, and adaptability for rapid response to opportunities.

The implementation of the principle of continuous improvement results in the implementation of a consistent method throughout the entire organization and the permanent improvement of its performance, as well as the training of personnel in methods and tools for permanent improvement and the establishment of constant improvements of products.

The use of this concept also results in the improvement of processes and systems as a goal for each employee in an organization, the establishment of guiding

objectives, metrics for monitoring continuous improvement, and the recognition and reward of improvement (ISO, 2009).

Alternative performances or opportunities that must be considered as part of continuous development. An organization must, if feasible, select and employ suitable instrument and procedures for investigating patterns and subpar concert and as a support for continuous development.

As show in figure (3.3) One of them is the "PDCA" approach, which we have mentioned many times in this work, but which merits a more in-depth examination**.**

Regarding to our assessment, the "PDCA" cycle of continuous development should address four basic problems.

How should it be? What should we do, and how should we do it? What was accomplished? What else is there to do?

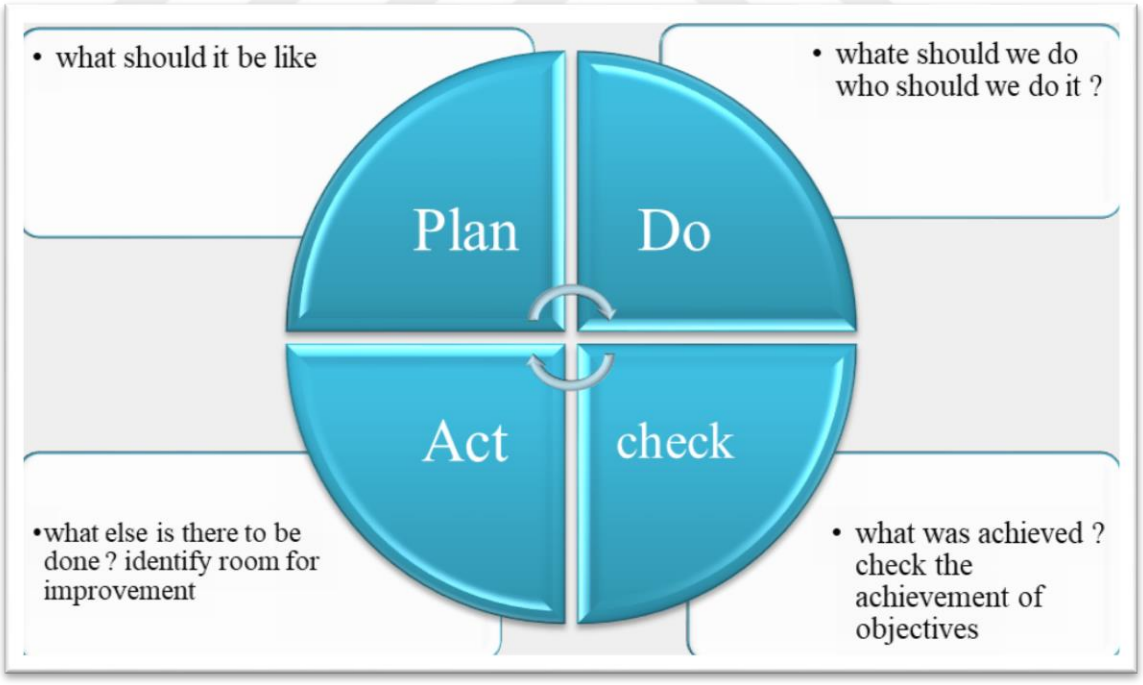


**Figure 3.3:** PDCA cycle of continual improvement of process

Source: ISO 9001

#### 3.2.5.1 Plane “What should it be including?”

The process cycle begins with objective definition and activity planning, this stage is crucial to the overall success of the cycle. The reason for this is obvious. If objectives are not clearly specified, and especially if the plan was not effectively established, it is unlikely that the entire cycle would work successfully. The plan must have well described operating standards and, in order to be complete, it must also be able to anticipate unplanned actions and difficulties.

#### 3.2.5.2 Do “What should we do, and how should we do it?”

During this phase, the plan is designed and refined. In productivity, this stage refers to production and supply, whereas in services, it refers to the implementation of services. The present standard defines the implementation of services as the implementation of goods.

#### 3.2.5.3 Check “What was accomplished?”

Research investigates the contributions of changes and other elements influencing the understanding of the situation. This step employs specialized tools and procedures, such as statistical approaches, to ensure the completeness and Reliability of initial hypotheses and comprehensiveness of situation assessment. In the context of manufacturing, the purpose of this stage cycle is to examine client responses to the new product or service.

#### 3.2.5.4 Act ”What else is there to do?”

Identification key objectives is an integral part of the last, crucial step. If earlier stages have shown positive results, the planned, designed, and studied implementation is implemented. Each complete full round of the circle represents the completion of the enhancement cycle or performance improvement process. If the previous cycle did not produce the intended

outcomes, a new cycle should be initiated with a fresh strategy, new documentation, and the application of knowledge obtained from prior cycles.

### 3.2.6 Factual approach to decision making

A standard “ISO 9004:2009” qualifies this quality management guideline as follows: "Effective choices are based on the examination of data and information." 17 Key benefits of this concept as stated by this standard include the ability to make informed judgments, to show the success of prior decisions via the use of factual records, and to examine, debate, and amend opinions and conclusions. This specification demonstrates that the use of this concept of a a rational method to making decisions generally results in ensuring that data and information are sufficiently accurate and dependable, as well as making data available to those who require it. The implementation of this concept also results in "analyzing facts and information using reliable methodologies and making conclusions and taking action based on factual analysis, balanced with experience and intuition" (ISO, 2009).

### 3.2.7 Mutually beneficial supplier relationships

The standard highlights the following as benefits of this principle: increased potential to produce value for both parties, increased flexibility and speed of joint replies to changing market or customer demands and expectations, and cost and resource optimization. These specification states that the application of the principle of mutually beneficial supplier relationships typically results in the establishment of relationships that strike a balance between short-term and long-term considerations, the pooling of expertise and resources with partners, the identification and selection of key suppliers, and transparent communication.

The use of this concept also results in the exchange of information and future plans, the establishment of cooperative development and improvement initiatives, and the instigation, encouragement, and recognition of supplier

improvements and accomplishments (ISO, 2009). The connection between the corporation and its suppliers is mutually beneficial and interdependent.

### 3.2.8 Communications

Every employee must be informed of the organization's plans, procedures, and strategies for achieving its objectives. Failure is more likely without an effective communication plan.To implement the QMS principle Establish a formal communication channel to keep all employees aware of updates, policy changes, and new procedures. Include employees wherever feasible in decision-making. Ensure that each department is aware of its own responsibilities and their link to the rest of the company.


**Figure 3.4:** Quality management principles

Source: ISO 9001

Following describes the twenty aspects of the ISO 9001 standard for building construction in table 3.1.

As an international standard for QMS, ISO 9001 is now widely accepted in many manufacturing, production, and service industries because it specifies what an organization should do to achieve better quality management and improvement (in comparison with other quality standards and awards - Six Sigma, Malcolm Baldrige National Quality Award Criteria, The European Foundation for Quality Management Excellence Model-EFQM EM).

McCornac (2006) acknowledges that the norm focuses on the manner in which an organization does its business, rather than directly on the outcomes of this business. It is advised by the Ministry of Public Works to Indonesian construction enterprises to use this QMS standard in order to address quality issues in the sector and fulfill client expectations.

### 3.3 Advantages of using a "Quality Management System (QMS)"

The application of a QMS has benefitted a large number of businesses. Customers' contentment, operational efficiency, and a company's standing on the market are all on the minds of organizations throughout the world as they work to implement quality management concepts (Magd, 2008).

As a consequence of successfully application "ISO 9001 QMS", a textile factory saw waste and unneeded inventory levels drop. It was also said to have reduced the number of workers who were absent from the workplace (Sarkar, 1998).

Lee and Lam (1997) conducted a study that found advantages including increased dependability and lower maintenance costs. In order for small businesses to successfully adopt a Quality Management System (QMS), they must be aware of the requirements and their purpose. If the QMS is not correctly implemented, it will fail (McAdam and Fulton, 2002). The standard was developed to help businesses of all sizes, in any industry, develop a quality management system (QMS) that is capable of creating, producing, and delivering high-quality goods and services (Ab Wahid and Corner, 2009).

**Table 3.1:** Elements of ISO 9001 Standard

| ISO 9001 Elements | | Quality Functions Required |
|---|---|---|
| E1 | Management responsibility | • Define, document and publicize quality policy<br>• Define, document responsibility, authority and interrelations of staff<br>• Identify and provide adequate resources<br>• Appoint quality manager<br>• Review quality systems on a regular basis |
| E2 | Quality system | • Establish, document and maintain quality system<br>• Prepare and effectively implement documented procedures.<br>• Define and document how quality planning is conducted for a project or contract, including preparation of a quality plan |
| E3 | Contract review | • Review tender before submission<br>• Review contract before signing<br>• Review variation order before acceptance and transfer amended requirements to functions concerned |
| E4 | Design control | • Plan design activities<br>• Identify and review design input<br>• Review, verify, and validate design input |
| E5 | Document and data control | • Review and approve documents prior to issue<br>• Review and approve document changes prior to issue<br>• Control distribution and updating of documents |
| E6 | Purchasing | • Evaluate and select subcontractors on basis of capabilities for quality<br>• Exercise appropriate control over subcontractors<br>• Review and approve purchasing documents prior to release<br>• Specify arrangements for verification and product release of subcontractors product or work at subcontractor's premises if required<br>• Allow the client or his representative to verify subcontracted product or work at the contractor's/subcontractor's premises where specified in contract |
| E7 | Control of customers' supplied product | • Control verification, storage, and maintenance of customer-supplied product |
| E8 | Product identification and traceability | • Identify material and semi-finished product from receipt and during all stages of production, delivery, and installation, where appropriate<br>• Provide unique identification of individual product or batches where specifically required |
| E9 | Process control | • Identify, plan, and control production, installation and servicing processes, including provision of documented procedures and suitable equipment<br>• Assign qualified operators to carry out special processes |
| E10 | Inspection and testing | • Conduct receiving inspection and testing of incoming materials and components<br>• Conduct in-process inspection and testing of semi-finished work in accordance with quality plan<br>• Maintain signed-off records of inspections and tests |

**Source:** ISO9001

Organizations with ISO 9000 certification have been proven to perform better, according to previous research (Singels et al., 2001; Jang & Lin, 2008). More productivity, reduced operating expenses, enhanced flexibility, decreased cycle times, and an improvement in employee satisfaction are just a few of the benefits of QMS adoption (Kim et al., 2011). The same study found that QMS gave firms better control over their suppliers and more defined roles and responsibilities for staff.

### 3.4 Challenges to Quality Management System Implementation

According to some QMS implementation experts, ISO 9001 is an inappropriate standard to apply in construction enterprises.

Landin (2000), for example, argues in his research of the Swedish construction industry that the articles in ISO 9001 are too vague for construction enterprises to apply. A general quality management system like ISO 9001 may not be able to properly encompass all aspects of a construction project's procedures, contracts, and requirements, which are recognized as unique and particular in every project.

The construction of an ISO 9001 certified Quality Management System (QMS) requires a large quantity of written paperwork and takes some time to incorporate into a company's management system, which can lead to major increases in operational expenses, according to (Turk ,2006). In addition, the author points out that the ISO 9001 certification procedure in Turkish construction enterprises is beset by several issues that cause it to take longer and cost more money. For the construction of a Quality Management System (QMS), some companies' management does not allow for study and criticism, while in others, the personnel processes need to be restructured (ibid 2006).

As a result of their arguments, Quazi, Hong, and Meng (2002) point out in their investigation of the Singapore construction industry that there is evidence to show that ISO 9001 certified enterprises do not always produce competent goods and services.

As a result of these conflicting viewpoints, the most important question is why certain construction businesses are unable to properly empower their organizations to develop successful QMS arrangements, while others are successful.

QMS implementation in the construction industry is difficult because of the construction industry's unique characteristics (e.g., Long project completion timelines, once-formed human relationships, difficulties in specifying quality requirements, and feedback related to construction processes) are obstacles that make it challenging for businesses to apply QMSs, that can be scattered and delayed in their quality enhancement efforts (Leonard ,2010). Additionally, the delayed deployment of ISO 9001 in developing nations reflects the building industry's reluctance to change (Low and Hong 2005).

### 3.4.1 Challenge1: The Way of thinking and Goals of Management

There is no assurance that installing an ISO 9001 quality system would result in an increase in the efficiency of an organization's internal processes if the goal of the certification is merely for marketing or consumer pressure (ISO9000Council.org 2009).

### 3.4.2 Challenge 2: The Activity of Consultants

A specific condition, quality processes, and other ISO 9001-required papers are routinely written by consulting firms. Even yet, a company's quality management consultant may not understand the company's business philosophy and culture (ISO9000Council.org ,2009). Trying to conform the entire firm to "a one-size-fits-all" ISO 9001 set of quality processes, the consultant seeks to shape it (ibid ,2009). To make matters worse, management will frequently go with the "easiest" certification body advised by the consultant, indicating a lack of knowledge about why an organization needs “ISO 9001” certification in the first place (Watson and Howarth ,2011).

### 3.4.3 Challenge 3: Management Representative for ISO 9001 without License

Many firms wrongly believe that ISO 9001 standards are only a set of paperwork requirements that must be met by enterprises, rather than a set of tools that can be used to transform their management systems and make them much better. When it comes to making real decisions or implementing changes, a Quality Management Representative (QMR) can only assist in the preparation of quality documentation and the implementation of a functional Quality Management System (QMS). The QMR also frequently lacks sufficient power to properly include individuals in the execution phase of the project (Watson and Howarth ,2011).

### 3.4.4 Challenge 4: lack of finance:

In order for an efficient Quality Management System (QMS) to be established and implemented, management must provide appropriate financial resources. Top management must be convinced that an ISO 9001 is necessary, as well as its potential advantages, in order for a dedicated QMR to be educated and led. It is necessary to write an ISO 9001 quality manual, quality procedures, and other quality system documents; to analyze and simplify firm operations; and to teach people (Chini and Valdez 2003; Ahmed et al. 2005; ISO9000Council.org 2009).

### 3.4.5 Challenge 5: Failure to Advance

The ISO 9001 standard must be regularly updated to keep up with the ever-changing business environment in order to help businesses remain competitive and technologically advanced (ISO9000, 2009). Management fails to improve when they believe that obtaining ISO 9001 certification is the pinnacle of their efforts (ibid 2009). According to McCornac (2006), business operations at a corporation have not improved much. when only modest alterations to the management system were made following ISO 9001 recognition.

### 3.4.6 Challenge 6: Complicating matters

As stated by ISO9000 council.org (2009), the ISO 9001 standard does not have to be difficult. Because they are applicable to businesses of all sizes in a wide range of industries, the ISO 9001 standard's standards are, as the council admits, quite generic and hence difficult to grasp. If management and employees don't know how the system works and what it can do for their company, things get much more difficult for everyone involved. To the contrary, employees complain that bureaucratic procedures (including "stiff" auditors) and subpar standard templates and training materials put them at risk (ibid 2009).

Many organizations' attempts to apply ISO 9001 have been thwarted by issues relating to management's attitudes and views, as well as a resulting lack of commitment. These issues may further be complicated by the fact that every organization has its own unique culture, which may have an effect on the efficiency with which QMSs are implemented and the attitudes of employees toward adhering to ISO 9001's requirements. In the construction business, the application of ISO 9001 is hindered by a lack of acceptable quality corporate cultures, effort is required to reap the benefits of a well-executed Quality Management System (Watson and Howarth 2011).

Most Iraqi governmental and private investment, as well as international investment, goes into the building industry. Private capital prefers KR-I over any other region. 40% of the projects submitted to the Board of Investment are in the construction industry. Short-term growth in this industry is predicted to be helped by these factors (Shatz, H. J,2014).

The stability in security; reduction in political instability; and improvement in the fiscal condition an equilibrium because of a partial rise in oil prices and a decrease in military spending.

Considering historically considerable local and international investment in this area, as well as the domestic demand rises when the economy grows again.

The building industry is expected to have a substantial impact on the economy in the long run. As In energy-intensive enterprises, Iraq has a comparative advantage because of its production of energy, both in the manufacturing and

the transportation of construction and transportation-related materials, it's expanding. There is a high percentage of young people (40 percent) and a huge population (2.8 percent every year).

Building is needed to ease the long-term housing shortage, which is a major factor in development opportunities for both domestic and international investment in the area are significant.

In addition, building has been designated as a top priority by the government. The Nation's Economic Progress Plan's Ministry of Planning has set up a group dedicated to the building industry.

second-most important area of the economy, the construction and services sector, should get 29 percent of all investment agriculture (13%) and education (38%) come after the industrial sector (38%) and before 10% of the population.

Construction services are only one aspect of the sector's effect on the Iraqi economy. Large spillovers in manufacturing, real estate, and general production capacity occur both upstream and downstream of this point.

In the estimated 17,500 factories in Iraq, construction accounts for 36 percent of the total output. materials and 20% specialize in metal processing, which is mostly used in the construction of buildings.

Construction activity is critical to the production of cement, iron, and steel approximately 15% of non-oil GDP was generated by real estate, rental, and commercial activities in 2015.

All forms of economic activity are hindered by infrastructure development. (Storage, energy, water, wholesale, etc.). Increasing the amount of infrastructure available will be beneficial open up new avenues for growth, (Shatz, H. J,2014).

# 4: METHODLOGY

## 4.1 Over View

The study methodology has been described in this chapter to achieve the purpose of the study and explains the approaches of study used to gathering and analyzing data, where describes the three main steps of this study research framework.

Stage one, review of relevant literature on sustainable buildings quality management system in construction company.

Stage two, questionnaire survey of Iraqi Engineers that working construction field.

Step three includes validating the development of a management system to achieve benefits gained from implementing quality management, there are several advantages which will be achieved through quality management in Iraq.

The research methods described above are discussed in depth in the following sections. In order to comprehend the intricacy of the research subject, the wealth of present data was crucial in this study. Therefore, systems that could collect data on numerous elements of a problem were crucial. Possible methods include survey/questionnaire, modeling, and historical analysis.

Therefore, modeling was deemed improper because it could not answer "why" or "where" queries. In addition, a cursory check of the sponsor's archive materials revealed that Historical Analysis might not be acceptable because the accessible materials might not be capable to focus on current events or give the requisite depth of information.

## 4.2 Research Design

The research design is a structured overview of how the research study is to be performed, where the overall approach is chosen to systematically and logically combine the various components of a study effectively solving the research issue and forming a basis for data collection, calculation, and analysis.

The selected approach can be qualitative, quantitative, and mixed methods to guide research procedures, that follow some philosophical theories, design techniques, and study methods (Creswell, 2018).

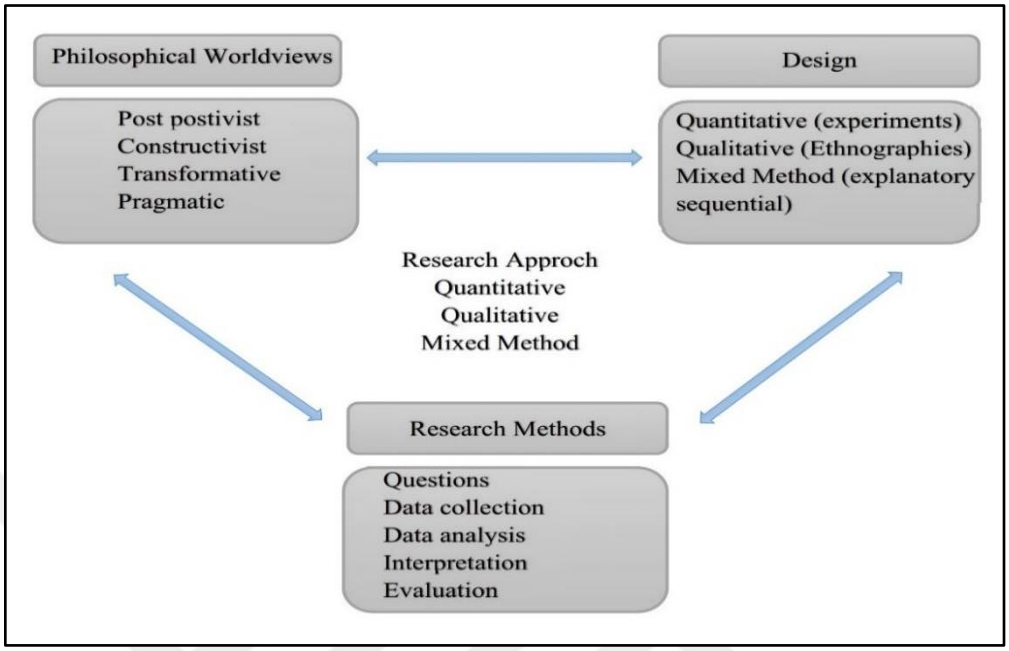


**Figure 4.1:** Framework for Research Design

**Source:** Creswell, ( 2018)

## 4.3 Philosophical Theories

Philosophical theories may be described as overall guidelines and understanding of the world or the purpose of a study carried out by the researcher (Creswell, 2018).

Usually, the author uses those principles and theoretical concepts in a research paper. However, some people might never agree that they should accept a particular assumption or agree on the role these hypotheses play in the study process (Mertens, 2015). Philosophical assumptions include ontology, epistemology, axiology, methodology, and philosophical assumptions of rhetoric (Creswell,2018).

Figure (4.2) demonstrates these philosophic assumptions according to Gunatilake (2013), focusing on particular issues like what is the method of the study? How does the investigator relate to the examined person? Which are the principles that contribute to the study? What was the study's reality? What's learning communication?

Ontology is a philosophical assumption regarding the essence of truth in which the investigators believe the multiple reality of their subjects and this is illustrated by the use of

various themes using the technique (What is the study process?) Rhetorical tale (What is the language of research?).

Epistemology is a metaphysical theory of the relation between the researcher and the known and how empirical knowledge has been gained. Axiology is an assumption philosophy on the role of ethics in science. The methodology is a logical theory of the research process and method, which is defined as inductive by the expertise of the scientists in data collection. Rhetoric is the practice of language study and the practice of convincing the public.

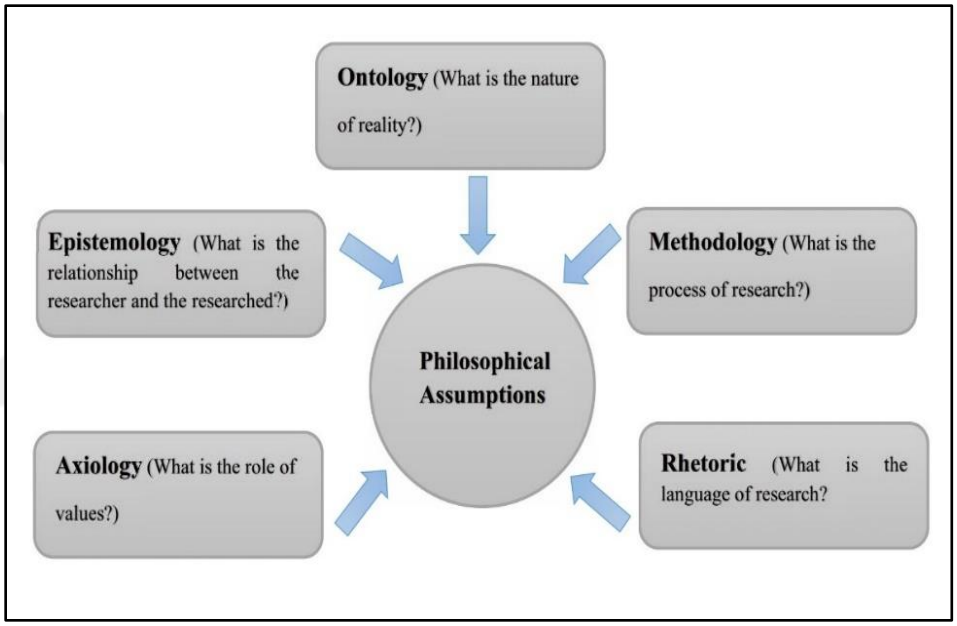


**Figure 4.2:** Philosophical Theories
**Source:** Gunatilake, (2013)

## 4.4 Mixed Methods Surveys

The researcher's choice of survey type is impacted by three primary factors: the time necessary to complete each survey, the research method, and the sample size. Combining survey methodologies is regarded as an efficient strategy for data collecting. It is based on the concept of mixing two or more strategies for the same subject and maintaining the best characteristics of each while reducing the drawbacks. According to Aaker et. al. (2006), this strategy has been shown to be extremely effective in increasing the credibility of research by increasing the response rate.

This research utilizes a mix of two very effective surveys: an interviewer-administered survey and a self-administered questionnaire.

The variety of this approach enables the researcher to mix several pertinent methodologies in order to address research problems and accomplish research objectives. This combination has the potential to provide a high response rate and a high level of reliability of studies. Additionally, by combining two or more methodologies, the investigator can reach a broader variety of responders who completed the questionnaire is released. However, this strategy demands researchers to invest additional time and effort, in addition to possessing the necessary abilities and expertise to run the hybrid method procedure.

### 4.5 **Web** Survey (Email)

According to the structure of mailing questionnaires and awaiting results, this method is akin to the postal research study; however, such approach is regarded more effective, despite the fact that the investigator may meet identical challenges as with the postal questionnaire, such as partial responses and no answers.

However, it is still more cost effective and efficient in terms of reaction time, which might range from a few minutes to several months or even longer. Nonetheless, the replies are in electronic format, which enables the researcher to more quickly handle and analyze them, as well as retain them for usage in the future.

This form of questionnaire has various benefits in terms of data dissemination and collection ways, which may be completed in a matter of hours in certain situations, as opposed to a postal survey, which needs more time for distribution and collection. Additionally, because there are no fees associated with employing this technology, it is considered the least expensive way of quantitative data collecting.

Finally, this technique is extremely convenient for data analysis and storage. Email survey approaches need some knowledge and abilities on the part of the researcher and respondents to disseminate and reply to the questionnaire, additionally, replies may be insufficient in certain circumstances due to respondents' time constraints or inability to comprehend some questions, especially in the absence of direct interaction.

Additionally, obtaining the appropriate sample size is a significant difficulty for any authors, beginning with purchasing an email list of the desired sample size from a third party (Schmidt and Hollensen ,2006).

### 4.6 Method Employed in the Research

Where that comes to this research, the researcher relied mostly on the qualitative technique, but he also employed the quantitative method when it was necessary to assist complete the picture.

Qualitative research is the most appropriate method for this study because it seeks to understand the situation from the perspective of the local inhabitants as well as the ideas, attitudes, and connections of people in the field through personal experience and in-depth questionnaires.

In order to fill in the gaps and bring the project to a close while also providing a clearer picture of the results, this thesis also employed deductive reasoning and quantitative methods. There are many different types of quantitative research, but they all follow the same basic principles: In addition, quantitative research is viewed as a cyclical process in which ideas and hypotheses are iterated and improved upon through time.

According to Proctor (2003), there are several ways to gather quantitative data, including surveys, journals, and questionnaires. So according Proctor, the questionnaire is the simplest common quantitative data gathering instrument, which also includes self-administered, personalized (face-to-face) investigations, postal questionnaires, internet surveys, panel surveys, and mobile interviews. Additionally, Proctor asserts that it is conceivable to integrate two or more data collection processes.

Face-to-face, self-completion and telephone interviews are all examples of questionnaire data obtained by Robson (2002). Postal survey strategies are described in this study, where using this type of data collection, there are several advantages to using a postal survey.

When compared to other methods, such as phone interviews and personal surveys, this one is less expensive for the researcher because it involves mailing out a large number of questionnaires.

In addition, Schmidt and Hollensen note that once released, it aids the researcher in reaching a broader segment of the intended. Respondents, in another sides, have the option of ending the

questionnaire at a time that suits them. The researcher can't interfere with the replies because this approach doesn't require any interviews, thus there's no interviewer (Bias ,2003).

In addition, the researcher has more time to offer a question since the responder is less rushed. Because this research is based on an evaluation study, if the researcher does not obtain enough replies, the survey needs to be issued again to the same or another sample which increases the overall time and expense of the project. In addition, the researcher may have issues employing this approach due to Iraqi's non-existent or complex postal system. It's also possible that the survey hasn't been entirely completed or even done by someone other than the intended recipient, which has the same effect on the study as previously stated.

As Yin (1984), it was also anticipated that a sort of implementation exercise would be required later in the study. As it was not essential to regulate behavioral events, studies were not needed. However, the Case Study method was deemed appropriate since it permits an empirical investigation of modern problems using real-world criteria

### 4.7 Questionnaire Survey

Scientists have designed a questionnaire survey to offer a quantitative or mathematical explanation of population patterns, behaviors, or views by analyzing a sample of that population (Creswell, 2018).

Figure (4.6) shows the research process at this point, where this part is dedicated to designing and processing the survey questionnaire and evaluating the survey results. The questionnaire aims to evaluate the Benefits gained from implementing quality management, there are several advantages which will be achieved through quality management in Iraq and the challenges of implementing this concept.

Questionnaires are a documented set of queries designed to specifically gather details from persons and gather details utilized for information analysis. Questionnaires must be designed in a method that may be completed easily method and not need any help.

They can be difficult because respondents cannot speak in their own words and sometimes the researcher has no chance to verify if the responses are valid. However, these are very simple to organize and all participants have required essentially the same queries and chosen from the recorded responses, it's suitable for quantitative study (Denscombe,2014).

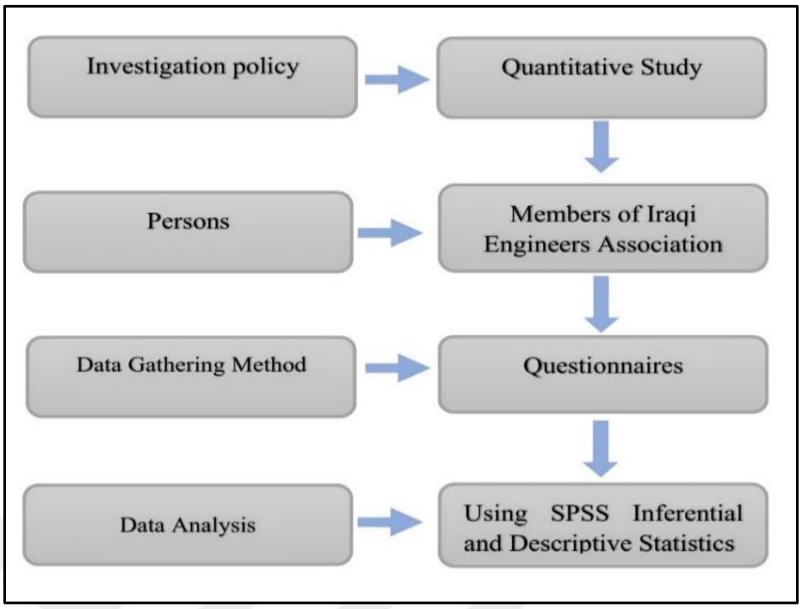


**Figure 4.3:** Steps of Questionnaire Survey
Source: Author

## 4.8 Research Activities and Findings

During this chapter, the primary operations of the study programmer are described, including how tasks were designed to satisfy aims and targets, how related study and sponsor needs influenced the study, and the programmer's conclusions and recommendations.

The Study Development Roadmap provides a summary of the entire process, including activities, results, decisions, and outcomes. This depicts the study flow by stressing how results and decisions arising from activities influenced further investigations, as well as when targets were achieved and programmer products provided.

## 4.9 Research Condition

Methodology encompasses the entire research procedure, from the theoretical foundation through the data collecting and analysis (Collis and Hussey ,2003). Clarity in how the study is conducted and a detailed description of the methodology are essential for the research's reliability.

A poor approach may lead to invalid results. Consequently, the chosen methodology must be consistent with the study aims and capable of answering the pertinent research questions. In

order to choose a suitable technique, it is necessary to identify the research's purpose and aims.

### 4.10 Type of Research

From the viewpoint of research goals, a research plan can be categorized as descriptive, correlational, illustrating, or exploratory. The aim of the study will decide the kind of research to be implemented from a perspective of the study goals (Neuman, 2014):

• Research is known as descriptive research when attempting to explain a situation, practice, service, or procedure in a systematic manner, or when attitudes regarding certain problems are identified, and how to study issues.

• Research includes a correlation between several parts of a situation if the study focuses on attempting to find or assessing the nature of an interaction, interdependence, or partnership.

• Research is defined as explaining when the main goal of explaining why events happen and constructing, creating, extending, or testing the theory. It helps to explain why and how two parts of a phenomenon are related.

• Research can be explorational if the purpose of a study is to either explore a field where minimal research needs to be done or to explore possibilities for specific research and to establish preliminary concepts and research issues.

The study is descriptive in concept as it aims to explain the various practices of sustainable building achievement and the challenges of implementing this concept in Iraq. The study is also considered an exploration of the method of inquiry, where the study takes both qualitative and quantitative methods into account, and the synthesis between the two methods to sufficient to accomplish the purpose of the study.

### 4.11 Choice of Research Methodology

The approaches of the analysis adopted by the study are based on the research researcher's philosophical concepts, research design, and fundamental research procedures for gathering, analyzing, and interpreting information according to Creswell (2018).

Study approaches are defined as the kind of qualitative, quantitative, and mixed techniques that guide the research design processes (Mertens, 2015).

Quantitative research as per Aliaga and Gunderson (2005) is effective at generating knowledge from a wide range of units in the broadest possible field, but quantitative methods can be very shallow when a topic or idea is to be studied in depth.

The qualitative method is best for a detailed investigation of a study issue. It is a system, which studies subjects in their natural environment, which attempts to explain or perceive a phenomenon with regard to the meanings that people bring to them, where data are inductively analyzed in this method based on details to general concepts, and the researcher interprets the importance of the information (Creswell, 2018).

Qualitative study can define an approach to analysis and try to understand the significance of individuals that are dedicated to social issues, where the qualitative study is intended to examine the real circumstances in their time-based and local circumstances (Flick, 2018).

On the other side, mixed methods given the quantitative and the qualitative benefits. Researchers regarded the selection between the quantitative and qualitative approaches as important. Nevertheless, they are no better than the other because they both have distinct traits and have their strengths and limitations (Mertens, 2015).

### 4.12 Choosing a Mixed Method

This study uses a mixed-methods approach because the study aims to get a detailed understanding of the significance of the concept of sustainable buildings and the challenge to achieve sustainable buildings in Iraq.

Regarding Creswell (2018), if a practice or theory requires to be investigated and clarified since few studies have been done, then a mixed approach is needed.

Valen and Olsson (2012) conducted a study to determine the extent of the importance of the occupational service management career for the owners of buildings in relation to their buildings in the fine, functional, and up to date conditions, by performing the questionnaire investigation and thorough interviews.

The qualitative approach was the first proposed, due to limited the literature in this field, the research analysis is exploratory and required explanatory studies to validate findings. The quantitative approach was then used to verify and generalize results for a population and to analyze the results of the qualitative process by means of a questionnaire survey.

## 4.13 Selection of Research Methods

This section describes effective research approaches by choosing mixed approaches for this study analysis as an acceptable methodology. The search method is the technique for the gathering of observation research information and may be classified into four main topics: documentation, interviews, analysis, and questionnaires (Denscombe, 2010).

The selected methods used for gathering information in this research include documentation and questionnaires.

The study mandated an exploratory development approach involving the collection first of qualitative information and then quantitative data. The study began with gathering qualitative information from related literature and documentation to collect as much knowledge about sustainable building components, it was the first step of the study.

The second step of the study involved the acquisition of quantitative data. The results of the documentation gathered were used for designing a questionnaire that was created and then bring up to Iraqi Engineers.

## 4.14 Response Rate

To determine the validity of the questionnaire, we presented it to 130 engineers who worked in the Iraqi construction industry between February and April 2022. The questionnaires were provided directly via printed papers or a questionnaire link (Google format) via social media numbers and email addresses; 103 completed questionnaires were returned, resulting in 81 percent participation.

$$\text{Total response } rate = \frac{total\ responses}{total\ number\ rasponses - ineligible} \tag{4.1}$$

The reliability test is used to assess the consistency of the selected scale and the alpha in Cronbach is the most popular reliability test as shown in equation (4.2).

The reliability test carried out to demonstrated the reliability of the scales to determine what important benefits gained from implementing quality management, and advantages which will be achieved through quality management.

$$\alpha = \frac{n}{(n-1)}\left[1 - \frac{\sum_{i=1}^{n}\sigma_{yi}^{2}}{\sigma_{x}^{2}}\right] \quad (4.2)$$

Where:

α = alpha Cronbach

n = refer to the number of scale items

σ_yi^2 = refer to the variance associated with the item i

σ_x^2 = refer to the variance associated with observed total scores

Where the values of (0.70) or larger are accepted. Table (4.1) indicates that all values more than (0.70) value, it's acceptable Cronbach's alpha value meaning that the scales are reliable for this analysis.

Table 4.1: The Cronbach's Alpha Values

| **Cronbach's Alpha** | **Internal Reliability** |
|---|---|
| $0 > \alpha \geq 0.8$ | Good |
| $\alpha \geq 0.9$ | Excellent |

Relevance of the analysis included results from earlier studies on the components, while this consistency of the contents involved concern of the rich data on research objectives available in the literature, the results and suggestion are typically set out in the abstracts.

## 5: DATA ANALYSIS

### 5.1 Introduction

This chapter will give empirical data acquired by a standard questionnaire; SPSS 22 data analysis software was used to analyze the data. The acquired data was extensively reviewed and discussed in order to achieve the study objectives established and to address the research questions asked. 120 respondents were used to collect data in accordance with the research technique used in this study. These respondents were asked to complete the questionnaire that had been developed. 103 people agreed and answered, yielding a 85.8 percent response rate.

### 5.2 likert scales

The data was analyzed using descriptive statistics; the questionnaire, which was designed to allow respondents to respond to the different variables based on their personal experiences and opinions, was scored on a Likert scale (for example, on a scale from 1 to 5, with strongly disagree=1 and strongly agree=5). Likert scales are appropriate and commonly utilized in many situations. opinion measurement on a scale with a range of values the findings of the questionnaires being assessed in this study will be presented in the following format:

**Table 5.1:** Evaluation of likert

| | | |
|---|---|---|
| Evaluation | Strongly agree | 5 |
| | Agree | 4 |
| | Neither agree nor disagree | 3 |
| | Disagree | 2 |
| | Strongly disagree | 1 |

### 5.3 Reliability Statistics

The reliability coefficient (alternatively referred to as Cronbach's Alpha) may be calculated using a statistical tool such as SPSS. Cronbach's Alpha is a number that ranges from 0 to 1. The greater the value, more the dependable the tools and items in the survey become.

Thus, it is a measure of internal consistency; that is, the degree to which a group of objects is connected. Cronbach's Alpha was 0.891 and 0.813 in this study, as seen in the accompanying table, indicating that reliability was strong and that the items had a reasonably high internal consistency. It is worth noting that a dependability coefficient of 0.70 or above is regarded as satisfactory (George and Mallery, 2010).

Table 5.2 shows the values of the Reliability Statistics for The Benefits of QMS Implementation

**Table 5.2:** Reliability Statistics Benefits of QMS implementation

| Cronbach's Alpha | N of Items |
|---|---|
| 0.813 | 12 |

Table 5.3 shows the values of the reliability of the study variables of challenge of QMS implementations.

**Table 5.3:**Reliability Statistics for the challenges of QMS Implementation

| Cronbach's Alpha | N of Items |
|---|---|
| 0.891 | 10 |

### 5.4 Respondents Levels

According to Table 5.4 about 65% of respondents in the BCS group and 17,5% in the MSC categories, had more than 5% of others in the construction business.

**Table 5.4:** Respondents Levels

| | Valid | Frequency | Percent % |
|---|---|---|---|
| Education Level | BSC | 67 | 65.0 |
| | MSC | 18 | 17.5 |
| | PHD | 12 | 11.7 |
| | Other | 6 | 5.8 |
| | Total | 103 | 100 |

According to table 5.4 ,the figure 5.1 shown the categories with circle diagram.

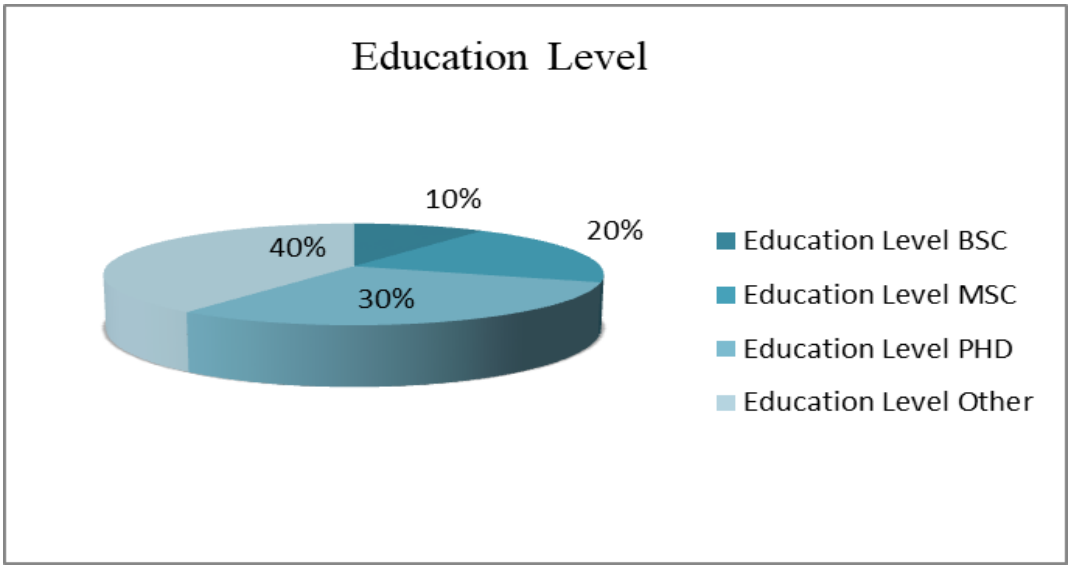


**Figure 5.1:** Education Level of responds

### 5.5 Response ratio

The response ratio for the data collection is beneficial in assessing the efficiency of the questionnaires returned in the study. Table (4.1) displays the distribution of the questionnaire for the survey method. 120 questionnaires were distributed directly either sent questionnaire link (Google format) through the social media numbers and email addresses, and then (103) completed questionnaires were then returned, which resulted in an (85.8 %) of participants.

### 5.5 Respondents Work specialization

According to table 5.5 depicts information about respondents' specialization. Using statistics, it can be determined that 57.3% of respondents are civil engineer.

**Table 5.5:** Engineering Specialization

| | Valid | Frequency | Percent |
|---|---|---|---|
| Engineering Specialization | Civil | 59 | 57.3 |
| | Architectural | 14 | 13.6 |
| | Mechanical | 3 | 2.9 |
| | Electrical | 9 | 8.7 |
| | Total | 103 | 100 |

According to Table 5.4, the figure 5,2 shown the categories with circle diagram.

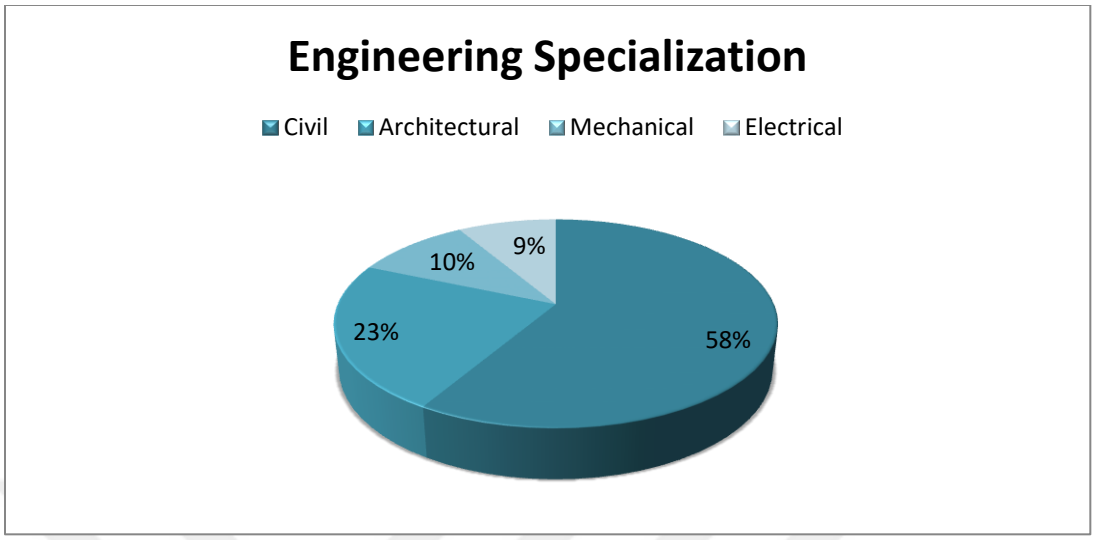


**Figure 5.2:** Engineering Specialization

### 5.6 Respondents Work Experience

Observe from Table 5.5 and Figure 5.3 that the research sample according to the number of years of scientific experience was 12% percent for the age group from 6 to 10 years, 9,7% percent for the age group 11-15 years 28%, and 51,5 % percent for more than 20 years, as the number of years of scientific experience of the individuals of the research sample was concentrated in the two age groups of 11-15 years and more than 16 years, which is an indication of a concentration of scientific experience.

**Table 5.6:** Years of Experience

| | Years | Frequency | Percent |
|---|---|---|---|
| Years of Experience | 1 to 5 | 12 | 11.7 |
| | 6 to 10 | 10 | 9.7 |
| | 11 to 15 | 28 | 27.2 |
| | 16 to 20 | 53 | 51.5 |
| | Total | 103 | 100 |

According to table 5.5, the figure 5,3 shown the categories with circle diagram.

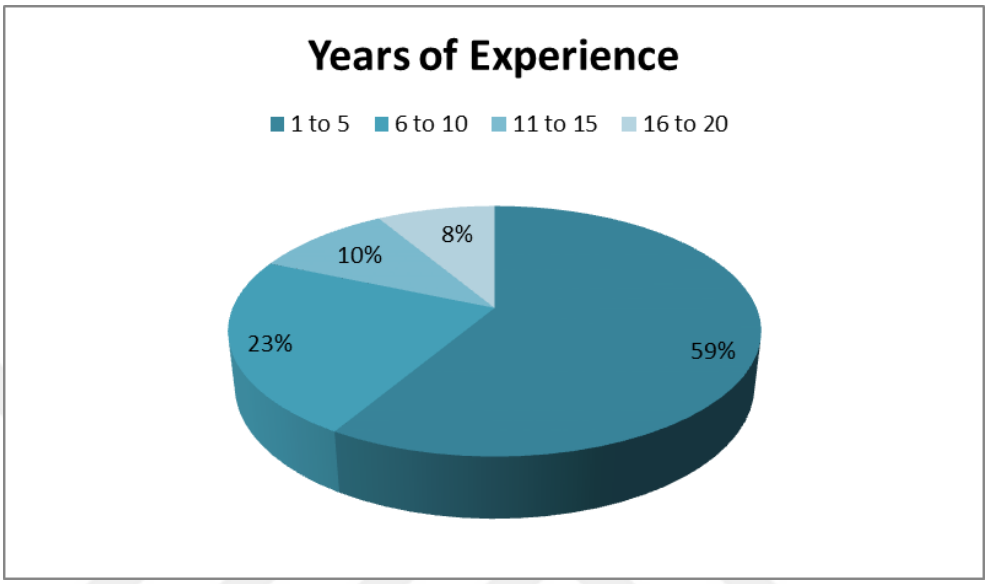


**Figure 5.3:** Years of Experience

### 5.7 rank correlation

In statistics, a rank correlation is any of several statistics that measure an ordinal association the relationship between rankings of different ordinal variables or different rankings of the same variable, where a "ranking" is the assignment of the ordering labels "first", "second", "third", etc. to different observations of a particular variable.

### 5.8 The Benefits of TQM Implementation

This section will provide and analyze data from surveys evaluating the influence of QMS implementation on increasing a company's competitiveness, specifically the impact of the independent variables QMS (twelve) important success factors on.

According the surveys for responds the higher frequency for implement B6 (QMS being used to cost estimating and reducing for any project) with agree scale. Statistical calculations (standard deviation, median, mean Variance, Std. Error of Mean and Rank) were performed for all parameters and as indicated in the table below.

In statistics, a rank correlation is any of several statistics that measure an ordinal association the relationship between rankings of different ordinal variables or different rankings of the same variable, where a "ranking" is the assignment of the ordering labels "first", "second", "third", etc. to different observations of a variable. The table (5.7) show the details for statistics done for elements.

Table 5.7: The details for statistics the Benefits of QMS Implementation

| N. | Realizing of QMS Benefits in Organization | Sample | Mean | Std. Error of Mean | Std. Deviation | Variance | Rank |
|---|---|---|---|---|---|---|---|
| **1** | Do you believe that a quality management system (QMS) will work in your organization (or already does)? | BQMS 1 | 4.16 | 0.074 | 0.751 | 0.564 | 12 |
| **2** | Would a quality management system (QMS) program benefit your organization? | BQMS 2 | 4.42 | 0.061 | 0.619 | 0.383 | 3 |
| **3** | Does your organization have a formalized management? | BQMS 3 | 4.33 | 0.061 | 0.617 | 0.38 | 6 |
| **4** | QMS being used to assist and guide of Project design? | BQMS 4 | 4.42 | 0.064 | 0.65 | 0.422 | 2 |
| **5** | QMS being used to cost estimating and reducing for any project? | BQMS 5 | 4.21 | 0.067 | 0.681 | 0.464 | 10 |
| **6** | QMS being used to increase the market share for organizations on any project? | BQMS 6 | 4.22 | 0.067 | 0.685 | 0.469 | 9 |
| **7** | The quality improvement program plan must be a part of the organization policy for some time. | BQMS 7 | 4.39 | 0.065 | 0.660 | 0.436 | 7 |
| **8** | The quality improvement plan must have the full support of top management | BQMS 8 | 4.30 | 0.064 | 0.654 | 0.428 | 8 |
| **9** | The quality improvement program for organizations must be dependent on ISO 9000 | BQMS 9 | 4.48 | 0.061 | 0.624 | 0.389 | 1 |
| **10** | QMS will enhance the company reputation | BQMS 10 | 4.17 | 0.074 | 0.747 | 0.557 | 11 |
| **11** | The applying of QMS lead to appointed Quality Manager is without the authority to effect substantive changes | BQMS 11 | 4.4 | 0.064 | 0.647 | 0.418 | 4 |
| **12** | The realization of QMS results in increases the self-improvement of any element of management. | BQMS 12 | 4.34 | 0.068 | 0.694 | 0.481 | 5 |

The table 5.8 show the rank of items of benefits of QMS in organization according the value of mean ,the first item is (The quality improvement program for organizations must be dependent on ISO 9000) with Sample (BQMS 9) and mean value (4.48) ,and the last item with minimum value of mean ( 4.16 ) for item BQMS 1(Do you believe that a quality management system (QMS) will work in your organization (or already does)).

**Table 5.8:** The rank of items of QMS Benefits in Organization

| Rank | Realizing of QMS Benefits in Organization | Sample | Mean |
|---|---|---|---|
| **1** | The quality improvement program for organizations must be dependent on ISO 9000 | BQMS 9 | 4.48 |
| **2** | QMS being used to assist and guide of Project design? | BQMS 4 | 4.42 |
| **3** | Would a quality management system (QMS) program benefit your organization? | BQMS 2 | 4.40 |
| **4** | The applying of QMS lead to appointed Quality Manager is without the authority to effect substantive changes | BQMS 11 | 4.39 |
| **5** | The realization of QMS results in increases the self-improvement of any element of management. | BQMS 12 | 4.34 |
| **6** | Does your organization have a formalized management? | BQMS 3 | 4.33 |
| **7** | The quality improvement program plan must be a part of the organization policy for some time. | BQMS 7 | 3.30 |
| **8** | The quality improvement plan must have the full support of top management | BQMS 8 | 4.22 |
| **9** | QMS being used to increase the market share for organizations on any project? | BQMS 6 | 4.21 |
| **10** | QMS being used to cost estimating and reducing for any project? | BQMS 5 | 4.17 |
| **11** | QMS will enhance the company reputation | BQMS 10 | 4.16 |
| **12** | Do you believe that a quality management system (QMS) will work in your organization (or already does)? | BQMS 1 | 4.16 |

According to table 5.8, the figure 5.4 shown the categories of QMS benefits depended on the value of mean.

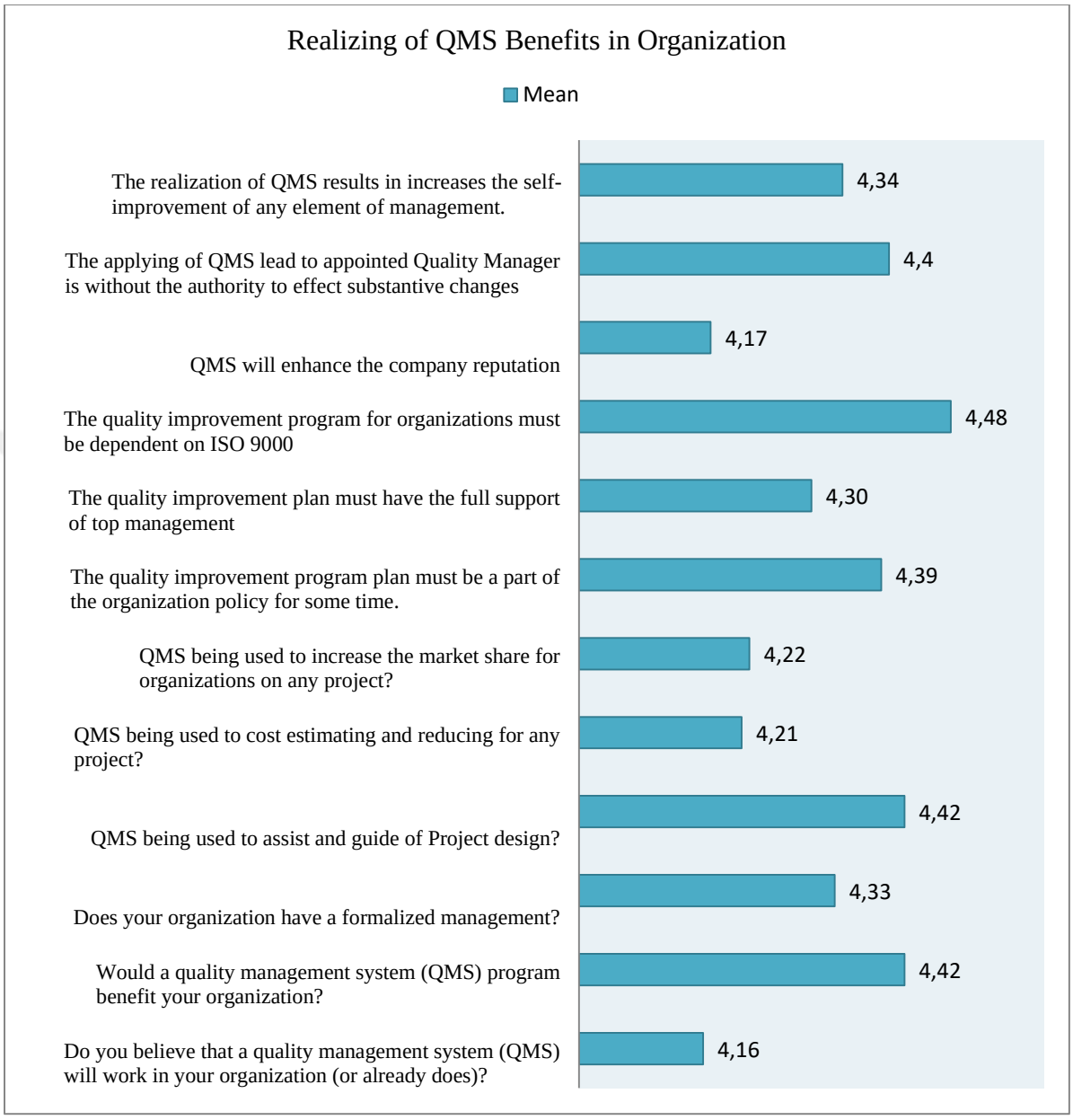


**Figure 5.4:** QMS benefits depended on the value of mean

## 5.9 Difficulties that face to applying the QMS in Organization projects analysis

According to Table 5.9 the primary problem in implementing the quality management system in the study industry has been ' Compliance with ISO 9001 is viewed as a documentation task rather than an opportunity to adopt a more systematic management style.' which has a higher mean score on the

respondents' agreement measurement scale. The following one was titled The QMS is viewed by management and employees.' Additionally, Management perceptions and objectives appear to be purely motivated by marketing efforts or by imposed customer expectation.

**Table 5.9:** The details of QMS Difficulties in Organization

| No. | Realizing of QMS Difficulties in Organization | Sample | Mean | Std. Error of Mean | Std. Deviation | Variance | Rank |
|---|---|---|---|---|---|---|---|
| 1 | Management perceptions and objectives appear to be purely motivated by marketing efforts or by imposed customer expectation | DQMS1 | 4.17 | 0.081 | 0.822 | 0.675 | 4 |
| 2 | Compliance with ISO 9001 is viewed as a documentation task rather than an opportunity to adopt a more systematic management style. | DQMS2 | 4.42 | 0.070 | 0.707 | 0.500 | 1 |
| 3 | Lack of logic in management action and decision-making due to a lack of corporate commitment. | DQMS3 | 4.09 | 0.094 | 0.951 | 0.904 | 6 |
| 4 | Inadequate management response to employee grievances and needs. | DQMS4 | 4.14 | 0.093 | 0.940 | 0.883 | 5 |
| 5 | Challenges in fully integrating ISO 9001 terminology into company operating procedures | DQMS5 | 4.07 | 0.090 | 0.910 | 0.829 | 8 |
| 6 | The QMS is viewed by management and employees as only a means to meet internal and external audit standards | DQMS6 | 4.17 | 0.090 | 0.909 | 0.825 | 3 |
| 7 | The workforce is opposed to the implementation of a QMS | DQMS7 | 3.99 | 0.087 | 0.880 | 0.774 | 10 |
| 8 | The organization does not have the finances to implement a QMS | DQMS8 | 4.04 | 0.095 | 0.959 | 0.920 | 9 |
| 9 | There is some uncertainty regarding the effectiveness and/or applicability of subcontractors' and suppliers' quality management systems. | DQMS9 | 4.08 | 0.074 | 0.750 | 0.563 | 7 |
| 10 | Absence of significant motivation at all management levels. | DQMS 10 | 4.22 | 0.079 | 0.804 | 0.646 | 2 |

The table 5.10, shows the value of (Mean Std. Error of Mean Std. Deviation, Variance, Rank) for each item and value according to the value of the rank according of the value of mean. The first rink with higher value of mean (4,42)was the item (DQMS2) (Compliance with ISO 9001 is viewed as a documentation task rather than an opportunity to adopt a more systematic

management style).and the minimum value of mean (3.99)for item DQMS7 (The workforce is opposed to the implementation of a QMS).

**Table 5.10:** The rank of items of QMS difficulties in Organization

| Rank | Realizing of QMS Difficulties in Organization | Sample | Mean |
|---|---|---|---|
| **1** | Compliance with ISO 9001 is viewed as a documentation task rather than an opportunity to adopt a more systematic management style. | DQMS2 | 4.42 |
| **2** | Absence of significant motivation at all management levels. | DQMS 10 | 4.22 |
| **3** | The QMS is viewed by management and employees as only a means to meet internal and external audit standards | DQMS6 | 4.17 |
| **4** | Management perceptions and objectives appear to be purely motivated by marketing efforts or by imposed customer expectation | DQMS1 | 4.17 |
| **5** | Inadequate management response to employee grievances and needs. | DQMS4 | 4.14 |
| **6** | Lack of logic in management action and decision-making due to a lack of corporate commitment. | DQMS3 | 4.09 |
| **7** | There is some uncertainty regarding the effectiveness and/or applicability of subcontractors' and suppliers' quality management systems. | DQMS9 | 4.08 |
| **8** | Challenges in fully integrating ISO 9001 terminology into company operating procedures | DQMS5 | 4.07 |
| **9** | The organization does not have the finances to implement a QMS | DQMS8 | 4.04 |
| **10** | The workforce is opposed to the implementation of a QMS | DQMS7 | 3.99 |

According to table 5.10, the figure 5.5 shown the categories of QMS difficulties depended on the value of mean of items in the questioners

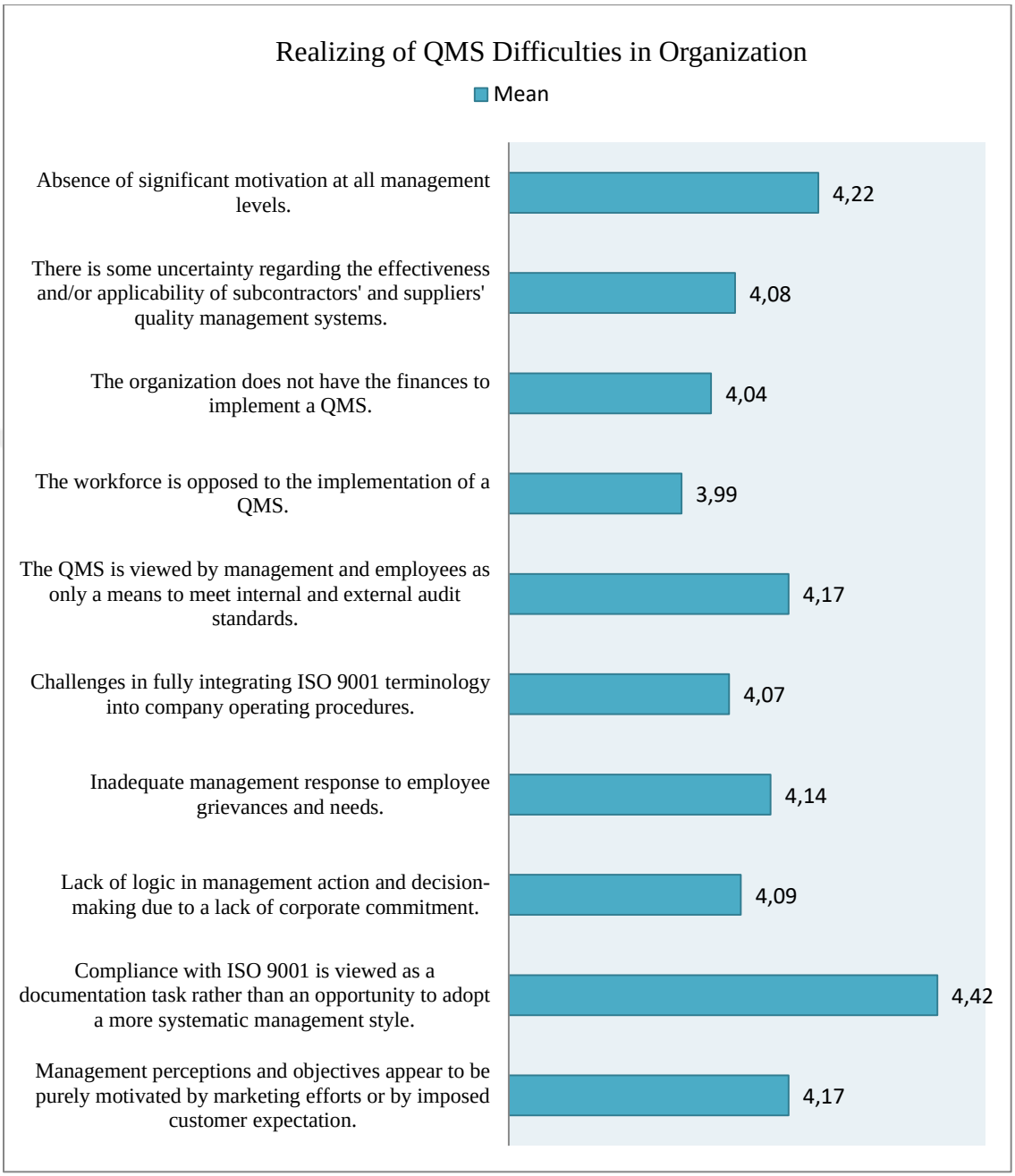


**Figure 5.5:** QMS difficulty depended on the value of mean

## 5. CONCLUSION

### 5. 1Conclusion

The study's task was to determine the benefits of Quality Management System Improvement Implementation for Iraqi construction , which can be easily integrated into their own business and project quality management procedures. With the help of a solid organizational culture and extensive data collection, this goal was achieved in the context of Iraqi construction organizations by examining issues relating to the effectiveness and continuous improvement of quality management systems implemented within the country's construction industry. The research fills in the difficulties of implementation ISO 9001's stated ideals and the presence of actual proof of the QMS in the Iraqi construction industry, assuring the final delivery of a well-operated QMS capable of delivering customer satisfaction. This study also highlights a lack of research purpose in the organizational culture profiles of Iraqi construction organizations to investigate the impact of organizational culture in driving effective QMS-ISO 9001 adoption. According to the research, the following are the findings.

According to the study, the status of good business performance of the ISO 9001 certified construction enterprises cannot be directly related to the certification of their ISO 9001 certification. Due to this, Iraqi contractors are forced to stay in their "safe zone" and do not consider the certification as having any significant value-adding implications beyond completing tender administration criteria for domestic infrastructure projects. With Iraqi contractors confronting reforms in the national construction sector and global competition concerns, this position will no longer exist for a long time to come. If the Culture-based Quality Management System Improvement Implementation Framework can be made to work, it suggests that the frameworks can assist the ISO 9001 certified contractors in utilizing the adoption of QMS-ISO 9001 in aiding them with better project quality delivery, as well as making them more competitive in their industry.

## 5.2 Recommendations

- Management must have respect in their employees and enhance their work relationships, while employees must be encouraged and supported to achieve progress.

  They must be able to make judgments on their job and suggest solutions to work-related issues. By enhancing project collaboration and communication, personnel must be motivated to enhance their performance and abilities.

- Rather than implementing a price-centric strategy, Iraqi construction enterprises should use a customer-centric approach. The transformation should be driven by adjustments in organizational strategy and a redefinition of the purpose and fundamental values of the organization.
- The Iraqi building industry refers to change, that can be completed without modifications to conventions, beliefs, and values. Change should not be immediate or cause undue anxiety; rather, the focus must be on modifying the organization's key strategic challenges. Otherwise, this will result in a substantial variance in organizational performance.

## 5.3 Recommendations for future study

- Further study might concentrate on the measurement of QMS implementation in construction organizations using IT software by defining the role of each process within the project and then identifying the flaws of each process using an upper level and lower level control chart.
- Further research could investigate the impact of external factors such as government rules and regulations, political relations, a lack of equipment and tools on the market, and transportation delays on the QMS implementation, with an emphasis on the government's commitment to provide financial and technical support to mitigate the impact of such factors on the QMS implementation and project success.
- If this research were to begin today, the most significant modifications would be made to the data collecting techniques, where observation methods would be advantageous for observing management and employee daily practice on the job. However, the research may encounter obstacles such as gaining daily access to building sites and the time necessary to gather data, which may take the duration of any construction project.

- Further study may research the requirement of marketing for the construction sector in Iraq and its influence on enhancing the competitiveness and market share of building projects.

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# Appendix 1

QUALITY MANAGEMENT SYSTEM IN CONSTRUCTION INDUSTRY

## QUESTIONNAIRES

### Section (A): Personal Data:

1. Engineering Specialization:

□ Civil □ Architectural □ Mechanical □ Electrical □ Other

2. Years of Experience:

□ 1 to 5 □ 6 to 10 □ 11 to 15 □ 16 to 20 □ more than 21

3 . Education Level:

□ BSC □ MSC □ PHD □Other

Section (B) Realizing of QMS Benefits in Organization

Benefits gained from implementing quality management, there are several advantages which will be achieved through quality management.

Please tick (√) the appropriate box which indicates whether you have experienced these.

5= Strongly Agree 4= Agree 3=Neither agree nor Disagree 2= Disagree 1= Strongly Disagree

| No. | Realizing of QMS Benefits in Organization | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|
| 1 | The quality improvement program for organizations must be dependent on ISO 9000 | | | | | |
| 2 | QMS being used to assist and guide of Project design? | | | | | |
| 3 | Would a quality management system (QMS) program benefit your organization? | | | | | |
| 4 | The applying of QMS lead to appointed Quality Manager is without the authority to effect substantive changes | | | | | |
| 5 | The realization of QMS results in increases the self-improvement of any element of management. | | | | | |
| 6 | Does your organization have a formalized management? | | | | | |
| 7 | The quality improvement program plan must be a part of the organization policy for some time. | | | | | |
| 8 | The quality improvement plan must have the full support of top management | | | | | |
| 9 | QMS being used to increase the market share for organizations on any project? | | | | | |
| 10 | QMS being used to cost estimating and reducing for any project? | | | | | |
| 11 | QMS will enhance the company reputation | | | | | |
| 12 | Do you believe that a quality management system (QMS) will work in your organization (or already does)? | | | | | |

## Section (C): Difficulties that face to applying the QMS in Organization projects

The following statements are related to problems that organization mostly face in relation to effective ISO 9001 implementation.

Please tick (√) the appropriate box which indicates whether you have experienced these problems

5=Strongly Agree 4=Agree 3=Neither agree nor Disagree 2=Disagree 1=Strongly Disagree

| No. | Difficulties in the process of attaining QMS | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|
| 1 | Management perceptions and objectives appear to be purely motivated by marketing efforts or by imposed customer expectation | | | | | |
| 2 | Compliance with ISO 9001 is viewed as a documentation task rather than an opportunity to adopt a more systematic management style. | | | | | |
| 3 | Lack of logic in management action and decision-making due to a lack of corporate commitment. | | | | | |
| 4 | Inadequate management response to employee grievances and needs. | | | | | |
| 5 | Challenges in fully integrating ISO 9001 terminology into company operating procedures | | | | | |
| 6 | The QMS is viewed by management and employees as only a means to meet internal and external audit standards | | | | | |
| 7 | The workforce is opposed to the implementation of a QMS | | | | | |
| 8 | The organization does not have the finances to implement a QMS | | | | | |
| 9 | There is some uncertainty regarding the effectiveness and/or applicability of subcontractors' and suppliers' quality management systems. | | | | | |
| 10 | Absence of significant motivation at all management levels. | | | | | |

## Appendix 2

FREQUENCIES VARIABLES=Specialaztion Experience Occupation Education BQMS1 BQMS2 BQMS3 BQMS4 BQMS5 BQMS6 BQMS7 BQMS8 BQMS9 BQMS10 BQMS11 BQMS12

/STATISTICS=STDDEV VARIANCE RANGE SEMEAN MEAN

/ORDER=ANALYSIS.

# Frequencies

**Notes**

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| | Cases Used | Statistics are based on all cases with valid data. |
| Syntax | | FREQUENCIES VARIABLES=Specialaztion Experience Occupation Education BQMS1 BQMS2 BQMS3 BQMS4 BQMS5 BQMS6 BQMS7 BQMS8 BQMS9 BQMS10 BQMS11 BQMS12<br>/STATISTICS=STDDEV VARIANCE RANGE SEMEAN MEAN<br>/ORDER=ANALYSIS. |

| | | |
|---|---|---|
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| | Elapsed Time | 00:00:00.03 |

**Statistics**

| | | Engineering Specialization | Years of Experience | Engineering Occupation | Education Level |
|---|---|---|---|---|---|
| N | Valid | 103 | 103 | 103 | 103 |
| | Missing | 0 | 0 | 0 | 0 |
| Mean | | 2.16 | 3.18 | 2.69 | 1.58 |
| Std. Error of Mean | | .157 | .101 | .144 | .090 |
| Std. Deviation | | 1.589 | 1.027 | 1.462 | .913 |
| Variance | | 2.525 | 1.054 | 2.138 | .834 |
| Range | | 4 | 3 | 4 | 3 |

**Statistics**

| | | Do you believe that a quality management system (QMS) will work in your organization (or already does)? | Would a quality management system (QMS) program benefit your organization? | Does your organization have a formalized management? | QMS being used to assist and guide of Project design? |
|---|---|---|---|---|---|
| N | Valid | 103 | 103 | 103 | 103 |
| | Missing | 0 | 0 | 0 | 0 |
| Mean | | 4.16 | 4.42 | 4.33 | 4.42 |
| Std. Error of Mean | | .074 | .061 | .061 | .064 |

| | | | | |
|---|---|---|---|---|
| Std. Deviation | .751 | .619 | .617 | .650 |
| Variance | .564 | .383 | .380 | .422 |
| Range | 3 | 3 | 3 | 3 |

**Statistics**

| | | QMS being used to cost estimating and reducing for any project? | QMS being used to increase the market share for organizations on any project? | The quality improvement program plan must be a part of the organization policy for some time. | The quality improvement plan must have the full support of top management |
|---|---|---|---|---|---|
| N | Valid | 103 | 103 | 103 | 103 |
| | Missing | 0 | 0 | 0 | 0 |
| Mean | | 4.21 | 4.22 | 4.39 | 4.30 |
| Std. Error of Mean | | .067 | .067 | .065 | .064 |
| Std. Deviation | | .681 | .685 | .660 | .654 |
| Variance | | .464 | .469 | .436 | .428 |
| Range | | 3 | 3 | 3 | 3 |

**Statistics**

| | | The quality improvement program for organizations must be dependent on ISO 9000 | QMS will enhance the company reputation | The applying of QMS lead to appointed Quality Manager is without the authority to effect substantive changes | The realization of QMS results in increases the self-improvement of any element of management. |
|---|---|---|---|---|---|
| N | Valid | 103 | 103 | 103 | 103 |

| | | | | |
|---|---|---|---|---|
| Missing | 0 | 0 | 0 | 0 |
| Mean | 4.48 | 4.17 | 4.40 | 4.34 |
| Std. Error of Mean | .061 | .074 | .064 | .068 |
| Std. Deviation | .624 | .747 | .647 | .694 |
| Variance | .389 | .557 | .418 | .481 |
| Range | 2 | 3 | 3 | 3 |

## Frequency Table

**Engineering Specialization**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Civil | 59 | 57.3 | 57.3 | 57.3 |
| | Architectural | 14 | 13.6 | 13.6 | 70.9 |
| | Mechanical | 3 | 2.9 | 2.9 | 73.8 |
| | Electrical | 9 | 8.7 | 8.7 | 82.5 |
| | Other | 18 | 17.5 | 17.5 | 100.0 |
| | Total | 103 | 100.0 | 100.0 | |

**Years of Experience**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 1-5 | 12 | 11.7 | 11.7 | 11.7 |

| | | | | | |
|---|---|---|---|---|---|
| | 6-10 | 10 | 9.7 | 9.7 | 21.4 |
| | 11-15 | 28 | 27.2 | 27.2 | 48.5 |
| | 16-20 | 53 | 51.5 | 51.5 | 100.0 |
| | Total | 103 | 100.0 | 100.0 | |

**Engineering Occupation**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Site Manager | 40 | 38.8 | 38.8 | 38.8 |
| | Planning Engineer | 25 | 24.3 | 24.3 | 63.1 |
| | Supervisor | 28 | 27.2 | 27.2 | 90.3 |
| | Other | 10 | 9.7 | 9.7 | 100.0 |
| | Total | 103 | 100.0 | 100.0 | |

**Education Level**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | BSC | 67 | 65.0 | 65.0 | 65.0 |
| | MSC | 18 | 17.5 | 17.5 | 82.5 |
| | PHD | 12 | 11.7 | 11.7 | 94.2 |
| | Other | 6 | 5.8 | 5.8 | 100.0 |
| | Total | 103 | 100.0 | 100.0 | |

**Do you believe that a quality management system (QMS) will work in your organization (or already does)?**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Disagree | 4 | 3.9 | 3.9 | 3.9 |
| | Neutral | 10 | 9.7 | 9.7 | 13.6 |
| | Agree | 55 | 53.4 | 53.4 | 67.0 |
| | Strongly agree | 34 | 33.0 | 33.0 | 100.0 |
| | Total | 103 | 100.0 | 100.0 | |

**Would a quality management system (QMS) program benefit your organization?**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Disagree | 1 | 1.0 | 1.0 | 1.0 |
| | Neutral | 4 | 3.9 | 3.9 | 4.9 |
| | Agree | 49 | 47.6 | 47.6 | 52.4 |
| | Strongly agree | 49 | 47.6 | 47.6 | 100.0 |
| | Total | 103 | 100.0 | 100.0 | |

**Does your organization have a formalized management?**

| | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Valid | Disagree | 1 | 1.0 | 1.0 | 1.0 |
| | Neutral | 5 | 4.9 | 4.9 | 5.8 |
| | Agree | 56 | 54.4 | 54.4 | 60.2 |
| | Strongly agree | 41 | 39.8 | 39.8 | 100.0 |
| | Total | 103 | 100.0 | 100.0 | |

**QMS being used to assist and guide of Project design?**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Disagree | 2 | 1.9 | 1.9 | 1.9 |
| | Neutral | 3 | 2.9 | 2.9 | 4.9 |
| | Agree | 48 | 46.6 | 46.6 | 51.5 |
| | Strongly agree | 50 | 48.5 | 48.5 | 100.0 |
| | Total | 103 | 100.0 | 100.0 | |

**QMS being used to cost estimating and reducing for any project?**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Disagree | 2 | 1.9 | 1.9 | 1.9 |
| | Neutral | 9 | 8.7 | 8.7 | 10.7 |
| | Agree | 57 | 55.3 | 55.3 | 66.0 |

| | | | | | |
|---|---|---|---|---|---|
| | Strongly agree | 35 | 34.0 | 34.0 | 100.0 |
| | Total | 103 | 100.0 | 100.0 | |

**QMS being used to increase the market share for organizations on any project?**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Disagree | 2 | 1.9 | 1.9 | 1.9 |
| | Neutral | 9 | 8.7 | 8.7 | 10.7 |
| | Agree | 56 | 54.4 | 54.4 | 65.0 |
| | Strongly agree | 36 | 35.0 | 35.0 | 100.0 |
| | Total | 103 | 100.0 | 100.0 | |

**The quality improvement program plan must be a part of the organization policy for some time.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Disagree | 1 | 1.0 | 1.0 | 1.0 |
| | Neutral | 7 | 6.8 | 6.8 | 7.8 |
| | Agree | 46 | 44.7 | 44.7 | 52.4 |
| | Strongly agree | 49 | 47.6 | 47.6 | 100.0 |
| | Total | 103 | 100.0 | 100.0 | |

**The quality improvement plan must have the full support of top management**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Disagree | 1 | 1.0 | 1.0 | 1.0 |
| | Neutral | 8 | 7.8 | 7.8 | 8.7 |
| | Agree | 53 | 51.5 | 51.5 | 60.2 |
| | Strongly agree | 41 | 39.8 | 39.8 | 100.0 |
| | Total | 103 | 100.0 | 100.0 | |

**The quality improvement program for organizations must be dependent on ISO 9000**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Neutral | 7 | 6.8 | 6.8 | 6.8 |
| | Agree | 40 | 38.8 | 38.8 | 45.6 |
| | Strongly agree | 56 | 54.4 | 54.4 | 100.0 |
| | Total | 103 | 100.0 | 100.0 | |

**QMS will enhance the company reputation**

| | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Valid | Disagree | 2 | 1.9 | 1.9 | 1.9 |
| | Neutral | 15 | 14.6 | 14.6 | 16.5 |
| | Agree | 49 | 47.6 | 47.6 | 64.1 |
| | Strongly agree | 37 | 35.9 | 35.9 | 100.0 |
| | Total | 103 | 100.0 | 100.0 | |

**The applying of QMS lead to appointed Quality Manager is without the authority to effect substantive changes**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Disagree | 1 | 1.0 | 1.0 | 1.0 |
| | Neutral | 6 | 5.8 | 5.8 | 6.8 |
| | Agree | 47 | 45.6 | 45.6 | 52.4 |
| | Strongly agree | 49 | 47.6 | 47.6 | 100.0 |
| | Total | 103 | 100.0 | 100.0 | |

**The realization of QMS results in increases the self-improvement of any element of management.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Disagree | 1 | 1.0 | 1.0 | 1.0 |
| | Neutral | 10 | 9.7 | 9.7 | 10.7 |

| | | | | | |
|---|---|---|---|---|---|
| | Agree | 45 | 43.7 | 43.7 | 54.4 |
| | Strongly agree | 47 | 45.6 | 45.6 | 100.0 |
| | Total | 103 | 100.0 | 100.0 | |

```
FREQUENCIES VARIABLES=DQMS1 DQMS2 DQMS3 DQMS4 DQMS5 DQMS6 DQMS7 DQMS8 DQMS9
DQMS10
  /ORDER=ANALYSIS.
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## Frequencies

**Notes**

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| | Cases Used | Statistics are based on all cases with valid data. |
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**Statistics**

| | | Management perceptions and objectives appear to be purely motivated by marketing efforts or by imposed customer expectation. | Compliance with ISO 9001 is viewed as a documentation task rather than an opportunity to adopt a more systematic management style. | Lack of logic in management action and decision-making due to a lack of corporate commitment. | Inadequate management response to employee grievances and needs. | Challenges in fully integrating ISO 9001 terminology into company operating procedures. |
|---|---|---|---|---|---|---|
| N | Valid | 103 | 103 | 103 | 103 | 103 |
| | Missing | 0 | 0 | 0 | 0 | 0 |

**Statistics**

| | | The QMS is viewed by management and employees as only a means to meet internal and external audit standards. | The workforce is opposed to the implementation of a QMS. | The organization does not have the finances to implement a QMS. | There is some uncertainty regarding the effectiveness and/or applicability of subcontractors' and suppliers' quality management systems. | Absence of significant motivation at all management levels. |
|---|---|---|---|---|---|---|
| N | Valid | 103 | 103 | 103 | 103 | 103 |
| | Missing | 0 | 0 | 0 | 0 | 0 |

## Frequency Table

**Management perceptions and objectives appear to be purely motivated by marketing efforts or by imposed customer expectation.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Strongly disagree | 1 | 1.0 | 1.0 | 1.0 |
| | Disagree | 5 | 4.9 | 4.9 | 5.8 |
| | Neutral | 6 | 5.8 | 5.8 | 11.7 |
| | Agree | 54 | 52.4 | 52.4 | 64.1 |

| | | | | | |
|---|---|---|---|---|---|
| | Strongly agree | 37 | 35.9 | 35.9 | 100.0 |
| | Total | 103 | 100.0 | 100.0 | |

**Compliance with ISO 9001 is viewed as a documentation task rather than an opportunity to adopt a more systematic management style.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Disagree | 2 | 1.9 | 1.9 | 1.9 |
| | Neutral | 7 | 6.8 | 6.8 | 8.7 |
| | Agree | 40 | 38.8 | 38.8 | 47.6 |
| | Strongly agree | 54 | 52.4 | 52.4 | 100.0 |
| | Total | 103 | 100.0 | 100.0 | |

**Lack of logic in management action and decision-making due to a lack of corporate commitment.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Strongly disagree | 3 | 2.9 | 2.9 | 2.9 |
| | Neutral | 24 | 23.3 | 23.3 | 26.2 |
| | Agree | 34 | 33.0 | 33.0 | 59.2 |
| | Strongly agree | 42 | 40.8 | 40.8 | 100.0 |
| | Total | 103 | 100.0 | 100.0 | |

**Inadequate management response to employee grievances and needs.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Strongly disagree | 3 | 2.9 | 2.9 | 2.9 |
| | Disagree | 3 | 2.9 | 2.9 | 5.8 |
| | Neutral | 12 | 11.7 | 11.7 | 17.5 |
| | Agree | 44 | 42.7 | 42.7 | 60.2 |
| | Strongly agree | 41 | 39.8 | 39.8 | 100.0 |
| | Total | 103 | 100.0 | 100.0 | |

**Challenges in fully integrating ISO 9001 terminology into company operating procedures.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Strongly disagree | 2 | 1.9 | 1.9 | 1.9 |
| | Disagree | 5 | 4.9 | 4.9 | 6.8 |
| | Neutral | 12 | 11.7 | 11.7 | 18.4 |
| | Agree | 49 | 47.6 | 47.6 | 66.0 |
| | Strongly agree | 35 | 34.0 | 34.0 | 100.0 |
| | Total | 103 | 100.0 | 100.0 | |

**The QMS is viewed by management and employees as only a means to meet internal and external audit standards.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Strongly disagree | 3 | 2.9 | 2.9 | 2.9 |
| | Disagree | 3 | 2.9 | 2.9 | 5.8 |
| | Neutral | 8 | 7.8 | 7.8 | 13.6 |
| | Agree | 49 | 47.6 | 47.6 | 61.2 |
| | Strongly agree | 40 | 38.8 | 38.8 | 100.0 |
| | Total | 103 | 100.0 | 100.0 | |

**The workforce is opposed to the implementation of a QMS.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Strongly disagree | 1 | 1.0 | 1.0 | 1.0 |
| | Disagree | 5 | 4.9 | 4.9 | 5.8 |
| | Neutral | 19 | 18.4 | 18.4 | 24.3 |
| | Agree | 47 | 45.6 | 45.6 | 69.9 |
| | Strongly agree | 31 | 30.1 | 30.1 | 100.0 |
| | Total | 103 | 100.0 | 100.0 | |

**The organization does not have the finances to implement a QMS.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Strongly disagree | 3 | 2.9 | 2.9 | 2.9 |
| | Disagree | 6 | 5.8 | 5.8 | 8.7 |
| | Neutral | 9 | 8.7 | 8.7 | 17.5 |
| | Agree | 51 | 49.5 | 49.5 | 67.0 |
| | Strongly agree | 34 | 33.0 | 33.0 | 100.0 |
| | Total | 103 | 100.0 | 100.0 | |

**There is some uncertainty regarding the effectiveness and/or applicability of subcontractors' and suppliers' quality management systems.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Strongly disagree | 2 | 1.9 | 1.9 | 1.9 |
| | Disagree | 2 | 1.9 | 1.9 | 3.9 |
| | Neutral | 7 | 6.8 | 6.8 | 10.7 |
| | Agree | 67 | 65.0 | 65.0 | 75.7 |
| | Strongly agree | 25 | 24.3 | 24.3 | 100.0 |
| | Total | 103 | 100.0 | 100.0 | |

**Absence of significant motivation at all management levels.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Disagree | 6 | 5.8 | 5.8 | 5.8 |
| | Neutral | 6 | 5.8 | 5.8 | 11.7 |
| | Agree | 50 | 48.5 | 48.5 | 60.2 |
| | Strongly agree | 41 | 39.8 | 39.8 | 100.0 |
| | Total | 103 | 100.0 | 100.0 | |