T.C.
İSTANBUL GEDİK ÜNİVERSİTESİ
LİSANSÜSTÜ EĞİTİM ENSTİTÜSÜ

CHALLENGES AND BENEFITS OF TOTAL QUALITY MANAGEMENT IN CONSTRUCTION PROJECTS

MASTER'S THESIS

Alaa Mohammed Abdulrazzaq ABDULRAZZAQ

Civil Engineering Department

Master in Civil Engineering English Program

SEPTEMBER 2023

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Yüksek Lisans Tez Onay Belgesi

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DECLARATION

I, Alaa Mohammed Abdulrazzaq ABDULRAZZAQ, declare that this thesis titled "Challenges and Benefits of Total Quality Management in Construction Projects" is original work I did for the award of the master's degree in Civil Engineering. I also declare that this thesis or any part of it has not been submitted and presented for any other degree or research paper in any other university or institution. (06/09/2023)

Alaa Mohammed Abdulrazzaq ABDULRAZZAQ

DEDICATION

Present thesis devoted to my wonderful parents and in order to appreciate for their unwavering, eternal love, encouragement, support, patience and sacrifices.

PREFACE

I appreciate the effort and support of the members of my advisory and examination committees.

I would particularly like to thank my advisor, Dr. Hasan Bozkurt Nazilli, for his guidance and instruction throughout my time at Istanbul Gedik University.

Additionally, I'd like to thank my family, particularly my wife. You are always my pillar during difficult times, and I cannot thank you enough for your assistance.

September 2023 Alaa Mohammed Abdulrazzaq ABDULRAZZAQ

ABBREVIATIONS

TQM	: Total Quality Management
QA	: Quality Assurance
QC	: Quality Control
QI	: Quality Inspection
CPM	: Construction Project Management
PM	: Project Management
PMPOK	: Project Management Body of knowledge
PMI	: Project Management Institutional
DPMO	: Defects-Per-Million-Opportunities

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CHALLENGES AND BENEFITS OF TOTAL QUALITY MANAGEMENT IN CONSTRUCTION PROJECTS

ABSTRACT

Two articles were combined to create this thesis. The first gives a history of TQM up to the present day's commercial environment. The foundational tenets of TQM are examined, and advantages are noted. To comprehend why well-intentioned organizations are not always able to sustain this management method, an examination of the difficulties and impediments that prevent the majority of businesses from reaching these results is done. The effectiveness of a TQM program is examined in the second article, which also examines these TQM hurdles and difficulties and their effects. In this work, structural equation modeling is used to examine survey data. The results show that several of the TQM Principles' problems are connected, and some of them have an effect on how well a TQM program works. This study is distinctive in that it apply tangible criteria to the difficulties that companies that strive to introduce TQM initiatives. The core tenets of TQM are examined, and the overwhelming advantages and precise success metrics are stated. An analysis of the difficulties and hindrances that prevent the majority of businesses from succeeding these accomplishments are made in order to better comprehend why even the most well-intentioned businesses are sometimes unable to maintain this management strategy built on reliable quality principles.

This thesis concludes by outlining potential directions for future research to provide a solid knowledge of analyzing the stated obstacles and issues in order to provide a conceptual model of implementation based on them.

Keywords: *Project Management, Quality Management, Construction project, Benefits of TQM, challenge of TQM*

İNŞAAT PROJELERİNDE TOPLAM KALİTE YÖNETİMİNİN ZORLUKLARI VE FAYDALARI

ÖZET

Bu tezi oluşturmak için iki makale birleştirilmiştir. Birincisi, TKY'nin günümüze kadar olan ticari ortamına kadar bir tarihini verir. TKY'nin temel ilkeleri incelenmekte ve avantajlara dikkat çekilmektedir. İyi niyetli kuruluşların neden her zaman bu yönetim yöntemini sürdüremediklerini anlamak için, işletmelerin çoğunluğunun bu sonuçlara ulaşmasını engelleyen zorluk ve engellerin incelenmesi yapılır. Bir TKY programının etkinliği, bu TKY engellerini ve zorluklarını ve bunların etkilerini de inceleyen ikinci makalede incelenmiştir. Bu çalışmada anket verilerinin incelenmesinde yapısal eşitlik modellemesi kullanılmıştır. Sonuçlar, TKY İlkeleri'nin sorunlarının birçoğunun bağlantılı olduğunu ve bazılarının bir TKY programının ne kadar iyi çalıştığını etkilediğini göstermektedir. Bu çalışmalar . Bu çalışma, TKY girişimlerini tanıtmaya çalışan şirketlerin karşılaştığı zorluklara somut kriterler uygulaması bakımından ayırt edicidir. TKY'nin temel ilkeleri incelenir ve ezici avantajlar ve kesin başarı metrikleri belirtilir. Bu çalışma, TKY girişimlerini tanıtmaya çalışan şirketlerin karşılaştığı zorluklara somut kriterler uygulaması bakımından ayırt edicidir. TKY'nin temel ilkeleri incelenir ve ezici avantajları ve kesin başarı metrikleri belirtilir. İşletmelerin çoğunluğunun bu başarıları başarmasını engelleyen zorlukların ve engellerin analizi, en iyi niyetli işletmelerin bile bazen güvenilir kalite ilkeleri üzerine kurulu bu yönetim stratejisini neden sürdüremediklerini daha iyi anlamak için yapılır.

Bu tez, bunlara dayalı kavramsal bir uygulama modeli sağlamak için belirtilen engelleri ve sorunları analiz etme konusunda sağlam bir bilgi sağlamak için gelecekteki araştırmalar için potansiyel yönleri özetleyerek sona ermektedir.

Anahtar Kelimeler: *Proje Yönetimi, Kalite Yönetimi, İnşaat projesi, TKY'nin faydaları, TKY'nin zorluğu*

1. INTRODUCTION

1.1 Introduction to the Study

Total Quality Management (TQM) is an approach to management that emphasizes the importance of both the work process and the people involved in it in order to maximize customer satisfaction and boost business results. Meeting or exceeding customers' expectations requires well-coordinated work processes that enable constant development across all areas of the company. It's a way of doing business that places an emphasis on quality as a whole, across the board, to cut down on inefficiencies and save cost.

Because of its versatility, TQM is increasingly being used by organizations in the public sector with the goal of better satisfying citizens' needs. Noncompliance with the TQM implementation processes and principles has, however, slowed the ideology's spread within most organizations. In contrast to the organizations that have implemented TQM wholeheartedly, those who have only dabbled in its ideas have treated it more like a gimmick.

As a result, most organizations that adopted this approach have fallen short of their goals. Especially in emerging economies like Nigeria, where the adoption of these concepts may seem farfetched to organizations, it is important to continue to bolster the benefits that arise from the use of TQM. The aviation sector in Nigeria sheds light on the flaws that arise when businesses prioritize profits over quality. The nature of competition appears to be shifting from what it was before the avalanche of changes taking place in the country as a result of government reforms. Foreign and domestic investors flooding many economic sectors have spawned fierce rivalry, forcing businesses to examine their internal workings and make strategic adjustments to stay competitive.

Issues with subpar service, and quick implementation of the TQM system were noted. have perennially plagued the construction sector, with several parties pointing fingers at one another for the industry's lack of productivity. While the influx of fresh

capital and widespread adoption of the TQM philosophy have undoubtedly revitalized the business, the usage of these services by the construction industry continues to raise a wide range of concerns. The purpose of this study is to investigate the quality standards of Iraqi companies, identify barriers to TQM's spread, and evaluate TQM's impact on the country's construction sector.

Therefore, construction company that employ a strategic approach to quality management will gain a competitive edge (Ghobadian, 1994).

This method keeps company focused on their customers. TQM encourages creativity by letting workers make choices that directly affect their work. In order to provide costumer with novel services, construction need a structure that is adaptable enough to allow for collaboration between several departments.

The leadership of the company need support the idea and practices of quality management if TQM are to be successfully implemented throughout the organization. That is to say, both the auxiliary and primary functions of service provision need to embed quality into their operations.

1.2 Research Motivation

As a result of shifts in consumer preferences, several businesses have adjusted their offerings to better suit modern consumers. That's why it's so important for businesses to focus on providing clients with services that not only live up to but also surpass their expectations. There are still certain problems with the service delivery process, despite companies' best efforts to meet customers' expectations. Most Iraqi businesses don't prioritize quality across the board but instead focus on a select few processes in order to save money. New entrants to the market, with an emphasis on overall quality management, are altering the nature of competition in the business. One way in which this helps them is by attracting more customers in the long run.

The refusal of established companies to take a quality strategy seriously runs the risk of precipitating their demise. Because of this, a shift in organizational culture and structure is required to make place for a new method of service provision. When the principles of Total Quality Management are properly followed, the practice can be profitable for businesses by increasing customer satisfaction with products and services. Gains in market share and earnings potential may follow from the quality

boost. The Total Quality Management (TQM) approach assures that businesses alter their methods of operation to boost productivity, delight customers, and reach peak performance (Porter, 1996). According to Porter, increasing the efficiency of operations is necessary but not enough to ensure a company's financial success. According to Sila (2007), TQM helps develop a consistent manufacturing process, which in turn improves product quality and decreases scrap, rework, and the requirement for buffer stock. He said that using TQM, both manufacturing time and money could be cut.

There are many more TQM activities that contribute to improved operational performance, including as training, information system management, supplier relationships, etc.

1.3 Research Questions

Project managers in Iraq need a new construction management system supported by appropriate legislation, control and pricing systems with efficient designs that are suited for the current scenario material to help them steer their projects in the face of intense competition.

The following questions must be addressed:

- Identify the statements with respect to the organization that was initiating or not to TQM
- Which describe the results of best implementation of TQM?

The purpose of this thesis is to address these questions and others like them so that the Iraqi construction industry can become more proficient in project management.

1.4 Methodology

This thesis started with the study of the TQM in project management and the present issues in the construction industry in order to meet its research objectives.

To create and evaluate competence models, a thorough literature review was performed. This included books, articles, websites, and electronic journals. Conceive research questions that can help elucidate the construction industry's project management technique. Conduct a pilot study to obtain data, and then modify the

questions as necessary. Data collected should be analyzed thematically. Conclude the paper and provide some recommendations.

1.5 Chapter Descriptions

There are five 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: Methodology.

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

- Chapter Four : Analysis of Data

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 Five: 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.

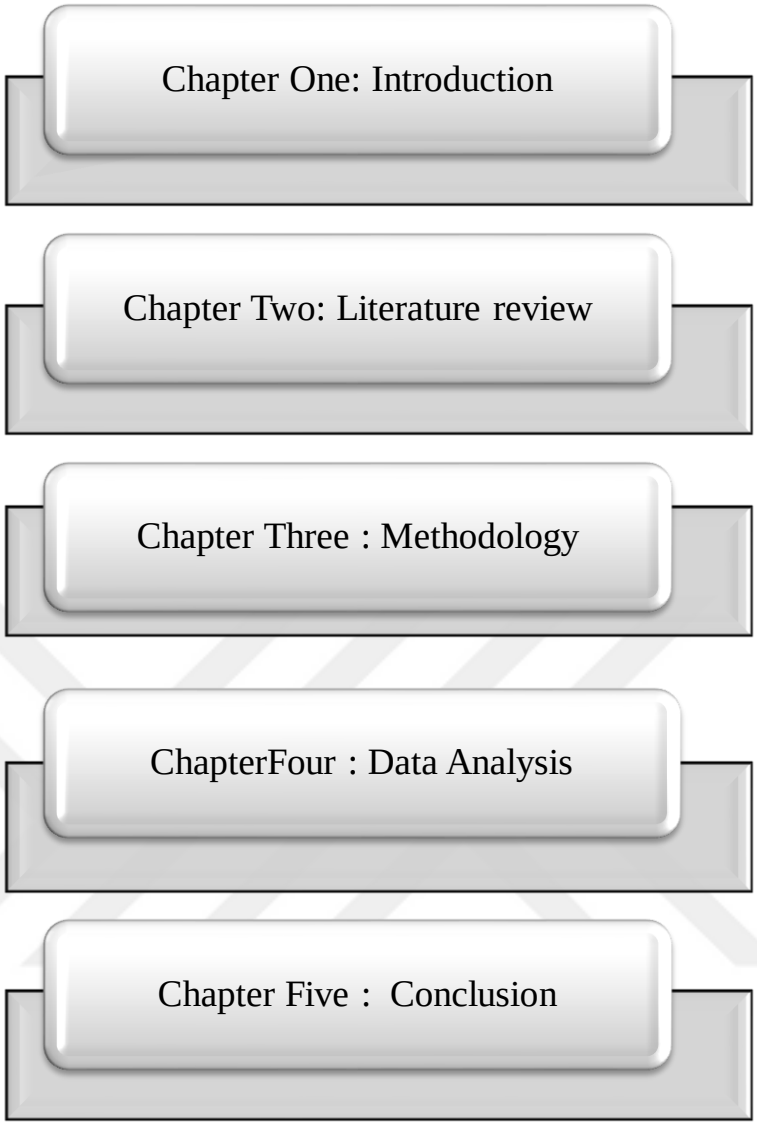

Figure 1.1: Chapter Descriptions for Research Stage

Source: Author

2. LITERATURE REVIEW

2.1 Introduction

This chapter examines the notion of quality by analyzing the varying definitions and perspectives of a number of authors. Under quality aspects, a broad framework of what quality is all about is presented. Since the focus of the research is on the impact of TQM on construction quality, as well as how it has been evaluated by previous researchers. organization as well as customers. The application of TQM adheres to the principle of quality of service, discussing the many stages and features of these levels.

The subject of TQM under consideration examines the contributions of its founders to its tenets of TQM. The advantages of TQM and the obstacles to its adoption are discussed during the literature provides a summary of the Iraqi construction sector and the necessity for benchmarking its performance. activities with the finest in the world.

2.2 The Core Concept of Quality

Quality is an important part of products and services that keep customer satisfied. Different people have different definitions of the word "quality" and different ideas about what it means. One thing that all business definitions have in common is that a Crosby (1979) said that quality is meeting requirements or specifications. He also said that quality must be able to be measured in order to be managed well.

Volley and Tickle (2001) said that ISO 9000:2000 defined quality as "how well a set of inherent characteristics meets requirements. "Product or service's quality is how well it meets the customer's expectations. The American Society of Quality says that quality is subjective and that different people have different ideas about it. To them, quality can mean two different things: the ability of a product or service to meet a certain need, or a product or service that is free of flaws. It can be described as being

in line with valid requirements, where valid requirements are conditions that meet customer needs.

Kondo (1997) said that quality is a way for employees to exert control. He thinks that a company's main goal is to be appealing to both its employees and its customers while also earning profit for its shareholders. Able to be measured and done, Peters (1999) said that quality is a "magic bullet" that leads to lower costs, better products, better customer service, and higher margins. 'Quality is in,' he also said. This means that what it is depends on what the customer thinks it's really.

George Bernard, who was mentioned in Stebbing (1992), said that the world has two kinds of qualities: those that are efficient and those that are not. He thinks that every senior manager should strive for efficiency, and that's what customers expect from service. He said that organizations aren't effective because employers don't train their workers well enough or give jobs to people who aren't qualified. No matter how quality is defined, it is seen as part of an organization's culture. This culture should include all parts of production.

2.3 Quality Management

Quality management includes the design of strategies, the establishment of goals and objectives, the planning and execution of plans, and the utilization of control systems for monitoring feedback and applying corrective measures. There are two components to an organization's quality management solutions.

- Achieving consumer satisfaction and
- Improvement in total productivity and profitability (dale et al., 1994a).

The basic objective of quality management, according to Juran (1988), is the abolition of failure, both conceptually and practically, in terms of goods, services, and procedures. This indicates that not only would products, services, and procedures fail to perform as intended, but also that their intended purpose was not what the client desired. In order to avoid failure in quality management, there should be planning, organizing, and controlling. Dale (1994) identified four levels of quality management: inspection, quality control (QC), quality assurance (QA), and comprehensive quality management (TQM).

2.3.1 Inspection

Inspection is described as "actions such as measuring, inspecting, testing, gauging one or more features of a product or service and comparing them with specified standards to assess conformance" in accordance with ISO 8402, 1986. It entails examining, measuring, and evaluating a product's or service's qualities, comparing them to predetermined standards, and determining if the attributes meet those requirements (Dale et al., 1994b). Finding flaws in goods and services may be done quickly and easily through inspection.

Deming (1986) stated that "identifying defective products and discarding them is too late, useless, and expensive." For him, state resulting through process development rather than external examination.

2.3.2 Quality control

Organizations have always managed quality through quality control. Checking and evaluating completed work is part of quality control. This is mostly accomplished by inspecting goods and services both during and after the operations process to ensure that they fulfill the necessary standards.

According to Juran (1988), quality control is the regulatory process through which we gauge the actual quality performance, assess how it stacks up against standards, and take appropriate action. It is a more advanced management tool designed to stop products and services that don't meet standards from reaching the ultimate consumer. Operational methods and activities are utilized as quality controls to satisfy quality requirements (ISO 8402, 1994).

2.3.3 Quality assurance

This approach is founded on the idea that the manufacturing process should be designed with the intention of reducing the risk of creating substandard items. Dale, 1994) propose that quality assurance is a prevention-based approach that emphasizes product, service, and process design to enhance product and service quality while boosting efficiency.

Contrary to quality control, which concentrates on fault discovery after the product is created, quality assurance places an emphasis on defect prevention.

Quality control puts a lot of attention on the actions that take place during the manufacturing process in order to avoid the manufacture of non-conforming goods.

As a result, it is a management strategy intended to regulate quality at all production phases to stop quality issues from developing. According to the quality assurance theory, issues with quality are brought on by inadequate process design and that quality is produced in the design stage rather than the control stage.

In order to be effective, quality assurance, according to Lockwood et al. (1996), "must entail the establishment of a new operational philosophy and methodology that aims to be proactive rather than reactive, including inspiring and engaging individuals in the process beyond usual departmental barriers.

"Quality assurance is broadly described by Oakland (1995) as the avoidance of quality issues by deliberate and methodical actions, which includes documentation.

2.3.4 Total quality management (TQM)

The greatest level of quality management is at this point. According to Dale et al. (1994) and Lockwood et al. (1996), it is concerned with the management of the quality principle in all areas of a business, including customers and suppliers. Total Quality Management (TQM) is the integration of quality management concepts into the main business operations and the application of these principles to all facets of the company, including customers and suppliers. It is a strategy that calls on everyone in the organization to continuously improve. TQM is a philosophy that calls for all of an organization's stakeholders to cooperate with one another in order to support its company's operations. BS.4778; section 2(1991) is referenced by Dale 1994).

'*TQM is defined as a philosophy embracing all activities through which the needs and expectations of the customer and the community, and the objectives of the organization are satisfied in most efficient and cost effective way by maximizing the potentials of all employees in a continuing drive for improvement*.'

TQM is an efficient method for combining the quality development, quality maintenance, and quality improvement efforts of many components of a system in order to provide services at the most affordable level and reap complete satisfaction, according to Mohammed (2006). The goal of TQM is to provide customers' demands

in an effective, dependable, and lucrative manner. It entails a drastic shift in how a company conducts its daily business in order to guarantee that every employee and the departments in which they work have quality at the front of their minds.

TQM was described by Vorley and Tickle (2001) as the synthesis of a company's organizational, technological, and cultural components. According to their opinion, TQM is a heart-and-mind concept that acknowledges how organizational culture influences behavior, which in turn affects quality.

TQM is a strategy to increase flexibility and competitiveness for the entire organization, according to Oakland (1989).

TQM may be characterized as a management system that consists of interdependent components, such as fundamental values, methods like process management, benchmarking customer-focused planning or improvement teams, and tools like control charts, according to Hellsten and Klefsjö (2000).

TQM may be characterized as a management system that consists of interdependent components, such as fundamental values, methods like process management, benchmarking customer-focused planning or improvement teams, and tools like control charts, according to Hellsten and Klefsjö (2000). TQM, according to Dahlgaurd, Kristensen, and Kanji (1999), is a business culture defined by higher customer satisfaction via ongoing improvement engaging all employees in the company. The methods and techniques used in TQM can be applied throughout any organization, according to Oakland (1989), who stated that "for an organization to be truly effective each part of it must work properly together towards the same goal, acknowledging that each person and each activity affects and in turn is affected by each other."

2.3.5 Stages of total quality management implementation

Six tiers of TQM adoption were established by (Dale, 1994), including uncommitted, drifters, tool pushers, improvement prize winners and world class. According to them, these stages do not necessarily represent the stages through which organizations around the world pass on their TQM journey. These levels according to Dale are to help organization in identifying their weaknesses and proffering solutions to them via means of use of continuous improvement.

- Uncommitted: Organizations in this level have not yet initiated a defined process for quality improvement. In this stage, organizations do not engage in quality improvement initiatives like staff training because they see them as additional costs.

Because they are unaware of the advantages of quality improvement and lack a suitable quality improvement strategy, organizations in this stage are referred to as being uncommitted (Dalem, 1994).

These organizations' management is distinguished by a focus on return on sales and net asset employed.

According to (Dale 1994), this level also shares other characteristics that include:

- A significant problem for reaching the target sales.
- Employees have little to no consideration for quality.
- A comprehensive material inspection is conducted on arriving materials and at crucial points in during the production process.
- Even amongst the highest management and front-line personnel, there is a lack of communication throughout the various manufacturing divisions.
- Minimal user friendliness.
- Drifters: These are organizations who have engaged in a quality improvement process for up to three years while adhering to TQM's accessible advice and expertise. The management of companies at this level prefer to evaluate the firm's performance based on the TQM adoption and anticipate quick advantages. These firms regard TQM as a program rather than a process, resulting in poor employee awareness of the policy.

(Dale ,1994) stated that organizations with such a management style are referred to as drifters because they move from one programmer to the next in a stop-and-go manner, with concepts, ideas, and initiatives being reborn and re-launched under various guises.

This stage is typically characterized by the absence of a strategy for the organization-wide deployment of the TQM concept, which restricts the implementation of TQM to managers while keeping the shop floor out of the implementation process.

- Tool pushers: In most situations, organizations in this group fail to implement quality improvement initiatives effectively. They implement quality management instruments such as quality cycles and quality improvement groups. These organizations frequently attribute the failure of TQM to the deployed instruments. According to Dale et al. ((b) 1994,) companies at this stage find it difficult to retain the momentum of their development activities and are always seeking fresh ideas. A number of characteristics of drifters include:
- A significant issue about fulfilling sales goals.
- Focused on current rather than future issues
- No commitment of each top executive to TQM
- TQM is not implemented in every aspect of an organization.

  Compared to the drifters, companies in this category have greater expertise with quality improvement.
- Improvers: Organizations in this group have participated in a quality improvement effort for between five and eight years and have made significant progress during this period (Dale et al, 1994).

They comprehend that complete quality requires long-term cultural change and have acknowledged the significance of culture transformation and quality enhancement.

According to Dale 1994 organizations in this group are known as improvers because they are heading in the right direction and have achieved substantial progress, but still have a ways to go.

This is due to the fact that the execution of TQM relies on a small number of managers to sustain the motivation and direction of the improvement plan.

- Award Winners: These organizations are deemed award winners because they have reached a level of TQM maturity in which the culture, values, trust capabilities, and employee participation have become all-encompassing and permeate the whole business (Dale et al., 1994, p. In this type of company, every employee understands the significance of quality and makes every effort to preserve it. True competition based on product or service quality can

only be achieved when an organization has reached the point where it may compete for awards (William and Bech, 1989, citing Dale et al., 2012).

Organizations in this level are regarded to have mastered the quality improvement process, as they possess all the necessary elements to achieve higher levels.

- Exceptional quality: According to Dale et al. ((b) 1994), these organizations stand out for their commitment to continuous quality improvement and customer-focused business practices. The businesses that have reached this stage are always looking for ways to enhance their offerings to customers. It was further mentioned that the goal of TQM in this context is to increase competitiveness by influencing how clients view the business via ongoing service innovation. TQM has a greater effect since it focuses on continual improvement to increase consumer appeal. Every employee in the company has the objective of ensuring client satisfaction.

2.3.6 Principles of total quality management

One of the meanings of a "principle" is a fundamental idea, theory, or guideline that significantly affects how something is carried out. A collection of core ideals, standards, and values known as "quality management principles" can serve as a foundation for quality management. The QMPs can serve as a basis to direct performance improvement inside a company. International specialists from ISO/TC 176, which is in charge of creating and upholding the ISO quality management standards, created and updated them. The following are the seven quality management principles:

QMP 1 – Customer focus

QMP 2 – Leadership

QMP 3 – Engagement of people

QMP 4 – Process approach

QMP 5 – Improvement

QMP 6 – Evidence-based decision making

QMP 7 – Relationship management.

There is no ranking of importance for these ideas. Each principle's relative weight will differ from organization to organization and is likely to vary wildly through times(ISO 9000, ISO 9001).

2.3.6.1 Customer focus

The customer's needs are the main emphasis of the TQM philosophy. As a result, most businesses make every effort to both meet and surpass their clients' expectations in both their everyday operations and long-term strategies (Andrle, 1994). TQM mandates that businesses create a customer committed resources while simultaneously committing to operationally oriented practices that position consumers and exceeding their expectations as a benefit to the organization's financial health. Philippines and Forza (1998) said that organizations must keep a tight connection with its clients to understand their needs and gauge if it has been effective in providing their needs up to the demands of the consumer. Muffatto and Panizzolo (1995) claim that a high degree of customer .The only way to ensure satisfaction is to offer goods or services with attributes that will do so.Customer demands or specifications. Development is driven by the requirements and expectations of the client and service provision. This is because clients determine the degree of service excellence.provided (Jablonski, 1992) .

Organizations, according to Oakland (1993), are composed of a variety of internal suppliers and customers.

According to him, this establishes the company's quality chain and suggests that each employee is a potential client and supplier during the production process. The production process is organized in a way that each process has requirements and expectations that others in the system must meet the production network. The efficient satisfaction of these demands results in the creation of high-quality products services and products.

2.3.6.2 Leadership

Leaders at all levels create conditions that encourage participation of individuals in accomplishing the organization's quality goals by establishing unity of purpose and direction.

An organization may align its strategies, policies, procedures, and resources to accomplish its goals by establishing unity of purpose, direction, and employee involvement. The main advantages of leadership more efficacy and efficiency in achieving the organization's quality goals improving the organization's process coordination, improved dialogue across the organization's various levels and departments, Enhancing the organization's and its employees' capacity to provide the desired results , You may do this by: Promote internal communication about the organization's mission, vision, strategy, policies, and procedures, Establish and uphold agreed principles of justice and moral conduct at all organizational levels.

2.3.6.3 People's involvement

Competent, empowered and engaged people at all levels throughout the organization are essential to enhance its capability to create and deliver value. All levels of employees must be involved, and their individuality must be respected, for management to be effective and efficient.

People are more likely to participate in accomplishing the organization's quality goals when they are recognized, empowered, and given opportunities to grow in their competence. Characteristics suggest, a better knowledge of the organization's quality goals among its members, Increased participation of individuals in development efforts, Improved initiative, creativity, and personal growth, increased contentment of people ,and increased focus on the organization's common principles and culture.

You may do this by interact with individuals to help them appreciate the value of their contributions, Encourage teamwork across the whole organization, Recognize and appreciate the contributions, growth, and learning of others

2.3.6.4 Process approach

When operations are seen and handled as interconnected, consistent and predictable results are more successfully and efficiently attained. processes that work together in concert . The procedures that make up the quality management system work together. An organization may enhance the system and its performance by comprehending how this system generates results. The key advantages , improved capacity to concentrate efforts on important procedures and chances for development , Results that are consistent and predictable thanks to a set of connected procedures,

improvement provided about by efficient resource usage, less cross-functional barriers, and better process management, Making it possible for the organization to give interested parties assurances about its consistency, effectiveness, and efficiency.

Things that can do to provide process, Specify the system's goals and the procedures needed to achieve them, Create clear lines of duty, accountability, and authority for managing processes.

2.3.6.5 Improvement

Successful businesses constantly strive for improvement. For an organization to sustain present performance levels, respond to changes in its internal and external situations, and generate new possibilities, improvement is crucial. Key advantages of improvements, Better organizational capabilities, process performance, and customer satisfaction, Increased emphasis on root-cause analysis and identification, followed by preventative and remedial measures, improved capacity to recognize and respond to opportunities and hazards both inside and beyond the company.

Things that can do to provide improvement , Encourage the formulation of improvement goals at all organizational levels, • Train and teach individuals at all levels on the use of fundamental tools and processes to accomplish development goals, Ensure that individuals are capable of promoting and completing improvement projects, Monitor, evaluate, and audit improvement project planning, execution, completion, and outcomes.

2.3.6.6 Decision-making based on knowledge

Decisions that are based on the analysis and assessment of information and data are more likely to result in the intended outcomes. Making decisions may be a difficult process since there is usually some ambiguity involved. Frequently, it calls for inputs from a variety of sources and types, in addition to their interpretation, which be arbitrary. It is crucial to comprehend links between causes and effects and possible unanticipated outcomes. Facts and proof enhanced objectivity is achieved through data analysis. and assurance while making decisions. Characteristics suggest to prove better decision-making techniques , Improved evaluation of process effectiveness and goal-achieving capacity, Increased efficiency and efficacy of operations, Improved capacity to analyze, question, and revise judgments and decisions.

2.3.6.7 Relationship Management

For sustained success, an organization manages its relationships with interested parties, such as suppliers. The effectiveness of an organization is influenced by interested stakeholders. The likelihood of sustained success increases when the company handles connections with all of its interested partners to maximize their influence on its performance. It is especially crucial to manage relationships with the networks of its suppliers and partners Key advantages.

2.4 Benefits of TQM Implementation

Customer satisfaction with service offerings will rise as a result of the effective application of TQM (Omachonu and Ross, 1994). Through increased customer satisfaction, quality increases customer loyalty, which can then result in repeat business and attract new customers through positive word of mouth. The reduction of costs will be made possible by word-of-mouth advertising. This Omicron and Ross (1994) noted factor will give the business a competitive edge.

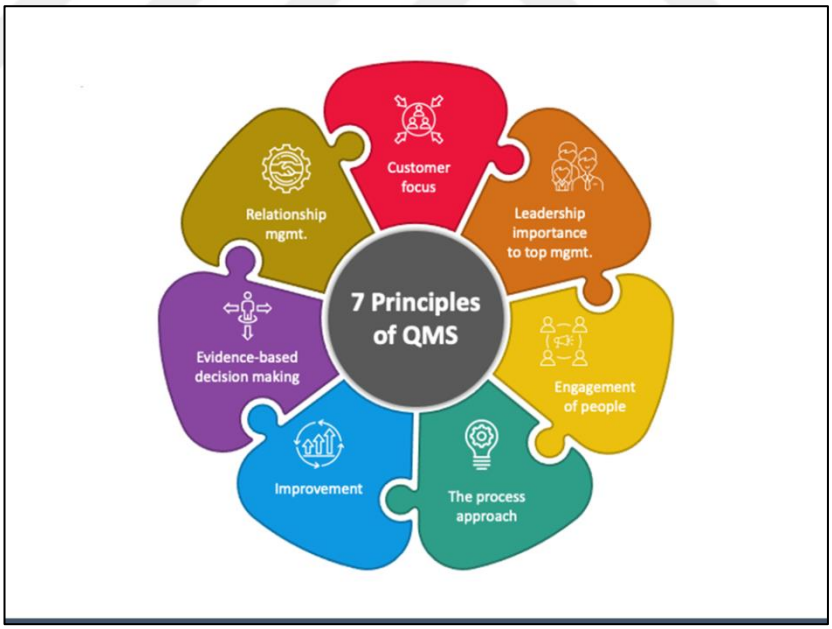

Figure 2.1: Principles of Total Quality Management

Source: ISO 9001, 2015

2.4.1 Increases reputation

Because errors and issues are discovered and resolved more quickly (zero defects), The competitive nature of the construction industry makes a better reputation crucial for businesses in the sector. When it comes to the tendering process, a construction

company's reputation can make a significant difference. A construction company with a good reputation has a clear advantage over one with a bad reputation. There will be fewer latent defects and the client will have more confidence or trust in the contractor if faults and problems are identified and reported more fast.

2.4.2 Increased motivation among employees

Due to increased responsibility, teamwork, and participation in TQM decisions since workers in the construction industry aren't hesitant to switch to companies that offer them higher pay, high employee morale is crucial. This is a typical occurrence in the construction sector. An employee will be more committed, productive, and loyal to the organization if they feel that they are a part of the team. Employee pride in their job will increase, and quality standards will improve.

2.4.3 The majority of money that is lost on building sites is due to waste

Latent faults can also result from poor craftsmanship, and fixing them costs a lot of money. Employers in the construction industry will be able to save money if workers know how to cut waste and minimize subpar labor.

2.4.4 Quality assurance audits

Since each employee is accountable for his own job and will critique a colleague employee's work if it is subpar or they are not doing well, total quality management theoretically enables every employee to serve as a quality control inspector.

2.4.5 provides managers and supervisors with a useful tool for problem-solving

Major construction sites are so large that it takes a lot of time for managers and supervisors to check on all the work. Total quality management empowers every individual to take ownership of the caliber of their own work, which greatly benefits managers and supervisors.

2.4.6 Improves managerial skills that have either never been taught or have been long lost through lack of use

The majority of workers in the construction sector lack formal education and training, and skilled managerial abilities are frequently underutilized. These managerial abilities may be developed through whole quality management.

2.4.7 The issues affecting a person's workplace are issues that management is becoming increasingly conscious of.

Employees have the option to report issues to management as soon as they become aware of them thanks to total quality management. Because of this, management may decide to address issues more quickly and implement mechanisms to do so. Employees handle issues more skillfully.

2.4.8 Gives the chance for personal development and progress (as a consequence of team training activities) as well as the chance to create and propose suggestions for improvement.

The chance for skill development is provided via total quality management for personnel and knowledge through instruction and the growth of abilities. It is crucial for a sense of skill development among workers, which also lessens employee departures.

2.5 The Implementation of Total Quality Management

2.5.1 Initial implementation expenses -training employees and interfering with present productivity while implemented

Since staff will need to be instructed on the value of quality and how to increase quality, the initial implementation costs of comprehensive quality management will be considerable. If the quality of the job is to be increased, this will cause production to be disrupted not just during the training process but also after.

2.5.2 Benefits may not be seen for several years

Total quality management won't start to have an impact unless staff members become accustomed to producing higher-caliber work. It takes time for people to

break bad behaviors. To adapt to total quality management, businesses must transform their organizational culture since comprehensive quality management will gradually engender a new culture.

2.5.3 Employees may oppose change and feel less comfortable in their positions

Experienced employees who have worked in the construction sector for a while may fall under the proverb "you can't teach an old dog new tricks." They dislike having their job dictated to them or having their techniques altered. The use of overall quality management may terrify these more senior individuals.

2.6 Lack of acceptance of TQM in the construction industry

The below is a discussion of the reasons that Pheng and Teo's (2003) study identified as potentially hindering the adoption of TQM in the construction industry.

2.6.1 Variation of products

Every structure that is built is distinct. A provision of freedom from inadequacies is added to the idea that quality consists of those aspects of a product that cater to the unique demands of the consumer and so give product satisfaction.

The previous concept is applicable to all construction projects since everything built in the construction sector is unique, not only buildings. Although each client or company is unique and has particular requirements, the final output must nonetheless be free from flaws. A good TQM system will have to account for the various quality requirements that each employer will have. In order for the employer to know what standard to anticipate, the TQM system's quality standard must be high enough to accommodate all employer quality expectations.

Setting a solid benchmark and addressing this issue both through benchmarking. Benchmarking is a potent instrument for managing for quality and putting the continuous improvement process in place.

According to Menon (1992, p. 180), Comparing aims to contrast comparable goods produced by other companies in order to acquire a competitive edge. In order to assess present operations in comparison to rivals and identify potential areas for

competitive advantage, the approach employed is to evaluate the process, service, and product.

2.6.2 Industrial stability

Organizational failures are common in the construction sector, especially when the economy is weak. Therefore, dedication to TQM techniques and policies that may take many years to show results may be seen as pointless or resource misallocation. The construction site is temporary in comparison to the headquarters. After a project's contract has expired, teams that were specifically constituted for it may no longer exist.

The construction sector experiences significant shifts throughout time as well. It is particularly challenging to assess the long-term advantages of TQM since many people are only working for the term of a single contract and few are employed for longer durations.

Every time a new person is hired, that individual must be taught in the quality standards of that particular organization, which might eventually cost money in terms of TQM objectives. To continue operating successfully, the TQM systems must account for this situation. A proper workout program will be beneficial.

2.6.3 Poor impression of the cost of quality

The cost of quality includes expenditures related to requirements compliance and costs related to requirements non-compliance. The expenses of prevention, evaluation, and nonconformance are added to the costs of the construction sector.

Contractors frequently view TQM as an additional expense, but they fail to grasp that the costliest aspect of TQM is noncompliance with quality standards, not the quality itself. The expenses of rework, fixing mistakes**,** responding to customer complaints, and other charges are among the sources of costs associated with the lack of quality. having inadequate project funding as a result of bad planning and missed deadlines According to Biggar (1990), depending on the size and type of the organization, the expenses associated with installing a TQM system might be significant. Biggar (1990) made the point that owners might lose up to 12% of the project's budget due to expenditures associated with poor quality, nevertheless.

According to Oakland (1993, p. 186), the expenses associated with quality are the same as all other expenditures.

They may be budgeted for, assessed, and evaluated, much like the expenses of maintenance, design, sales, production/operations, and other activities.

The cost of doing a work is significantly more than the cost of performing it properly the first time.

2.6.4 Other elements

There are eight elements, listed by Luna (Business First of Louisville - July 27, 1998), which, taken separately or all at once, have led to unsatisfactory results. Even while most firms lack all of these elements, they do have at least some of them. Here is further information on a few of these elements.

2.6.4.1 Lacking measurements

Measurement is likely the most crucial yet misunderstood aspect of TQM. After all, many of the key figures in the development of TQM, such as Deming, Juran, Ishikawa, and Shewhart, were statisticians. The fundamental tenet of TQM is that all processes fluctuate to some extent and are not flawless. This fluctuation results from either random variation (outside of the organization's control) or identifiable reasons (those which can be controlled by the organization). Measurement is utilized to pinpoint those determinable factors and keep track of how well a procedure is working. There is no TQM if measurement does not happen.

2.6.4.2 Senior management is not in favor

The effectiveness of TQM depends on senior management. They ought to be the ones who initially convince others of its value, provide the time and funding for execution, and permit organizational development based on the new TQM expertise.

2.6.4.3 Basic motives

The system being discussed is never TQM when it is mentioned with cost containment, consolidation, cutbacks, or attrition. Studies reveal that even while TQM is said to result in lower costs and higher quality, the first implementation of TQM may actually result in higher expenses. Nothing else is TQM's goal; it is to improve quality.

2.6.4.4 Companies that don't focus on the crucial few issues

Before initially identifying those few issues that are crucial to the company's performance, well-intentioned firms occasionally plunge into the TQM mindset and fully integrate their whole operation into the program. The corporation typically takes on more than it can handle as a result. TQM is quickly forgotten as staff quickly get overburdened and supervisors observe a decline in productivity and efficiency.

2.6.4.5 Companies that are anti-innovation

Many companies are resistant to change. TQM philosophy is, "If it ain't broke, there must be a better way of doing it," as opposed to the common adage, "If it isn’t broke, don't repair it."

2.6.4.6 The company's inability to recognize customers

While the typical definition of a customer is someone who makes a purchase of products or services, the TQM concept of a customer is far broader. Customers should include vendors, buyers, and other divisions inside the company. You can more effectively build your improvement tactics if you understand the diverse clients.

2.6.4.7 Teams with little experience and trainers

TQM "experts" proliferated when it was first brought to Iraq company , and many of them lacked experience in either TQM, business, or both.

A successful TQM system's installation is limited by a range of issues. If a TQM system is chosen to be utilized as a management tool, it should be carefully considered before being put into practice. The TQM structure continually being watched over is also necessary for effectiveness.

2.7 Total Quality costs

The last ten years have seen a significant rise in the importance of quality as businesses have come to understand the high cost of low quality due to its severe financial consequences and negative repercussions on every part of an organization. Unsatisfied consumers, a decline in market share, and ultimately a loss of business

are the results of poor quality expenses.Although there are other tools that must be taken into account, such as profits, production and servicing costs, and maintenance and quality costs, producing high-quality goods and services that satisfy customer needs and expectations is not thought to be a reliable measurement tool to guide management performance and reliability.

There has been a significant shift in the notion of what quality expenses are. Prior to the 1990s, corporations felt that improvements were inevitably associated with increased costs, which included scrap costs, warranty costs, and operating costs for the quality assurance department. In 1951, Juran divided the costs associated with quality into conformance and non-conformance costs, where conformance costs are associated with higher quality and non-conformance costs are associated with lower quality. Building on Juran's quality costs, Feigenbaum separated the non-conformance cost into internal and external failure costs and the conformance cost into preventative and assessment costs in 1961. These then became the ones that were most often utilized. Seokjin and Behnam's model of quality costs (2008). Due to the current economic downturn and intense competition, it has recently come to be widely accepted that there are additional costs associated with production, operation, maintenance, and design. As a result, organizations now need to tightly control their spending and conduct regular reviews of it. Quality costs emerge from range of activities; for instance; planning, research and development, production, marketing, sales, purchasing, storage, control, delivery, service making, and installation as internal activities. On the other hand, there are some external factors that can directly influence the cost of quality, such as, suppliers, distributors, agents, subcontractors, and especially customers. However, quality has many other costs which can be broken down into two categories. The first is called quality control cost consisting of necessary costs for achieving high quality and it is divided into two types: prevention and appraisal costs. The second is called quality failure cost consisting of cost resulting from poor quality, and it involves internal and external failure costs, as explained below, Laszlo (1997):

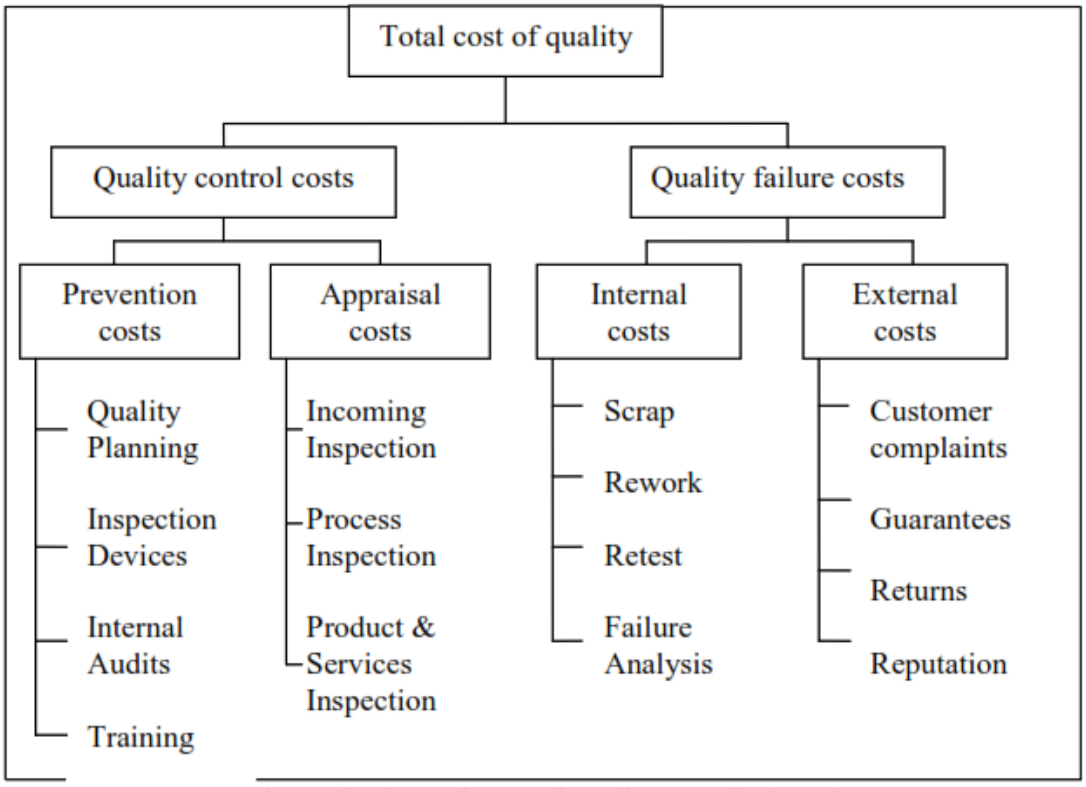

Figure 2.2: The part quality cost plays in TQM

Source: Laszlo, total cost of quality (1997)

By having strategic quality planning, frequent training, and regular internal auditing, prevention costs are expended to reduce appraisal and failure (internal and external) costs, satisfy customer expectations, and lower production and service costs.

The expenses incurred by input, process, and output inspections to make sure that the output meets standards are included in the appraisal costs. External costs, on the other hand, are related to poor product and service quality after customers have received them and include things like warranties, returns, and reputation or business loss as a result of customer dissatisfaction. Internal failure costs, on the other hand, result from defective goods and services before customers receive people.

According to Gryna et al. (2007), a company's quality effectiveness of its quality expenditure may be stated as a percentage by assessing total quality cost as a proportion of sales turnover, labor hours, material expenses, and overall manufacturing costs. While some businesses measure internal failure costs to the average percentage of production expenses, others use quality improvement costs as a proportion of quality costs, and still others use warranty costs as an average percentage of sales volume. (Giakatis et al. ,2001) do, though, emphasize that quality

expenses account for a sizeable portion of the overall manufacturing or maintenance costs. In manufacturing, yearly failure costs range between 5 and 35% of sales turnover as expenses, depending on the complexity of the product, but in service organizations, annual failure costs range between 25 and 40%, depending on the organization. Due to variations in organizational structures and operational systems, Nakhai and Kim (2007) claim that there is no one, universal definition of quality cost. As an example, Burns (1976) said that preventative costs account for 3.3% of overall quality costs, assessment costs for 40.3%, and internal and external failure costs for 56.4%. Other researchers who have studied quality costs have provided varying percentages. 6% for preventive, 14%, according to Moyer and(Gilmore, 1979).

Total quality management currently receives a great deal of international attention, and the majority of organizations have begun to implement it due to the growing consensus that it increases productivity and lowers costs. However, Lau and Tang note that some organizations disregard this strategy because they assume that greater quality comes at a higher price. However, as stated by Chauvel and Andre, many investigations of the adoption of quality by Ford, Jaguar, and certain construction organizations discovered a clear correlation between the two. According to Deming (1986), "increasing quality always decreases costs," as demonstrated by the following quality chain.

Cost control is a crucial strategy for enhancing quality within an organization and reducing costs. Since the whole quality management strategy focuses on performing the work correctly the first time, employee empowerment, continuous improvement, and supplier relations, all of which result in cost savings, all organizations are eager to apply it. As a result, an organization may reduce costs by using a deliberate and systematic approach. At the same time, this strategy can assist the company adopt the necessary changes for cost reduction and monitor their impacts by thoroughly examining all associated expenses. However, the notions of cost reduction need fundamental adjustments and enhancements to business strategy and culture. But in order to enhance product and service design, delivery, employee skills and knowledge, and particularly employee attitude toward mistake prevention by adopting an error prevention culture, the cost reduction concepts demand fundamental adjustments and improvement to corporate strategy and culture.

Therefore, it is crucial to talk about Six Sigma as a statistical strategy that leads to better quality and lower costs.

These employees are also familiar with the company's customers, their wants, requirements, and expectations, as well as the processes required to meet those needs, including the creation of appropriate work procedures, the establishment of appropriate quality metrics, and the maintenance of continuous improvement. Similar to what was mentioned by (Chin and Pun ,2002), Total Quality Management may lead to better goods and services, lower costs, happier cl Total Quality Management also boosts the company's public profile, operational predictability, employee morale, leadership, and customer loyalty. (Davis, 2003) ients and workers, and more profits. Total quality management is not straightforward to adopt since it requires a shift in organizational culture (Rao, Youssef, & Stratton, 2004). higher quality via process improvement has several benefits, according to Deming (1981), including increased productivity and profits in addition to higher quality and a more stable market position in the long run. Streamlining the procedure leads to more consistent product production, fewer errors, and less time and resources wasted on the job.

According to Kaynak (2003), there is a correlation between the degree to which a company uses Total Quality Management and the effectiveness of the company overall. Supplier quality management, product/service design, and process management are the three TQM techniques that have direct influence on operational performance (inventory management and quality performance). Total Quality Management (Claver, Gasco, Llopis, & Gonzalez, 2001) focuses on the collective and individual actions that lead to satisfied customers. The best approach to Total Quality Management is for each business to create its own unique structure that works for them and their resources.

Teamwork and dedication from both employees and management are essential to the success of any Total Quality Management initiative. Employees' reluctance to change can be lessened by well-designed training, mentorship, and feedback mechanisms (Jun, Cai, & Peterson, 2004). Successful implementation of Total Quality Management may lead to price reductions and increased customer satisfaction for consumers, larger profits for investors, and financial rewards for top executives (Beer, 2003). Total quality management was found to have a substantial and

favorable effect on product and process innovation performance in a research conducted by Prajogo and Sohal (2003).

2.8 Total Quality Management's Advantages in Organization

Total quality, as defined by Juran (2001), aims to maximize profit, increase customer satisfaction, and encourage innovation among staff. Error prevention, rework prevention, and eliminating unnecessary tasks are all ways to cut costs. Profits can rise if consumers are pleased with the product or service, the company gains a larger part of the market, keeps more of its current customers and attracts new ones, and costs higher prices. Consumers are always looking for improvements in the products and services they use.

Dudu and Agwu (2014) emphasized the importance of happy consumers, noting that they are more likely to make repeat purchases, spread the word about the company's offerings, and look to the brand for guidance before making any further purchases. as workers are given the tools to assess their own processes, they are better able to monitor progress toward goals, adjust course as necessary, and ultimately increase productivity.

Researchers discovered a large and favorable connection between quality output and innovation output, especially process innovation. Quality management techniques have been shown to have TQM may play an active part in formulating strategies, in addition to its more tactical function in the development and deployment of strategies (Leonard and McAdam, 2003). Total Quality Management programs were shown to be more effective and efficient in firms that implemented TQM on a strategic level. Increased life span as a result of routinely employing restorative therapies (Leonard, McAdam, & Reid, 2002), a good effect on product quality and company results (Zhang, 2000).

Some of his research found a favorable impact, while others found none. However, while the effect of TQM on profitability can be unpredictable, the link between TQM and quality/operating performance has been well researched and found to be significant (Lee et al., 1999; Roa et al., 1999; Agwu, et al., 2014). As TQM has gained in popularity, so has the recognition of the need to connect top-level executives with other critical areas of an organization, including strategic quality

planning, service design, people management, and more (Pannirselvam and Ferguson, 2001; Agwu et al., 2014). Practitioners have a strong interest in this topic, and quality award criteria are increasingly being used as part of the Total Quality Management framework (Black & Porter, 1996; Hua et al., 2000).

The importance of comprehensive quality, customer happiness, and management procedure in achieving a leading market position is highlighted by these honors. Many writers have warned about the perils of management "confusing" TQM with quality certification. There is also a well-established body of literature that criticizes quality awards, raising questions about the pervasiveness and comprehensiveness of such honors (Bounds et al., 1994). Assuming an organization has attained a mature degree of Total Quality Management implementation (Yusof and Aspinwall, 2000; Isiavwe, et al., 2006), award-based frameworks are designed for those who want to be seen as leaders in the quality management area. Botorff (2006) argued that preventing failure is more cost-effective than detecting it after it has already occurred and attempting to rectify it. Accuracy, repeatability, and performance would all improve if businesses treated ethics as the logic-based discipline and quality concern that it is. The moral and economic consequences would improve for everyone engaged, including themselves. There is a large amount of data suggesting that implementing Total Quality Management boosts organizational performance.

2.9 The Six-Sigma Method

A statistical technique to lessen process variance, Six Sigma was first introduced by Motorola Inc. in the United States in 1986. Over time, it has developed into a comprehensive business approach. At three separate levels—metric, methodology, and management system it may be defined, argues Six Sigma is a scale for measuring quality and reducing defects, while "technique" refers to a business improvement methodology that focuses on understanding customer needs, minimizing process variation, enhancing business processes, and lowering costs. The DMAIC model, which emphasizes the following steps: Define opportunity, Measure performance, Analyze opportunity, Improve performance, and Control performance, was expanded to DMAICT by adding the phrase "Transfer best practice" to encourage sharing of information and ideas across the organization. Additionally, Six Sigma is a management approach that emphasizes the use of process metrics and structured

methodology to enhance processes and quality as well as the consideration of top-down solutions when developing business strategies, fostering better teamwork, accelerating improvements, and ensuring sustainability in order to boost productivity and profit Motorola. To achieve near-perfect quality, it can be defined as a statistical method, according to the UK Department for Trade and Industry (2006). It emphasizes statistical analysis of manufacturing, design, and customer-oriented activities to control the production process and employee performance in order to reduce final product or service defects to the lowest level, as measured by Motorola (DPMO).

- Define: The first step in the Lean Six Sigma process is the Define Phase. In this stage, project managers develop a high-level picture of the process, identify stakeholders, and start to learn what they want out of it. At this stage of Lean Six Sigma, your teams will summarize their efforts for both internal stakeholders and the company's upper management.
- Measurement: While gathering initial data, the team should have two primary goals in mind: identifying the process's initial state, or "baseline," and locating indicators that may help shed light on the issue's underlying cause. Considering the time and energy required for data collecting is important at the outset of any endeavor.
- Analyze: The Measure Phase is closely linked to this one. As more information is gathered, the team's composition may shift to include members who specialize in gathering specific types of data. The team may revise their data gathering strategy to include new information as they analyze the results of the Measure Phase. The process of identifying and validating the causes of waste and defects continues as the team examines both data and the process.
- Improvement: After project teams have collected enough data and analyzed it to their satisfaction, they may move on to the next phase of the project: developing a solution. It's possible that the team is always thinking of ways to enhance the project, but a concerted effort to do so can provide far more sophisticated results.
- Control: In this stage, a simplified form of process management is implemented. The team has been constructing a foundation for the process as

a whole, and in the Control Phase, they begin to formalize the handoff to the people who will carry it forward.

Figure 2.3: Six Sigma

Source: Rahim (1995)

3. METHODOLOGY

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.

3.1 Research Methodology

According to Denzin and Lincoln (2000), the term "methodology" refers to the most efficient means of acquiring information about the universe.

Taylor and Bogdan (1984) define methodology as the manner in which we approach problems and seek answers. Before beginning a study, one can, for instance, determine the purpose of the research and whether it will be primarily positivistic or

hermeneutic, On the basis of how they are conducted, various research method approaches can be divided into two main categories: quantitative research methods and qualitative research methods. According to Merriam (1994), information conveyed by words is qualitative while information conveyed by numbers is quantitative.

According to Davidson (1991), quantitative research methods are statistical methods for analyzing numerical information. Comparatively, qualitative research methods are utilized to analyze other types of data, such as interpretations of text. Although both methodologies can be used to analyze research data and information, they have distinct differences. Quantitative research methods convert information into numbers and quantities, whereas qualitative research methods rely on the researcher's interpretation of information that cannot or should not be translated into numbers and quantities. The difference between quantitative and qualitative research resides in the investigation procedure. The quantitative technique is an approach that endeavors to investigate a specified problem by putting the theory to the test with numerical data and statistical analysis. The primary purpose of the quantitative method is to determine whether a theory can be generalized. Inductive or deductive, quantitative or qualitative. These issues are discussed in greater detail below.

Qualitative research, on the other hand, seeks to comprehend a social or human problem from multiple vantage points and is typically conducted in a natural setting.

Various research methods are appropriate for various research purposes, types of data involved, and other circumstances due to their unique characteristics. Both research methods can frequently be combined, complementing each other in research.

This study's approach is defined by the following categories:

- Plans for Research.
- Data collecting technique.
- The Concept of a Sample and a Population
- Analysis technique

3.1.1 Research approach

The research design is "a logical model of proof that allows the researcher to draw inferences concerning causal relations among the variables under investigation," as defined by Frankfort-Nachmias (1996).

Sekaran (2003) explains that when designing a study, there are many factors to consider, including the study's goals, the nature of the investigation, the sample to be used, the means by which the necessary data will be collected, and the procedure to be followed when analyzing the results.

There are two main approaches to obtain conclusions from research: induction and deduction. Deduction, as defined by Sekaran (2003), involves drawing conclusions based on the logical generalization of previously established facts, while induction, on the other hand, involves drawing conclusions based on direct observation of an occurrence.

Data obtained via observation can inspire new ideas and theories, whereas data gathered through reasoning might confirm or disprove existing ones. Due to the nature of the topic being investigated (the impact of TQM on organizational performance), the researchers opted for a deductive methodology (Figure 3.1), more precisely hypothesis testing.

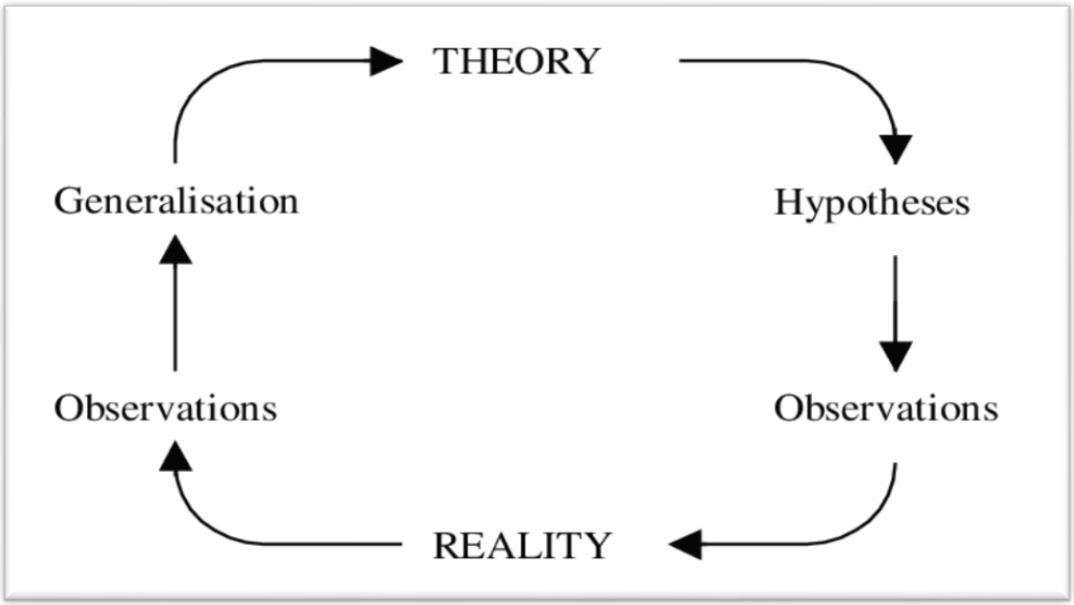

Figure 3.1: Research Design: Inductive and Deductive Concepts

Source: (Huigen, M. G., 2007)

3.1.2 Collection process

The term "data collection" refers to any and all methods used to collect data. There are two types of data collection: secondary data and primary data.

3.1.2.1 Secondary data

Data obtained by third parties for reasons other than the researcher's primary inquiry is called secondary data. Since it provides the study's rationale, this synthesis of relevant literature (both published and unpublished) is crucial (Sekaran, 2003; Fink, 1995).

There are pros and cons to collecting secondary data, but one of the main benefits is that it aids in issue formulation and comprehension and broadens the foundation upon which to build scientific inferences.

The data may not be applicable to the current study since it was originally collected by a different group of researchers, an organization, or a government agency for a different set of aims and purposes.

Books, scholarly publications, and professional magazines were culled for secondary data on TQM's application for this study. The literature review also drew on a variety of web resources.

Due to its inability to achieve the research goals, this method of data collection was utilized mostly for the literature review.

3.1.2.2 Primary data

When secondary data is unavailable or does not significantly contribute to satisfying study objectives, primary data is the information acquired directly from the researcher (Sekaran, 2003). Questionnaires and interview schedules designed specifically for a study are examples of research instruments used in primary data collecting. Primary data for this study were gathered using questionnaires and in-person interviews. The purpose of this exercise was to compare and contrast the various perspectives held by groups within each of the investigated airlines.

A researcher's top priority should be validating and generalizing their findings. Thus, after the research instrument is complete, the validity and reliability of the measures can be determined (Sekaran, 2003).

3.2 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 (3.3) 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?).

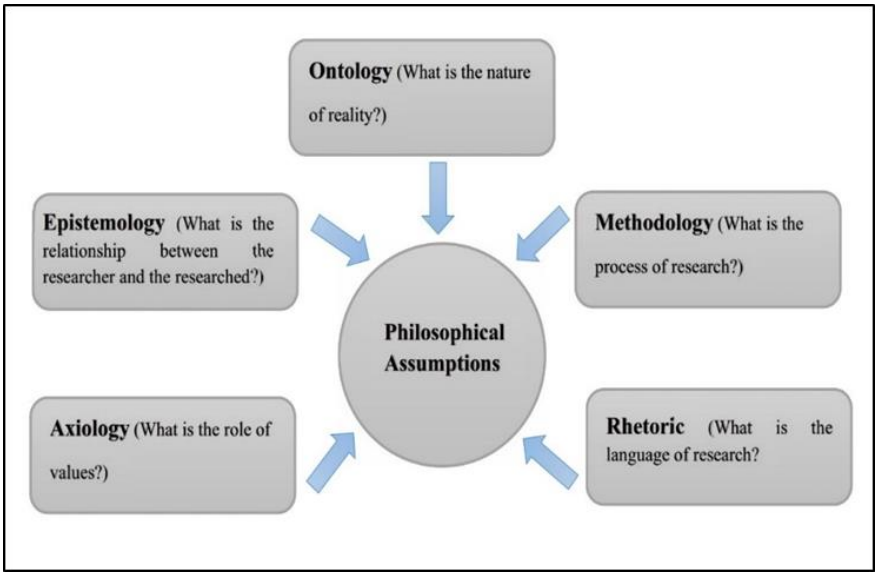

Figure 3.2: Philosophical Theories

Source: Gunatilake, (2013)

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.

3.3. 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.

3.4 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).

3.5 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.

3.6 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).

3.7 Questionnaires

A questionnaire is a tool for collecting data from respondents through a predetermined series of questions and other indicators. The results are typically analyzed statistically 'A questionnaire is a pre-formulated written set of questions to which responders' (Sekeran, 2003) .collects responses; questions are often multiple choice with limited options.

For this study, we developed a questionnaire (Appendix 1). The questionnaire was selected as a data collection tool because it is inexpensive, can be administered with less time and effort than in-person or over-the-phone surveys, and typically has standardized questions and responses that facilitate data compilation. Respondents are able to provide answers that are kept private. According to research (Sekeran, 2003),

Researchers had the opportunity to personally discuss the study's topic and encourage participants to answer honestly by handing out questionnaires. There are primarily three sections to the questionnaire, each of which is tailored to one of the study's core concerns.

When answering a closed-ended question, the respondent must select one of a predetermined number of options. Possibly one of the options is labeled "Other." If respondents select "Other," it is helpful to give them the option to provide free-form commentary. Closed-ended questions can be standardized with ease, and the data collected from them is amenable to statistical analysis (Fink, 1995). Closed-ended questions are more challenging to compose than open-ended questions, which is a drawback. This is because it is the responsibility of the evaluator to make sure that all of the possible responses to each question are accounted for when designing the choices. Researchers were able to easily analyze the data collected because to the use of closed-ended questions and a 5-point Likert scale (a ranked, one-dimensional scale on which respondents select the response that most closely matches their own).

3.8 Data Collection and Sampling

Sampling, as defined by Sekaran (2003), involves choosing a representative subset of a population from which to collect data. In scientific study, a population consists of all the variables of interest. When referring to a population, an element is defined as "a single individual in that population" (Jankowicz, 1991). The size of a sample depends on the nature and purpose of the study, as well as practical considerations like time and cost (Fink, 1995).

It is impossible to study the entire population, so the process of drawing the sample is an essential aspect of a research project that allows the researcher to generalize findings (Nachmias, 1996).

Due to time, money, and manpower limitations, researchers in this study drew samples from the complete population of study. It is anticipated that these samples will yield more accurate results than the full population would have (Sekaran, 2003; Blumberg et al., 2005).

Due to time, resources, and workforce limitations, researchers in this study drew samples from the complete population of study. It is anticipated that these samples will result in more accurate results than the full population would have (Blumberg, 2005).

3.9 Design of Samples

Probability and non-probability sampling are employed here, the former being the more common method. Probability sampling gives each member of the population a certain—though by no means guaranteed—chance of being included in the sample. Non-probability sampling, on the other hand, does not account for the likelihood that a given piece will be included in the sample.

A quota sampling technique, a non-probability sampling method, was used. This is so because the people who interact most closely with customers within an organization are the finest source of the data needed to conduct this study (Sekeran, 2003). It is expected that this approach will provide the necessary information for the research while also offering the advantage of saving the researcher some costs and time. However, the results cannot be generalized to the fullest extent if this approach is used.

3.10 Size of Sample and Number of People

Participants were recruited from different construction firms in Iraq. These surveys were given to works in constructions industry.

3.11 Analysis of Data

A parametric test was used to analyze the data, and the statistical significance between the samples was calculated. The building firm elected to use hypothesis testing to compare their resources. To determine if there is a statistically significant

difference in performance between TQM and non-TQM firms, the mean -Test analysis was conducted using the SPSS program (Pallant, 2005).

3.12 Pilot Study

Researchers can verify their data gathering strategies and spot any misunderstandings or blunders in the questionnaire thanks to the pilot test. Because the sample utilized in the pilot study must be representative of the final sample, the researcher has the opportunity to uncover unanticipated discoveries on which to base any necessary course corrections (Gerson and Horowitz, 2002). Before the questionnaire was distributed to the full sample, a pilot study was run to identify issues that could come from respondents' inability to understand the questions. Twenty questionnaires were sent out to company employees since, according to Blumberg et al. (2005).

4. DATA ANALYSIS

4.1 Introduction

The SPSS statistical analysis program was used to conduct an independent mean -test on the data collected from the questionnaires. This chapter provides an in-depth examination of the analysis's findings.

4.2 Population and Research Study Analysis

In February, 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. 145 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. 122 people agreed and answered, yielding a 84.1% percent response rate.

4.3 Distribution of Respondents by Department

Respondents in various parts of the building were given questionnaires. The following equation is used to symbolize 84.1 percent of the total population.

$$\text{Total response } rate = \frac{\text{total responses}}{\text{total number rasponses} - \text{ineligible}} \quad \textbf{(4.1)}$$

4.4 The Reliability Test

The alpha in Cronbach is the most often used dependability test since it measures how well one scale correlates with another, as illustrated in equation show. The results of the reliability analysis showed that the scales could be relied on to accurately reflect the benefits and outcomes anticipated from quality management implementation.

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

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 numbers greater than or equal to 0.70 are permitted. If a scale's Cronbach's alpha is greater than.70, as shown in Table 4.1, then it can be used reliably in this study.

Table 4.1: The Cronbach's Alpha Values

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

While this uniformity of contents required careful consideration of the wealth of information on research aims already present in the literature, the results and suggestions The table shows that the Cronbach's Alpha for this study was 0.891, suggesting high reliability, and that it was 0.813 for the items, showing moderate internal consistency. It's worth noting that, according to George and Mallery (2010), a reliability coefficient of 0.70 or above is considered acceptable are often presented there.

Table 4.2 shows the values of the Reliability Statistics for The Identify the following statements with respect to the organization that was initiating or not to TQM

Table 4.2: Reliability Statistics Benefits of TQM Implementation

Cronbach's Alpha	N of Items
0.890	14

The values of the dependability of the study variables of difficulty of QMS implementations are shown in Table 4.3.

Table 4.3: Reliability Statistics for the obstacle of TQM Implementation

Cronbach's Alpha	N of Items
0.874	17

4.5 Likert Scales

Descriptive statistics were used to analyze the data, and the questionnaire's Likert-scale scoring allowed respondents to provide responses based on their own experiences and perspectives with respect to the various variables being measured. Many contexts lend themselves to and even encourage the use of Likert scales. Findings from the questionnaires used to evaluate the instruments used to gauge respondents' opinions will be reported in the following format.

Table 4.4: Evaluation of Likert

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

4.6 Rank Correlation

A rank correlation is one of several statistics used to measure an ordinal association, or the connection between two or more rankings of the same ordinal variable. A ranking is the assignment of ordering labels like "first," "second," "third," etc. to observations of a variable.

4.7 Qualifications Regarding Education

According to table 4.4 depicts information about respondents' specialization. Using statistics, it can be determined that 59 % of respondents are BSC.

Table 4.5: Qualifications Regarding Education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	BSC	72	59.0	59.0	59.0
	MSC	33	27.0	27.0	86.1
	PHD	14	11.5	11.5	97.5
	Other	3	2.5	2.5	100.0
	Total	122	100.0	100.0	

4.8 TQM Challenge and Barriers

Table 4.6 shows that the most common issue with TQM implementation in the studied industry is that "TQM was implemented all at once" is seen as a

documentation task rather than an opportunity to adopt a more systematic management style. The next one was titled, "How management and staff perceive TQM." Management's views and goals also appear to be driven entirely by marketing initiatives or externally imposed standards of service.

Table 4.6: TQM Challenge and Barriers Items

N.	**Realizing of TQM Challenge and Barriers**	**Sample**	**Mean**	**Std. Error of Mean**	**Std Deviation**	**Variance**	**Rank**
1	Top management compensation is directly linked to profitability ?	B1	4.05	0.083	0.863	0.841	14
2	Top management compensation is directly linked to quality matrics such as defect rates ?	B2	4.25	0.079	0.792	0.765	4
3	Top management compensation is directly linked to costumer satisfaction level ?	B3	4.27	0.066	0.917	0.530	3
4	Top management is engaged	B4	4.28	0.076	0.875	0.699	2
5	Employees are trained in functional skills only	B5	4.16	0.070	0.728	0.601	5
6	Performance reviews focus on past mistakes	B6	4.16	0.73	.836	0.645	6
7	Employee selection process focuses only on individuals with the requisite skills	B7	4.0	0.77	0.775	0.616	7
8	TQM has created more work	B8	4.0	0.72	0.803	0.639	11
9	TQM was implemented all at once	B9	5.0	0.072	0.785	0.627	1
10	Suppler relationships are collaborative	B10	4.0	0.074	0.799	0.660	12
11	Quality invites are static and inflexible	B11	4.0	0.068	0.753	0.566	8
12	Quality initiatives focus only on the organizations production process	B12	4.0	0.075	0.833	0.693	9
13	The role of the quality manager is limited to documentation efforts only	B13	4.0	0.077	0.856	0.733	10
14	Quality initiatives test for consistency not continuous improvement or product performance	B14	4.0	0.076	0.842	0.71	13

According to table 4.6, the figure 4.2 shown the categories of TQM difficulties depended on the value of mean of items in the questioners,

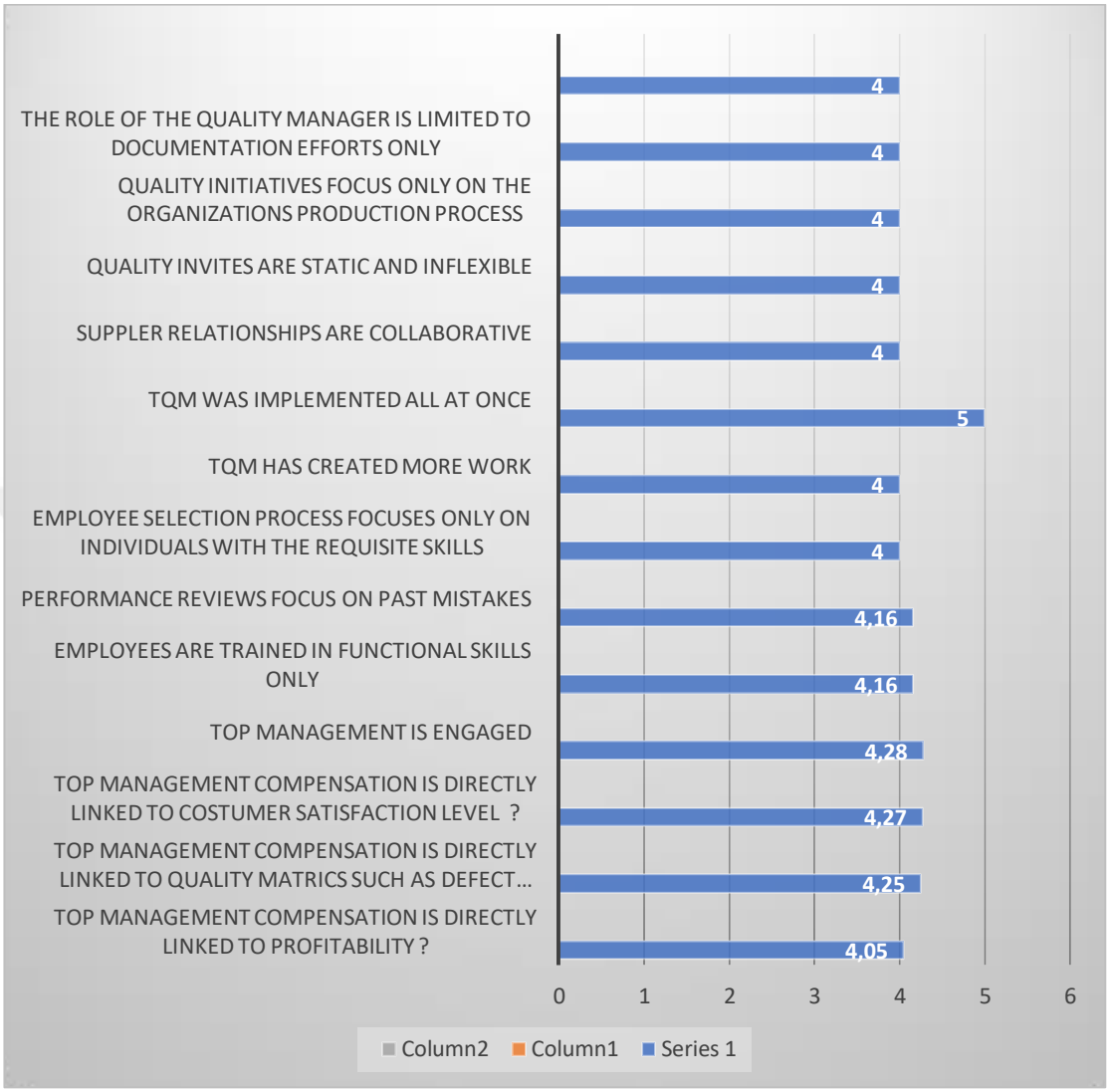

Figure 4.1: TQM Challenge and Barriers Depended on the Value of Mean

4.9 Best implementation of TQM

Here, we present and analyze survey data that measures the effect of TQM adoption on a company's competitiveness, focusing on the influence of the TQM (seventeen) critical success elements as independent variables.

According to the surveys, the more frequently respondents agree with the statement "O8" (Increase corporate market share), the higher its implementation frequency. All parameters were subjected to statistical analysis (mean, median, standard deviation, and standard error of the mean and rank were calculated). Assigning labels like "first," "second," "third," etc. to observations of a variable allows statisticians to

measure an ordinal association, or rank correlation. This can be done between two ordinal variables or between two rankings of the same ordinal variable. Statistics for elements are broken down in depth in table (4.7).

Figure 4.2: The Results of Best Implementation of TQM

N.	Realizing of TQM Challenge and Barriers	Sample	Mean	Std. Error of Mean	Std. Deviation	Variance	Rank
1	Commitment by senior management and Employees	O1	4.11	0.075	0.831	0.691	14
2	Meeting customers' requirements	O2	4.20	0.087	0.890	0.792	9
3	Improve customer relations	O3	4.26	0.076	0.841	0.707	5
4	Reduce operation defects	O4	4.16	0.075	0.833	0.695	12
5	Motivate employees	O5	4.10	0.087	0.966	0.932	15
6	Improve working climate	O6	4.30	0.074	0.822	0.676	3
7	Increase service quality	O7	4.13	0.088	0.970	0.941	13
8	Increase company market share	O8	4.37	0.074	0.815	0.664	1
9	Increase company turnover	O9	4.18	0.070	0.772	0.595	10
10	Improve employees satisfaction	O10	4.32	0.074	0.816	0.666	2
11	Reduce customers complaints	O11	4.29	0.066	0.733	0.537	4
12	Enhance company reputation	O12	4.24	0.074	0.814	0.662	7
13	Expand company activities overseas	O13	4.24	0.075	0.834	0.695	8
14	Invest in new technology and machines	O14	4.16	0.099	1.099	1.207	11
15	Build strong relation with suppliers	O15	4.06	0.088	0.973	0.947	16
16	Improve buyer/seller advance planning	O16	4.26	0.081	0.898	0.807	6
17	Improve suppliers satisfaction, quality and retention	O17	4.04	0.093	1.024	1.048	17

According to table 4.7, the figure 4.3 shown the categories of TQM difficulties depended on the value of mean of items in the questioners,

Figure 4.3: The Results of Best Implementation of TQM

5. CONCLUSION

5.1 Results

This study was the first attempt to investigate the factors preventing the TOM from being used in the Iraqi building sector. It is important to recognize that there is a dearth of empirical research on the obstacles to TOM implementation in Iraq and elsewhere. There is a dearth of research in the current body of literature. Because there is so little published work in this field, the findings of this study are welcome additions. The research's contributions are outside of the original scope of the project. Initially, this study's potential impact may have been based only on the fact that it was so unprecedented in the context of Iraqi construction management (TOM and culture). The truth is that in recent years, Iraq has made tremendous strides toward adopting and implementing quality management systems, such as ISO 9000. Therefore, the goal of this study's model development and questionnaire testing was to determine how widespread knowledge of the significance of organizational culture to TQM implementation philosophies in Iraq actually is. This study will be the first to evaluate how easily TQM can be implemented in an Iraqi business, therefore it will contribute new information to the field. This study's significance comes in the fact that it investigates the theoretical and applied dimensions of TQM's function on building sites. In this case, the construction sector has access to a true, practical model based on a firm grounding in academic research. Enhance human resource management at all organizational levels to facilitate TQM adoption; Develop a mechanism for evaluating TQM;

The acceptance and utilization of quality tools and methodologies, such as ISO 9000, has witnessed a substantial increase in recent years. Therefore, the primary objective of this research was to evaluate the level of recognition of the significance of organizational culture in relation to the adoption of Total Quality Management (TQM) philosophies in Iraq. To achieve this, a model and questionnaire were developed and utilized for the purpose of creating and testing. This research study makes a valuable contribution to the existing body of knowledge by being the first to

analyze the feasibility of implementing the ideas and principles of Total Quality Management (TQM) within an Iraqi organization. The significance of this study is in its examination of the dual dimensions, namely academic and practical, pertaining to the use of Total Quality Management (TQM) at building sites. A robust foundation in scholarly research offers a tangible and applicable framework that may be effectively employed in the construction sector, as the first three outlined below:

1. Motivation of employees
2. Facilitate the implementation of Total Quality Management (TQM) by enhancing human resource management practices across all organizational levels.
3. Enhance marketing efforts to augment the company's market presence and competitiveness.

This study is the first empirical investigation that focuses on the identification and analysis of hurdles that impede the application of Total Quality Management (TQM) within the construction sector of Iraq. Based on the findings of the survey, it is evident that enterprises have exhibited a sluggish response in comprehending the significance and potential advantages of Total Quality Management (TQM). This may be attributed to a dearth of knowledge and proactive measures at the national level. The study revealed that there is a significant lack of information regarding Total Quality Management (TQM) in Iraq. However, the research also brought attention to the fact that awareness of TQM is increasing, as the questioned organizations are becoming more cognizant of the potential advantages associated with implementing an efficient TQM strategy.

The main barriers to the successful implementation of a robust TOM strategy predominantly stem from a deficiency in comprehension about the fundamental concepts of TOM among key individuals within the studied organizations. Based on the data obtained from the questionnaires, the first three were evident that:

1. TQM was implemented all at once.
2. Top management is engaged.
3. Top management compensation is directly linked to profitability?

This paper presents an examination of the Theory of Mind (TOM) and the constraints that hinder its adoption, specifically focusing on its link with organizational culture within the Iraqi construction sector. It may be inferred that the implementation of Total Quality Management (TOM) criteria has had a significant influence on enterprises within the construction sector in Iraq. The implementation of the survey methodology in this study contributed to the enhancement of comprehension of Total Quality Management (TQM).

5.2 Recommendation

- Management must have trust in their staff and try to enhance working relationships, while staff members must be encouraged and empowered to make decisions about their job and offer suggestions for improving processes. Workers need to be encouraged to raise their performance and proficiency levels through better project organization and communication.
- Independent contractors need to stop focusing just on profits and instead foster an environment that encourages teamwork and serves as a unifying force inside the company. This should be evident in fewer errors and higher quality results for customers.
- Improving overall performance and quality requires contractors to pay attention to details like performance, time, the formation of long-term partnerships with subcontractors, and the maintenance of a well-trained workforce.
- Iraqi building companies would benefit from embracing transformational change by shifting their focus from pricing to client satisfaction. Organisational strategy adjustments and reframing the organization's mission and fundamental values should be the impetus for the necessary transformation.
- The Iraqi government must coordinate with the Housing Ministry and the Environment Ministry to establish parameters for developers to follow when making greener products.
- The marketing component of the Iraqi construction industry needs more focus because it directly affects the company's market share.

- It is important for individuals of the upper echelons of management to actively engage in listening to employees and effectively disseminate knowledge across the organization.
- The training program should encompass the necessary tools and methodologies to provide a conducive atmosphere that fosters the attainment of high quality outcomes. For instance, the training sessions should address the requirements of both internal and external customers.

5.3 Further Research

Further research might look into why construction firms in Iraq need marketing and how that can help them become more competitive and increase their share of the market. Changes in the construction industry as a result of implementing TQM are ripe for investigation. A best practise plan for TQM system adoption in the construction industry requires research into alternative measuring instruments to time, turnover, or market share, as well as the appropriate means to continuously monitor the TQM system.

The government's commitment to provide financial and technical support to mitigate the impact of external factors on TQM implementation and project success could be the subject of future study. Such factors include, but are not limited to, rules and regulations, political relations, a dearth of equipment and tools on the market, and transportation delays.

The possibility for cultural transformation via the implementation of high-quality customer service and worker engagement through TOM teams, who serve as a representation of momentary management.

The investigation is to develop a survey that will facilitate the exploration of the present state and obstacles in achieving quality standards within the construction industry. Additionally, the objective is to create a practical "tool" that can be utilized by construction companies to support the establishment and execution of an integrated quality system.

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APPENDIX

Appendix 1: Questionnaires

THESIS

Challenges and Benefits of Total Quality Management in Construction Projects

Please take a look at the following questionnaire and try to answer correctly and accurately, as many questions as possible. All the information gathered here will be kept strictly confidential and will be used only for research and analysis purposes without mentioning the person or company names.

Background Information

1. Years of Experience:

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

2 . Education Level:

□ BSC □ MSC □ PHD □Other

1. TQM challenge and barriers

Identify the following statements with respect to the organization that was initiating or not to TQM

Please Mark the Appropriate Answer by (√), if you believe that the following factors Influence company service quality, where

1. Strongly Agree 2. Agree 3. Don't now 4. Dis Agree 5. Strongly Disagree

No.	Iteam	Strongly Agree	Agree	Don't now	Dis Agree	Strongly Disagree
		1	2	3	4	5
1	Top management compensation is directly linked to profitability ?					
2	Top management compensation is directly linked to quality matrics such as defect rates ?					
3	Top management compensation is directly linked to costumer satisfaction level ?					
4	Top management is engaged					
5	Employees are trained in functional skills only					
6	Performance reviews focus on past mistakes					
7	Employee selection process focuses only on individuals with the requisite skills					
8	TQM has created more work					
9	TQM was implemented all at once					
10	Suppler relationships are collaborative					
11	Quality invites are static and inflexible					
12	Quality initiatives focus only on the organizations production process					
13	The role of the quality manager is limited to documentation efforts only					
14	Quality initiatives test for consistency not continuous improvement or product performance					

2. Which of the following describe the results of best implementation of TQM ?

   Please mark the appropriate answer by (√) where :

   1. Strongly Agree 2. Agree 3. Don't now 4. Dis Agree 5. Strongly Disagree

No.	Iteam	Strongly Agree	Agree	Don't now	Dis Agree	Strongly Disagree
		1	2	3	4	5
1	Commitment by senior management and employees					
2	Meeting customers' requirements					
3	Improve customer relations					
4	Reduce operation defects					
5	Motivate employees					
6	Improve working climate					
7	Increase service quality					
8	Increase company market share					
9	Increase company turnover					
10	Improve employees satisfaction					
11	Reduce customers complaints					
12	Enhance company reputation					
13	Expand company activities overseas					
14	Invest in new technology and machines					
15	Build strong relation with suppliers					
16	Improve buyer/seller advance planning					
17	Improve suppliers satisfaction, quality and retention					

Appendix 2: Data Analysis

FREQUENCIES VARIABLES=Qualitive1 Qualitive2 Qualitive3 Qualitive4 Qualitive5 Qualitive6 B1 B2 B3 B4 B5 B6 B7 B8 B9 B10 B11 B12 B13 B14

/STATISTICS=STDDEV VARIANCE SEMEAN MEAN MEDIAN MODE SUM

/HISTOGRAM

/ORDER=ANALYSIS.

Frequencies

Notes		
Output Created		03-MAY-2023 04:14:55
Comments		
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	N of Rows in Working Data File	122
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on all cases with valid data.
Syntax		FREQUENCIES VARIABLES=Qualitive1 Qualitive2 Qualitive3 Qualitive4 Qualitive5 Qualitive6 B1 B2 B3 B4 B5 B6 B7 B8 B9 B10 B11 B12 B13 B14 /STATISTICS=STDDEV VARIANCE SEMEAN MEAN MEDIAN MODE SUM /HISTOGRAM /ORDER=ANALYSIS.
Resources	Processor Time	00:00:03.92
	Elapsed Time	00:00:03.87

Statistics					
		Have you participated in TQM implementation project?	Was YQM successful implantation?	How long did TQM remind successful ?	What best describe your position in company ?
N	Valid	122	122	122	122
	Missing	0	0	0	0
Mean		1.25	1.25	1.69	1.57
Std. Error of Mean		.040	.040	.078	.072
Median		1.00	1.00	1.00	1.00
Mode		1	1	1	1
Std. Deviation		.437	.437	.863	.792
Variance		.191	.191	.745	.627
Sum		153	153	206	192

Statistics					
		What best described your role when you participated in TQM ?	Qualifications Regarding Education	Top management compensation is directly linked to profitability ?	Top management compensation is directly linked to quality matrics such as defect rates ?
N	Valid	122	122	122	122
	Missing	0	0	0	0
Mean		1.69	1.57	4.05	4.25
Std. Error of Mean		.078	.072	.083	.079
Median		1.00	1.00	4.00	4.00
Mode		1	1	4	4
Std. Deviation		.863	.792	.917	.875
Variance		.745	.627	.841	.765
Sum		206	192	494	518

Statistics					
		Top management compensation is directly linked to costumer satisfaction level ?	Top management is engaged	Employees are trained in functional skills only	Performance reviews focus on past mistakes
N	Valid	122	122	122	122
	Missing	0	0	0	0
Mean		4.27	4.28	4.16	4.16
Std. Error of Mean		.066	.076	.070	.073
Median		4.00	4.00	4.00	4.00
Mode		4	4	4	4
Std. Deviation		.728	.836	.775	.803
Variance		.530	.699	.601	.645
Sum		521	522	508	507

Have you participated in TQM implementation project?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	91	74.6	74.6	74.6
	No	31	25.4	25.4	100.0
	Total	122	100.0	100.0	

Was YQM successful implantation?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	91	74.6	74.6	74.6
	No	31	25.4	25.4	100.0
	Total	122	100.0	100.0	

How long did TQM remind successful ?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-5 years	70	57.4	57.4	57.4
	5-10 years	20	16.4	16.4	73.8
	more then 10 years	32	26.2	26.2	100.0
	Total	122	100.0	100.0	

What best describe your position in company ?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Exclusive management	72	59.0	59.0	59.0
	Mid-level management	33	27.0	27.0	86.1
	Engineering support	14	11.5	11.5	97.5
	Other	3	2.5	2.5	100.0
	Total	122	100.0	100.0	

What best described your role when you participated in TQM ?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Leader	70	57.4	57.4	57.4
	Core team member	20	16.4	16.4	73.8
	Other	32	26.2	26.2	100.0
	Total	122	100.0	100.0	

Qualifications Regarding Education					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	BSC	72	59.0	59.0	59.0
	MSC	33	27.0	27.0	86.1
	PHD	14	11.5	11.5	97.5
	Other	3	2.5	2.5	100.0
	Total	122	100.0	100.0	

Top management compensation is directly linked to profitability ?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	1.6	1.6	1.6
	Disagree	8	6.6	6.6	8.2
	Neutral	12	9.8	9.8	18.0
	Agree	60	49.2	49.2	67.2
	Strongly agree	40	32.8	32.8	100.0
	Total	122	100.0	100.0	

Top management compensation is directly linked to quality matrics such as defect rates ?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	1.6	1.6	1.6
	Disagree	6	4.9	4.9	6.6
	Neutral	5	4.1	4.1	10.7
	Agree	56	45.9	45.9	56.6
	Strongly agree	53	43.4	43.4	100.0
	Total	122	100.0	100.0	

Top management compensation is directly linked to costumer satisfaction level ?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	.8	.8	.8
	Disagree	3	2.5	2.5	3.3
	Neutral	5	4.1	4.1	7.4
	Agree	66	54.1	54.1	61.5
	Strongly agree	47	38.5	38.5	100.0
	Total	122	100.0	100.0	

Top management is engaged					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	1.6	1.6	1.6
	Disagree	4	3.3	3.3	4.9
	Neutral	6	4.9	4.9	9.8
	Agree	56	45.9	45.9	55.7
	Strongly agree	54	44.3	44.3	100.0
	Total	122	100.0	100.0	

Employees are trained in functional skills only					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	.8	.8	.8
	Disagree	4	3.3	3.3	4.1
	Neutral	10	8.2	8.2	12.3
	Agree	66	54.1	54.1	66.4
	Strongly agree	41	33.6	33.6	100.0
	Total	122	100.0	100.0	

Performance reviews focus on past mistakes					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	.8	.8	.8
	Disagree	5	4.1	4.1	4.9
	Neutral	10	8.2	8.2	13.1
	Agree	64	52.5	52.5	65.6
	Strongly agree	42	34.4	34.4	100.0
	Total	122	100.0	100.0	

Employee selection process focuses only on individuals with the requisite skills					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	.8	.8	.8
	Disagree	4	3.3	3.3	4.1
	Neutral	7	5.7	5.7	9.8
	Agree	58	47.5	47.5	57.4
	Strongly agree	52	42.6	42.6	100.0
	Total	122	100.0	100.0	

TQM has created more work					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	1.6	1.6	1.6
	Disagree	3	2.5	2.5	4.1
	Neutral	8	6.6	6.6	10.7
	Agree	65	53.3	53.3	63.9
	Strongly agree	44	36.1	36.1	100.0
	Total	122	100.0	100.0	

TQM was implemented all at once					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	.8	.8	.8
	Disagree	4	3.3	3.3	4.1
	Neutral	6	4.9	4.9	9.0
	Agree	51	41.8	41.8	50.8
	Strongly agree	60	49.2	49.2	100.0
	Total	122	100.0	100.0	

Suppler relationships are collaborative					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	.8	.8	.8
	Disagree	4	3.3	3.3	4.1
	Neutral	15	12.3	12.3	16.4
	Agree	60	49.2	49.2	65.6
	Strongly agree	42	34.4	34.4	100.0
	Total	122	100.0	100.0	

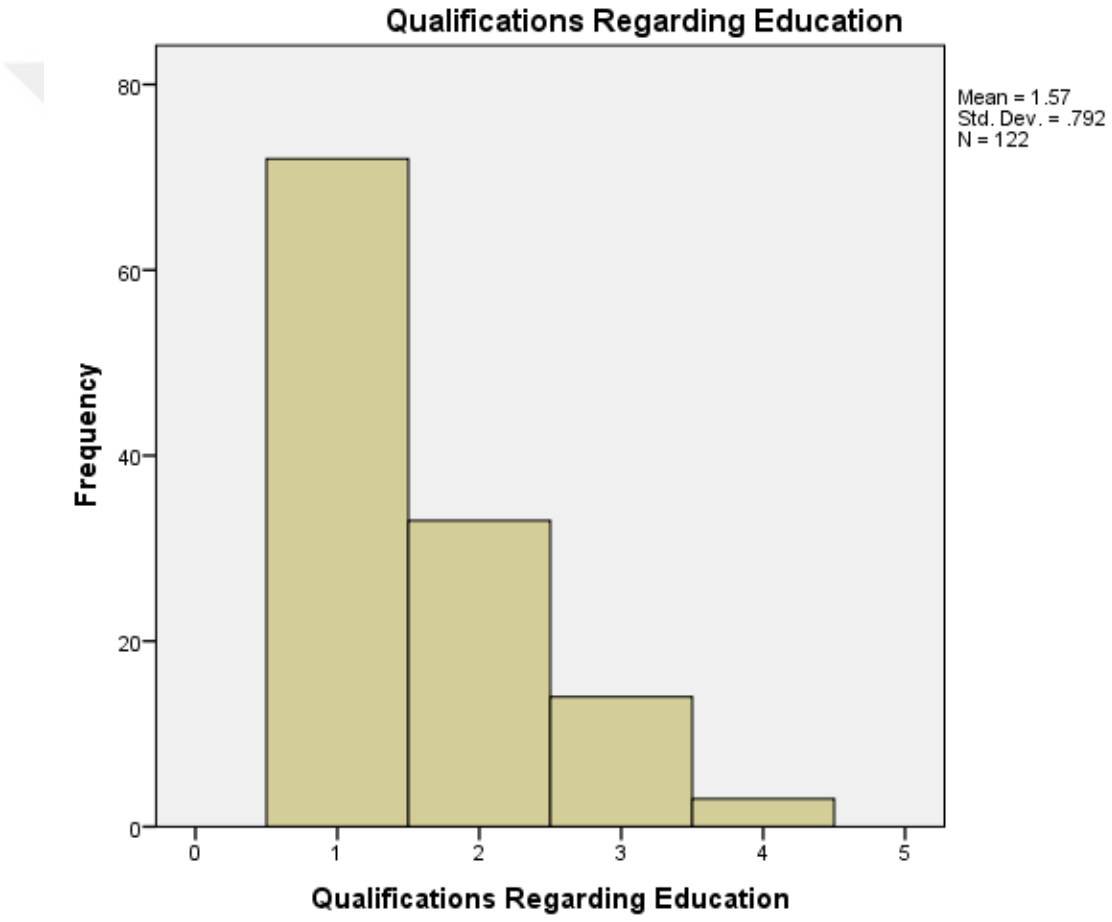
Quality invites are static and inflexible					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	.8	.8	.8
	Disagree	3	2.5	2.5	3.3
	Neutral	6	4.9	4.9	8.2
	Agree	58	47.5	47.5	55.7
	Strongly agree	54	44.3	44.3	100.0
	Total	122	100.0	100.0	

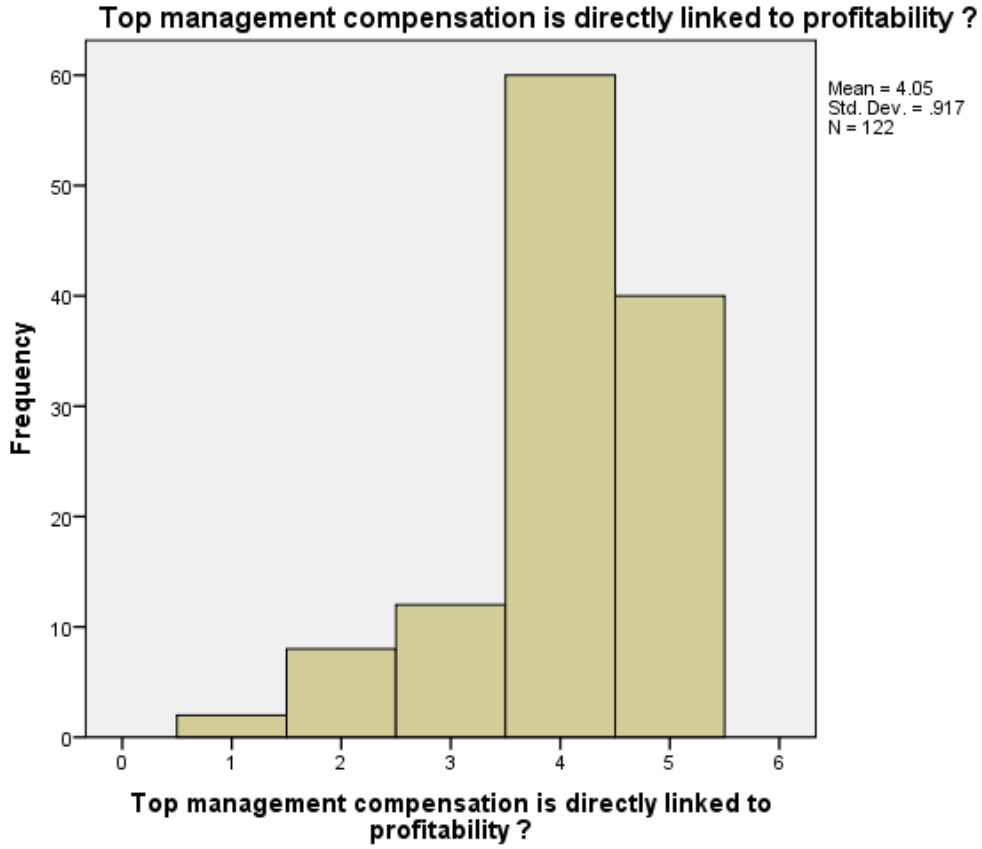
Quality initiatives focus only on the organizations production process					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	.8	.8	.8
	Disagree	5	4.1	4.1	4.9
	Neutral	11	9.0	9.0	13.9
	Agree	56	45.9	45.9	59.8
	Strongly agree	49	40.2	40.2	100.0
	Total	122	100.0	100.0	

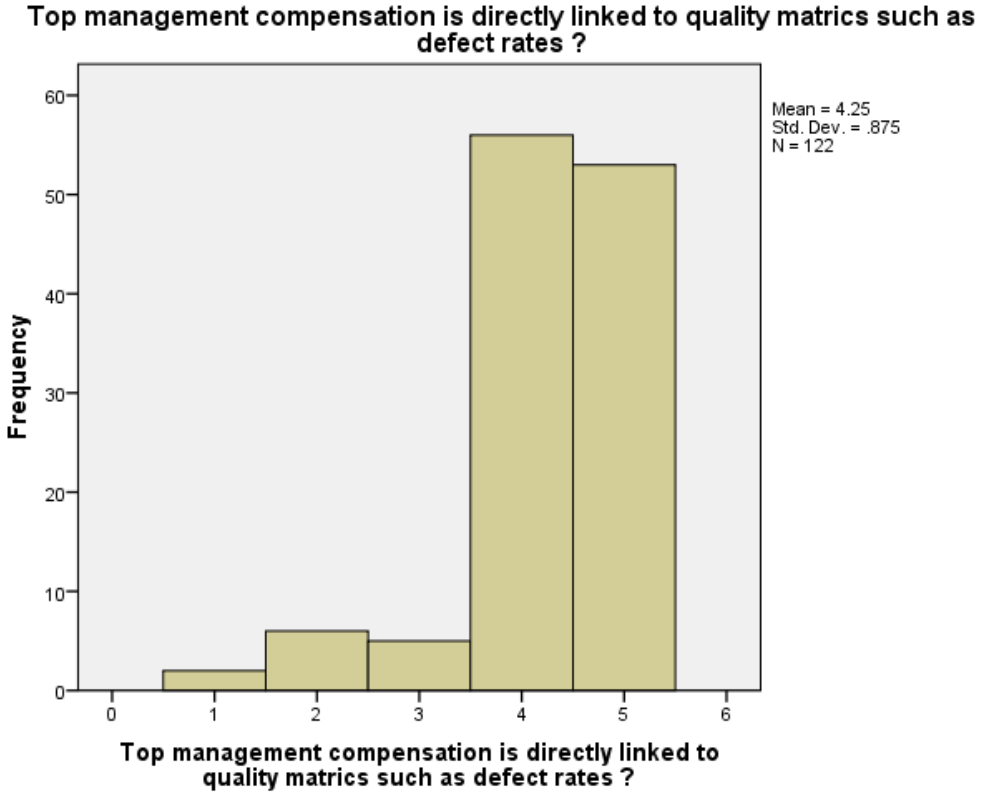
The role of the quality manager is limited to documentation efforts only					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	.8	.8	.8
	Disagree	5	4.1	4.1	4.9
	Neutral	14	11.5	11.5	16.4
	Agree	52	42.6	42.6	59.0
	Strongly agree	50	41.0	41.0	100.0
	Total	122	100.0	100.0	

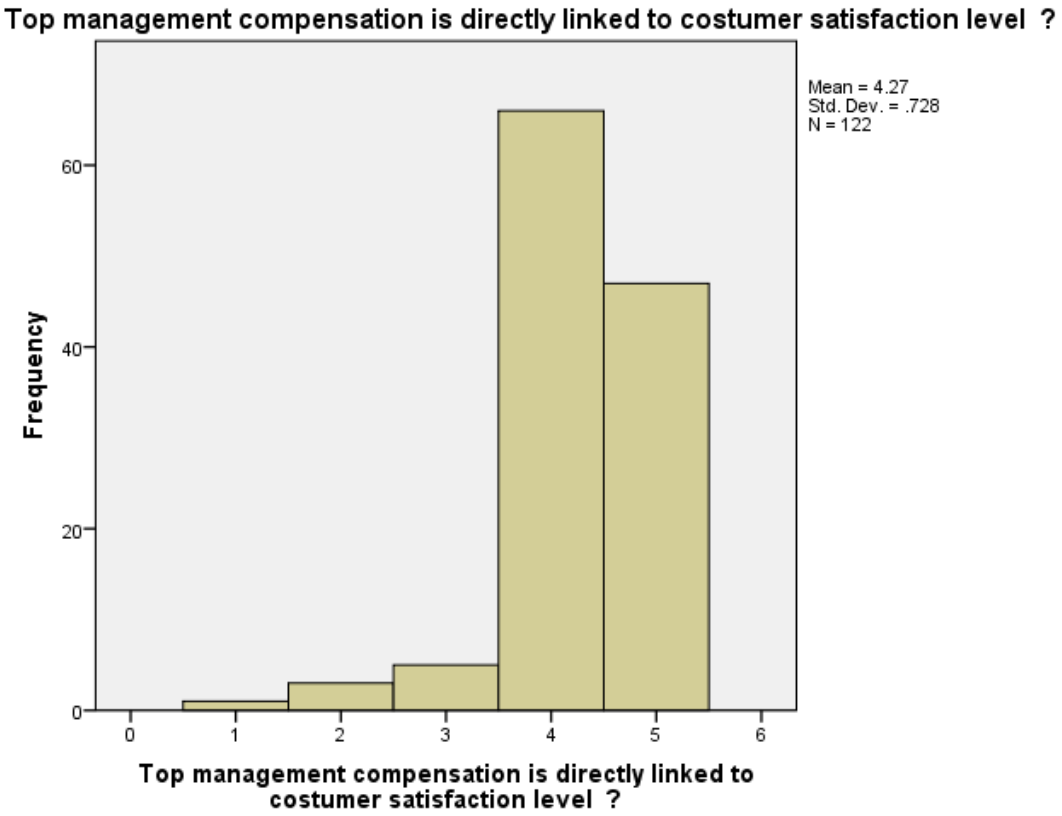
Quality initiatives test for consistency not continuous improvement or product performance					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	.8	.8	.8
	Disagree	6	4.9	4.9	5.7
	Neutral	9	7.4	7.4	13.1
	Agree	57	46.7	46.7	59.8
	Strongly agree	49	40.2	40.2	100.0
	Total	122	100.0	100.0	

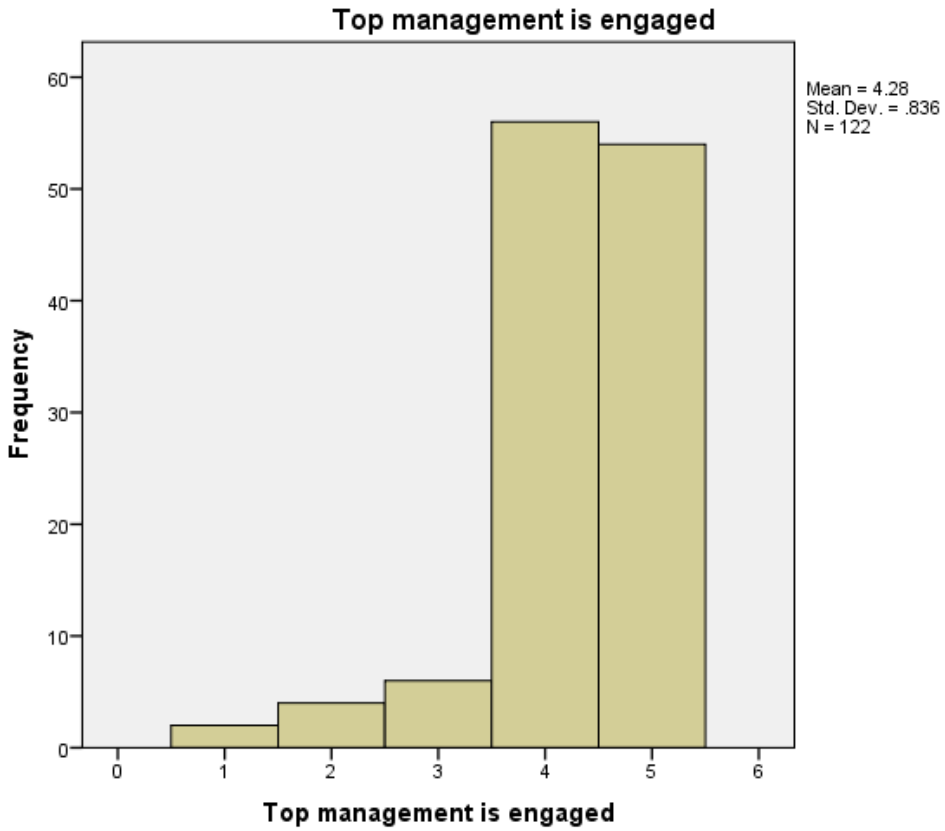
Histogram



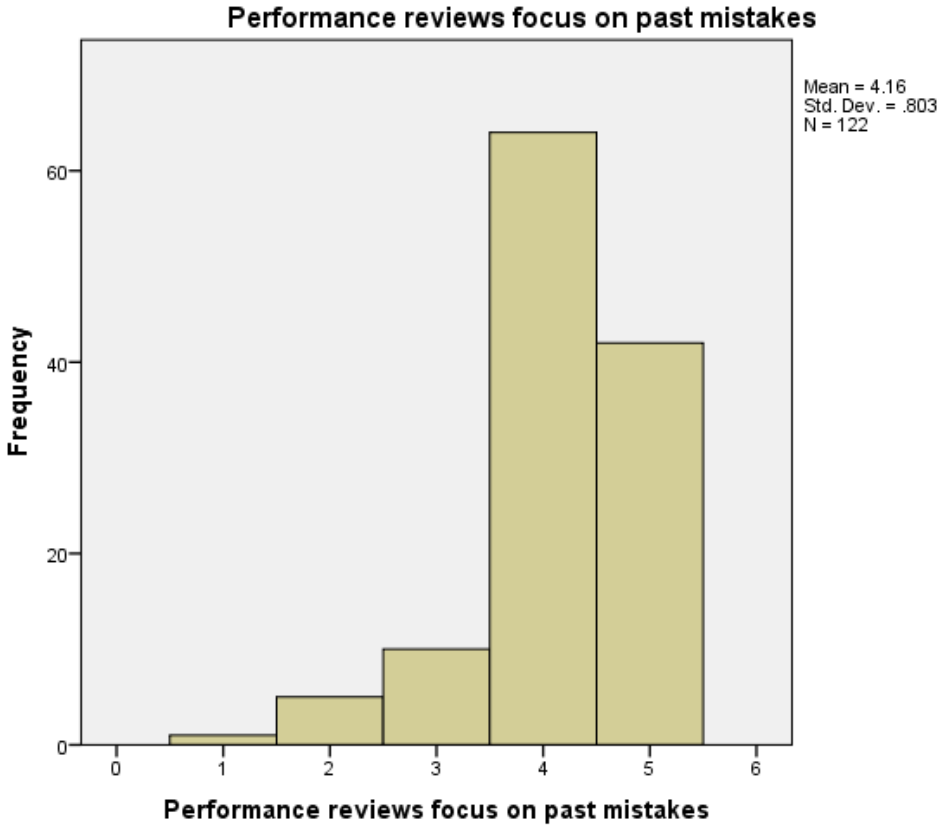

Top management compensation is directly linked to profitability ?
Mean = 4.05
Std. Dev. = .917
N = 122
Frequency
60
50
40
30
20
10
0
0
1
2
3
4
5
6
Top management compensation is directly linked to profitability ?

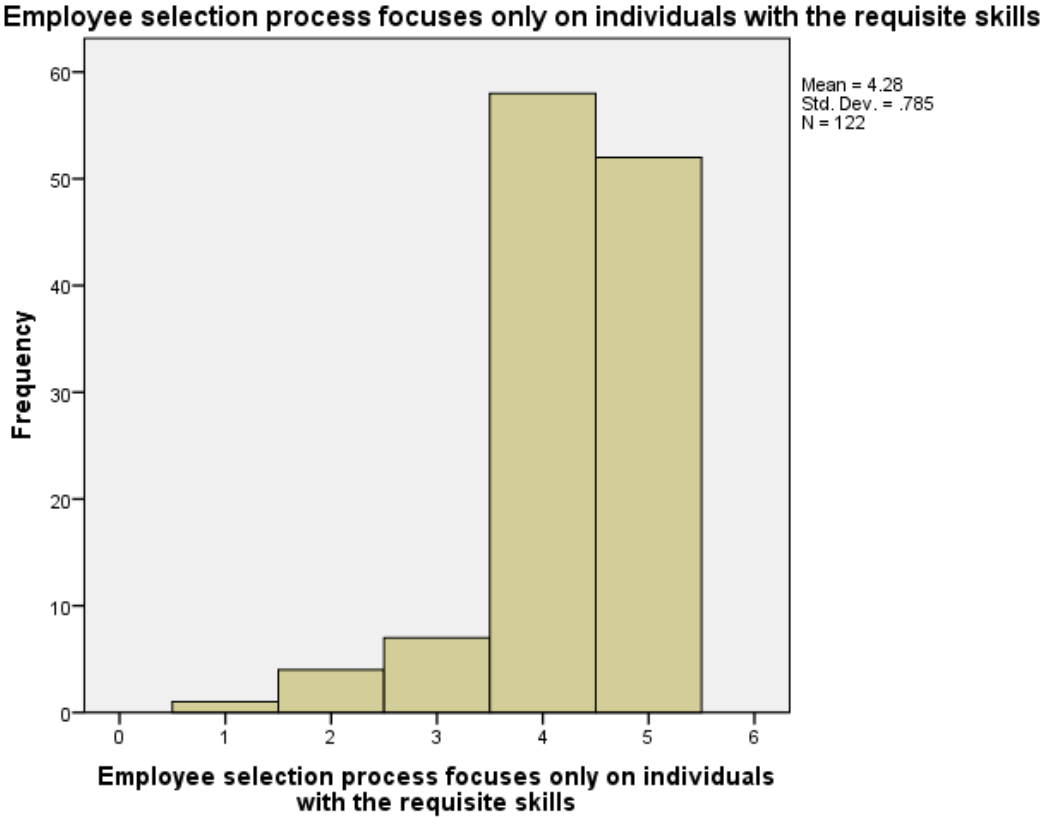

Top management compensation is directly linked to quality matrics such as defect rates ?
Mean = 4.25
Std. Dev. = .875
N = 122
Frequency
60
50
40
30
20
10
0
0
1
2
3
4
5
6
Top management compensation is directly linked to quality matrics such as defect rates ?

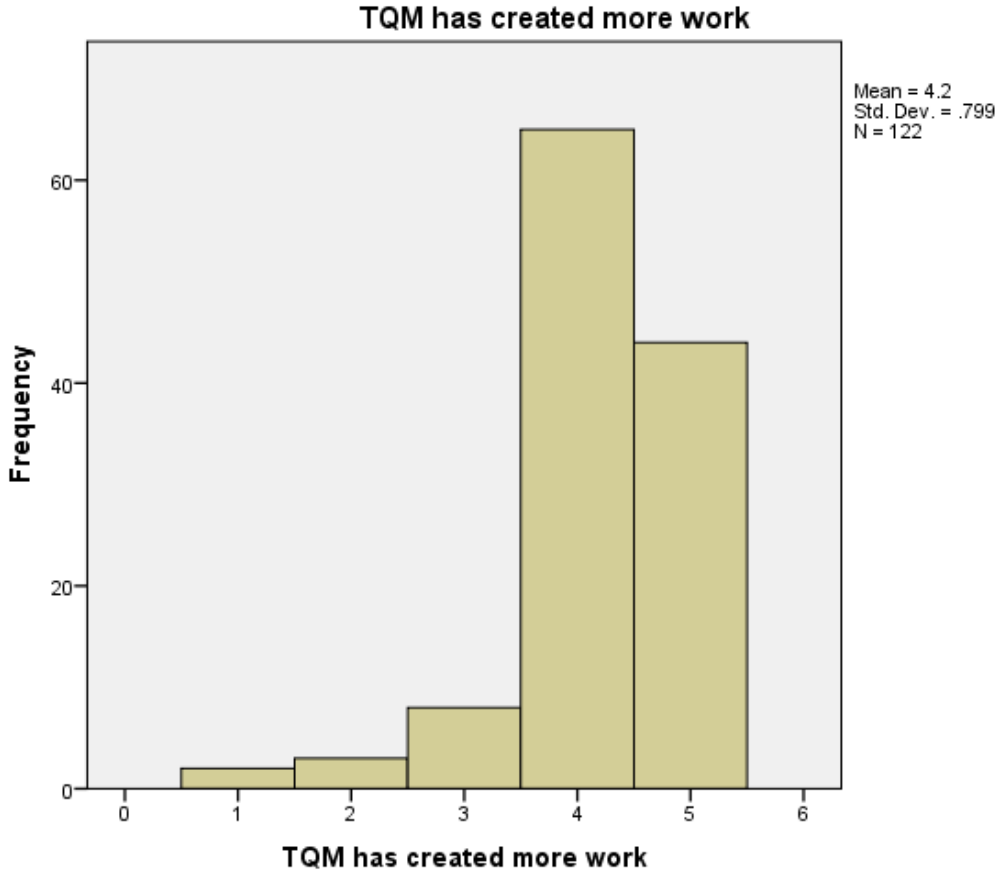

Top management compensation is directly linked to costumer satisfaction level ?
Mean = 4.27
Std. Dev. = .728
N = 122
Frequency
0
20
40
60
0
1
2
3
4
5
6
Top management compensation is directly linked to costumer satisfaction level ?

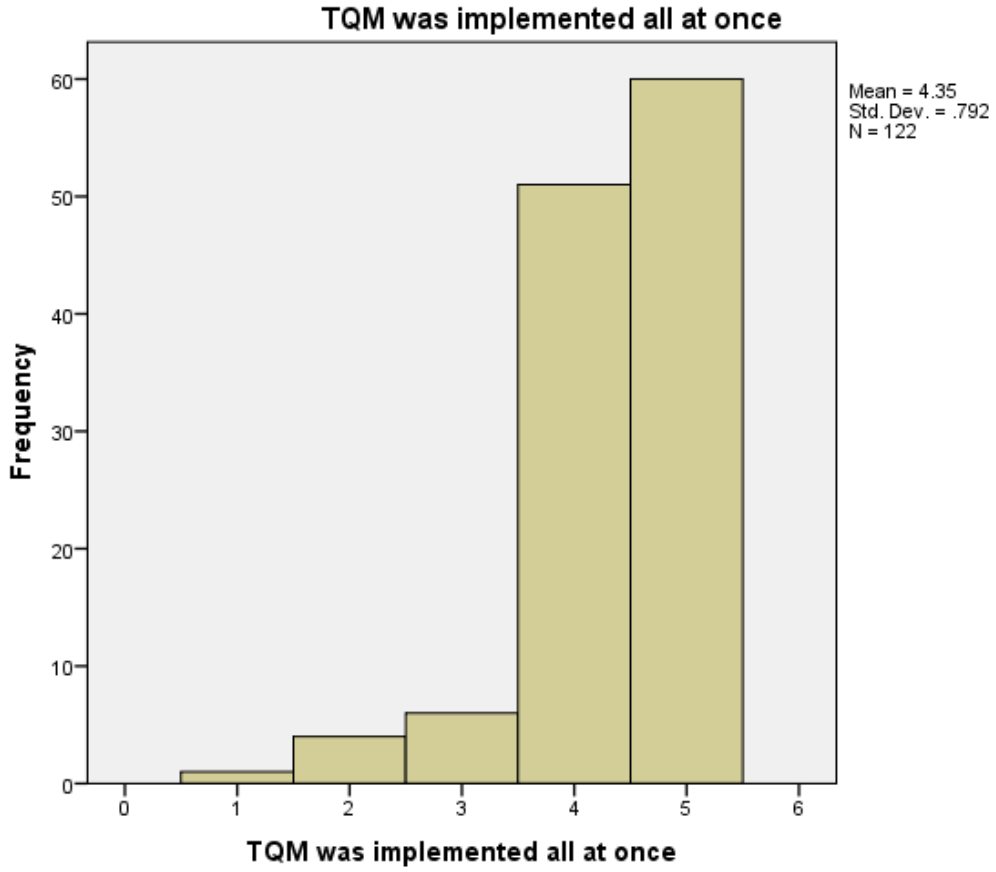

Top management is engaged
Mean = 4.28
Std. Dev. = .836
N = 122
Frequency
0
10
20
30
40
50
60
0
1
2
3
4
5
6
Top management is engaged

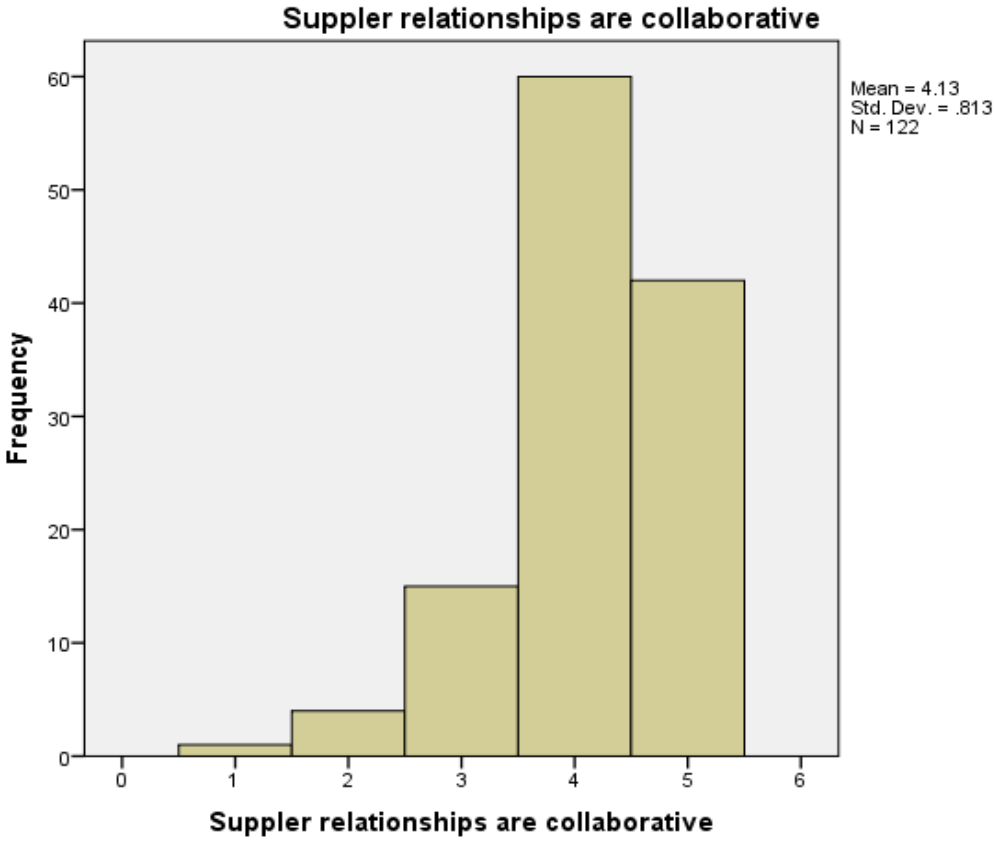

Employees are trained in functional skills only
Mean = 4.16
Std. Dev. = .775
N = 122
Frequency
60
40
20
0
0
1
2
3
4
5
6
Employees are trained in functional skills only

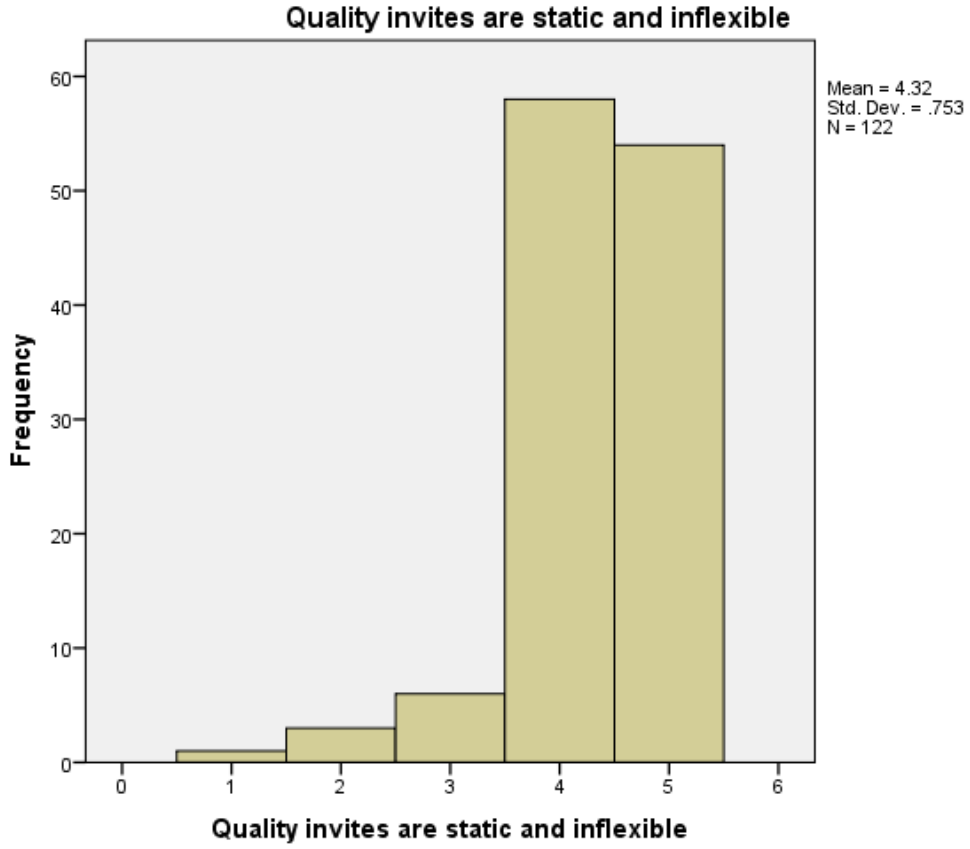

Performance reviews focus on past mistakes
Mean = 4.16
Std. Dev. = .803
N = 122
Frequency
60
40
20
0
0
1
2
3
4
5
6
Performance reviews focus on past mistakes


Employee selection process focuses only on individuals with the requisite skills
Mean = 4.28
Std. Dev. = .785
N = 122
Frequency
60
50
40
30
20
10
0
0
1
2
3
4
5
6
Employee selection process focuses only on individuals with the requisite skills

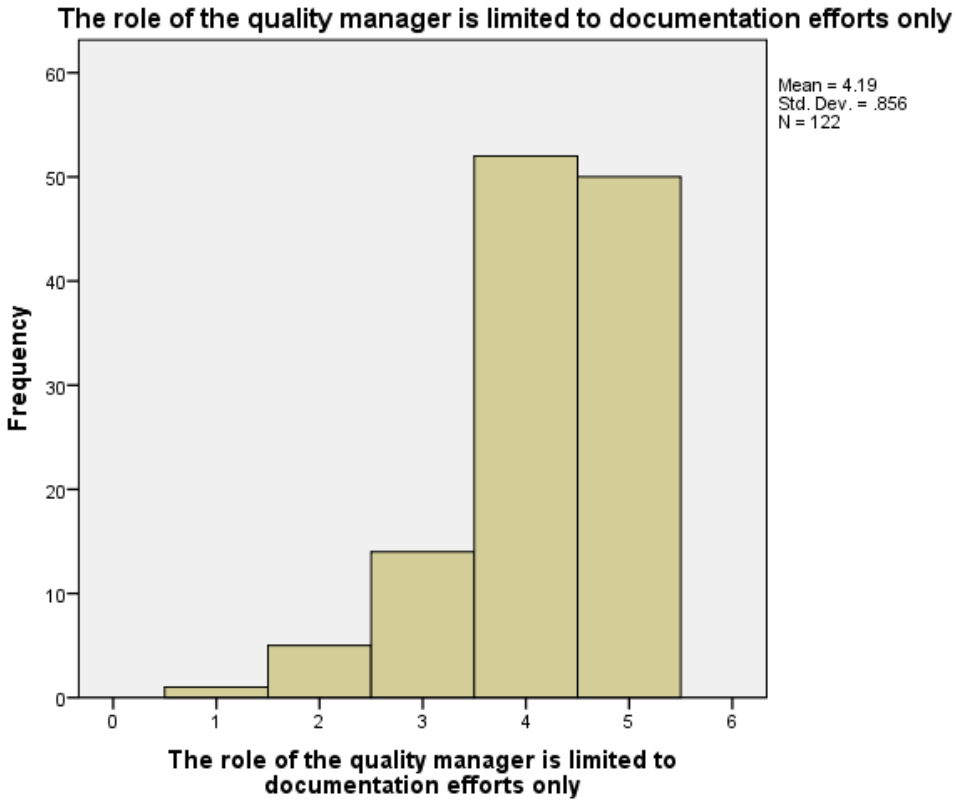

TQM has created more work
Mean = 4.2
Std. Dev. = .799
N = 122
Frequency
60
40
20
0
0
1
2
3
4
5
6
TQM has created more work


TQM was implemented all at once
Mean = 4.35
Std. Dev. = .792
N = 122
Frequency
0
10
20
30
40
50
60
0
1
2
3
4
5
6
TQM was implemented all at once


Suppler relationships are collaborative
Mean = 4.13
Std. Dev. = .813
N = 122
Frequency
0
10
20
30
40
50
60
0
1
2
3
4
5
6
Suppler relationships are collaborative


Quality invites are static and inflexible
Mean = 4.32
Std. Dev. = .753
N = 122
Frequency
60
50
40
30
20
10
0
0
1
2
3
4
5
6
Quality invites are static and inflexible


Quality initiatives focus only on the organizations production process
Mean = 4.2
Std. Dev. = .833
N = 122
Frequency
60
50
40
30
20
10
0
0
1
2
3
4
5
6
Quality initiatives focus only on the organizations production process


The role of the quality manager is limited to documentation efforts only
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2
3
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6
The role of the quality manager is limited to documentation efforts only


Quality initiatives test for consistency not continuous improvement or product performance
Mean = 4.2
Std. Dev. = .842
N = 122
Frequency
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2
3
4
5
6
Quality initiatives test for consistency not continuous improvement or product performance

Reliability

FREQUENCIES VARIABLES=O1 O2 O3 O4 O5 O6 O7 O8 O9 O10 O11 O12 O13 O14 O15 O16 O17

/STATISTICS=STDDEV VARIANCE SEMEAN MEAN MEDIAN MODE SUM

/HISTOGRAM

/ORDER=ANALYSIS.

Frequencies

Notes		
Output Created		03-MAY-2023 04:04:06
Comments		
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Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on all cases with valid data.
Syntax		FREQUENCIES VARIABLES=O1 O2 O3 O4 O5 O6 O7 O8 O9 O10 O11 O12 O13 O14 O15 O16 O17 /STATISTICS=STDDEV VARIANCE SEMEAN MEAN MEDIAN MODE SUM /HISTOGRAM /ORDER=ANALYSIS.
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	Elapsed Time	00:00:04.87

Statistics					
		Commitment by senior management and Empoyees	Meeting customers' requirements	Improve customer relations	Reduce operation defects
N	Valid	122	122	122	122
	Missing	0	0	0	0
Mean		4.11	4.20	4.26	4.16
Std. Error of Mean		.075	.081	.076	.075
Median		4.00	4.00	4.00	4.00
Mode		4	4	4	4
Std. Deviation		.831	.890	.841	.833
Variance		.691	.792	.707	.695
Sum		501	513	520	507

Statistics					
		Motivate employees	Improve working climate	Increase service quality	Increase company market share
N	Valid	122	122	122	122
	Missing	0	0	0	0
Mean		4.10	4.30	4.13	4.37
Std. Error of Mean		.087	.074	.088	.074
Median		4.00	4.00	4.00	5.00
Mode		4	4	4	5
Std. Deviation		.966	.822	.970	.815
Variance		.932	.676	.941	.664
Sum		500	525	504	533

Statistics					
		Increase company turnover	Improve employees satisfaction	Reduce customers complaints	Enhance company reputation
N	Valid	122	122	122	122
	Missing	0	0	0	0
Mean		4.18	4.32	4.29	4.24
Std. Error of Mean		.070	.074	.066	.074
Median		4.00	4.00	4.00	4.00
Mode		4	4[a]	4	4[a]
Std. Deviation		.772	.816	.733	.814
Variance		.595	.666	.537	.662
Sum		510	527	523	517

Statistics					
		Expand company activities overseas	Invest in new technology and machines	Build strong relation with suppliers	Improve buyer/seller advance planning
N	Valid	122	122	122	122
	Missing	0	0	0	0
Mean		4.24	4.16	4.06	4.26
Std. Error of Mean		.075	.099	.088	.081
Median		4.00	4.00	4.00	4.00
Mode		4	5	4	5
Std. Deviation		.834	1.099	.973	.898
Variance		.695	1.207	.947	.807
Sum		517	507	495	520

Statistics		
		Improve suppliers satisfaction, quality and retention
N	Valid	122
	Missing	0
Mean		4.04
Std. Error of Mean		.093
Median		4.00
Mode		4
Std. Deviation		1.024
Variance		1.048
Sum		493

a. Multiple modes exist. The smallest value is shown

Frequency Table

Commitment by senior management and Empoyees					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	1.6	1.6	1.6
	Disagree	4	3.3	3.3	4.9
	Neutral	12	9.8	9.8	14.8
	Agree	65	53.3	53.3	68.0
	Strongly agree	39	32.0	32.0	100.0
	Total	122	100.0	100.0	

Meeting customers' requirements					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	5	4.1	4.1	4.1
	Disagree	1	.8	.8	4.9
	Neutral	5	4.1	4.1	9.0
	Agree	64	52.5	52.5	61.5
	Strongly agree	47	38.5	38.5	100.0
	Total	122	100.0	100.0	

Improve customer relations					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	3	2.5	2.5	2.5
	Disagree	2	1.6	1.6	4.1
	Neutral	7	5.7	5.7	9.8
	Agree	58	47.5	47.5	57.4
	Strongly agree	52	42.6	42.6	100.0
	Total	122	100.0	100.0	

Reduce operation defects					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	3	2.5	2.5	2.5
	Disagree	2	1.6	1.6	4.1
	Neutral	10	8.2	8.2	12.3
	Agree	65	53.3	53.3	65.6
	Strongly agree	42	34.4	34.4	100.0
	Total	122	100.0	100.0	

Motivate employees					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	6	4.9	4.9	4.9
	Disagree	2	1.6	1.6	6.6
	Neutral	9	7.4	7.4	13.9
	Agree	62	50.8	50.8	64.8
	Strongly agree	43	35.2	35.2	100.0
	Total	122	100.0	100.0	

Improve working climate					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	3	2.5	2.5	2.5
	Disagree	1	.8	.8	3.3
	Neutral	7	5.7	5.7	9.0
	Agree	56	45.9	45.9	54.9
	Strongly agree	55	45.1	45.1	100.0
	Total	122	100.0	100.0	

Increase service quality					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	5	4.1	4.1	4.1
	Disagree	4	3.3	3.3	7.4
	Neutral	8	6.6	6.6	13.9
	Agree	58	47.5	47.5	61.5
	Strongly agree	47	38.5	38.5	100.0
	Total	122	100.0	100.0	

Increase company market share					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	3	2.5	2.5	2.5
	Neutral	8	6.6	6.6	9.0
	Agree	49	40.2	40.2	49.2
	Strongly agree	62	50.8	50.8	100.0
	Total	122	100.0	100.0	

Increase company turnover					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	.8	.8	.8
	Disagree	2	1.6	1.6	2.5
	Neutral	15	12.3	12.3	14.8
	Agree	60	49.2	49.2	63.9
	Strongly agree	44	36.1	36.1	100.0
	Total	122	100.0	100.0	

Improve employees satisfaction					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	3	2.5	2.5	2.5
	Disagree	1	.8	.8	3.3
	Neutral	6	4.9	4.9	8.2
	Agree	56	45.9	45.9	54.1
	Strongly agree	56	45.9	45.9	100.0
	Total	122	100.0	100.0	

Reduce customers complaints					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	.8	.8	.8
	Disagree	1	.8	.8	1.6
	Neutral	11	9.0	9.0	10.7
	Agree	58	47.5	47.5	58.2
	Strongly agree	51	41.8	41.8	100.0
	Total	122	100.0	100.0	

Enhance company reputation					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	.8	.8	.8
	Disagree	3	2.5	2.5	3.3
	Neutral	14	11.5	11.5	14.8
	Agree	52	42.6	42.6	57.4
	Strongly agree	52	42.6	42.6	100.0
	Total	122	100.0	100.0	

Expand company activities overseas					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	1.6	1.6	1.6
	Disagree	3	2.5	2.5	4.1
	Neutral	10	8.2	8.2	12.3
	Agree	56	45.9	45.9	58.2
	Strongly agree	51	41.8	41.8	100.0
	Total	122	100.0	100.0	

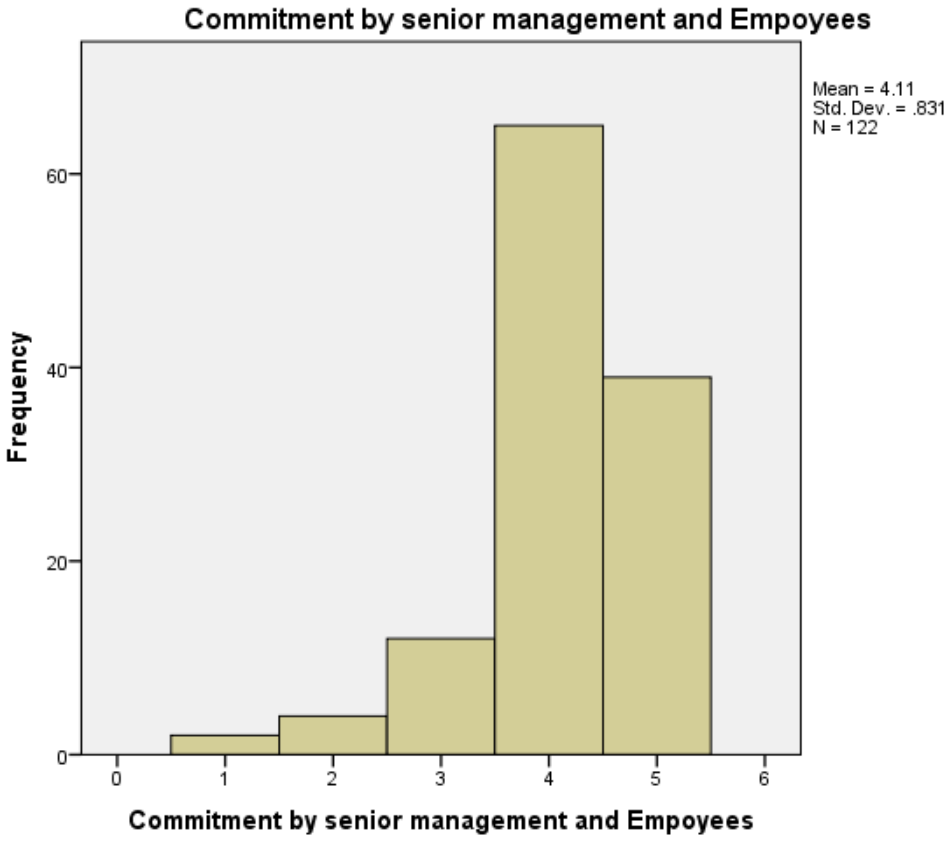
Invest in new technology and machines					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	7	5.7	5.7	5.7
	Disagree	5	4.1	4.1	9.8
	Neutral	8	6.6	6.6	16.4
	Agree	44	36.1	36.1	52.5
	Strongly agree	58	47.5	47.5	100.0
	Total	122	100.0	100.0	

Build strong relation with suppliers					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	5	4.1	4.1	4.1
	Disagree	5	4.1	4.1	8.2
	Neutral	9	7.4	7.4	15.6
	Agree	62	50.8	50.8	66.4
	Strongly agree	41	33.6	33.6	100.0
	Total	122	100.0	100.0	

Improve buyer/seller advance planning					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	4	3.3	3.3	3.3
	Disagree	1	.8	.8	4.1
	Neutral	10	8.2	8.2	12.3
	Agree	51	41.8	41.8	54.1
	Strongly agree	56	45.9	45.9	100.0
	Total	122	100.0	100.0	

Improve suppliers satisfaction, quality and retention					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	6	4.9	4.9	4.9
	Disagree	3	2.5	2.5	7.4
	Neutral	16	13.1	13.1	20.5
	Agree	52	42.6	42.6	63.1
	Strongly agree	45	36.9	36.9	100.0
	Total	122	100.0	100.0	

Histogram


Commitment by senior management and Empoyees
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N = 122
Frequency
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2
3
4
5
6
Commitment by senior management and Empoyees


Meeting customers' requirements
Mean = 4.2
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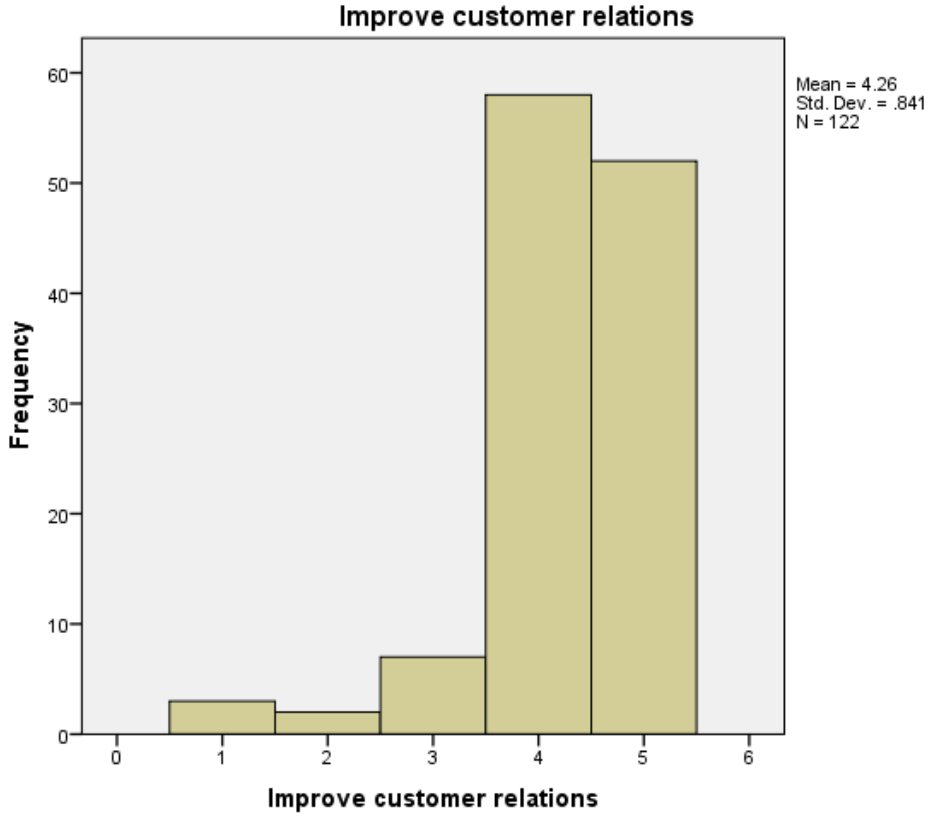
5
6
Meeting customers' requirements


Improve customer relations
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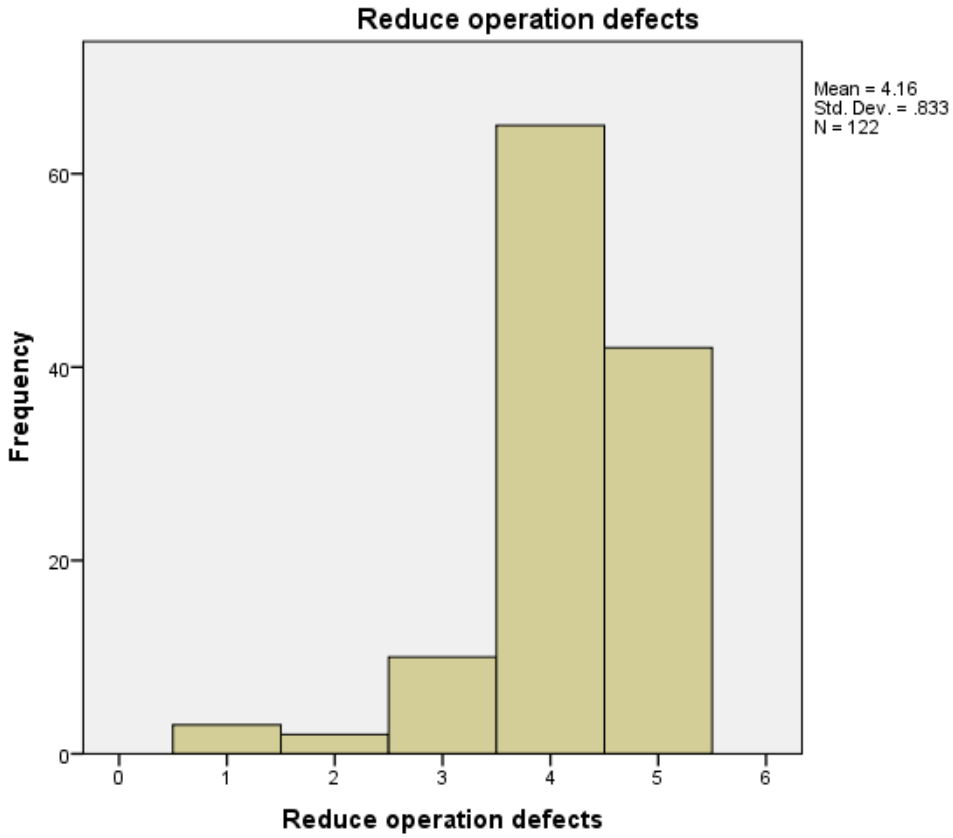
5
6
Improve customer relations


Reduce operation defects
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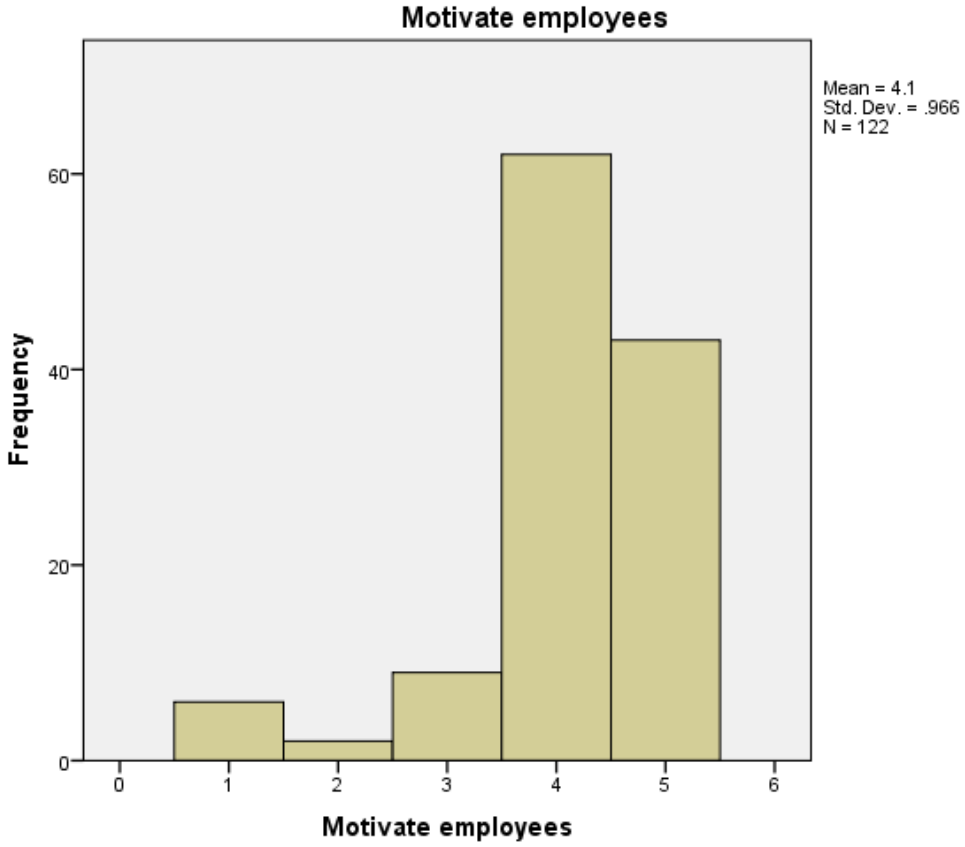
3
4
5
6
Reduce operation defects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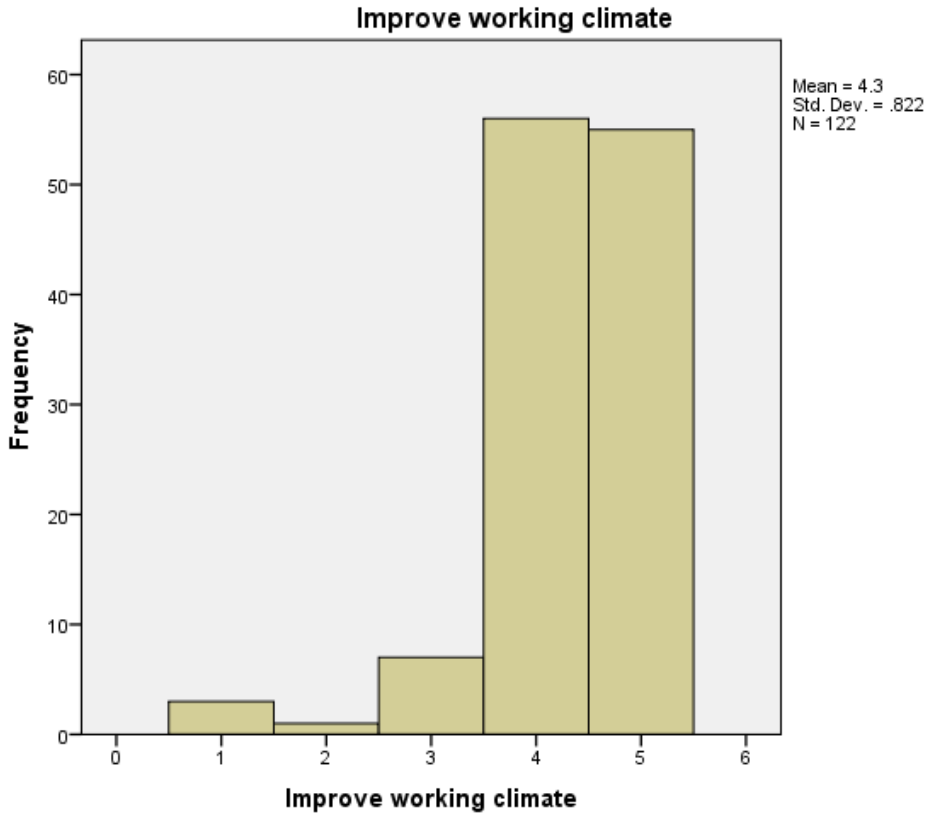
5
6
Motivate employees


Improve working climate
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Std. Dev. = .822
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1
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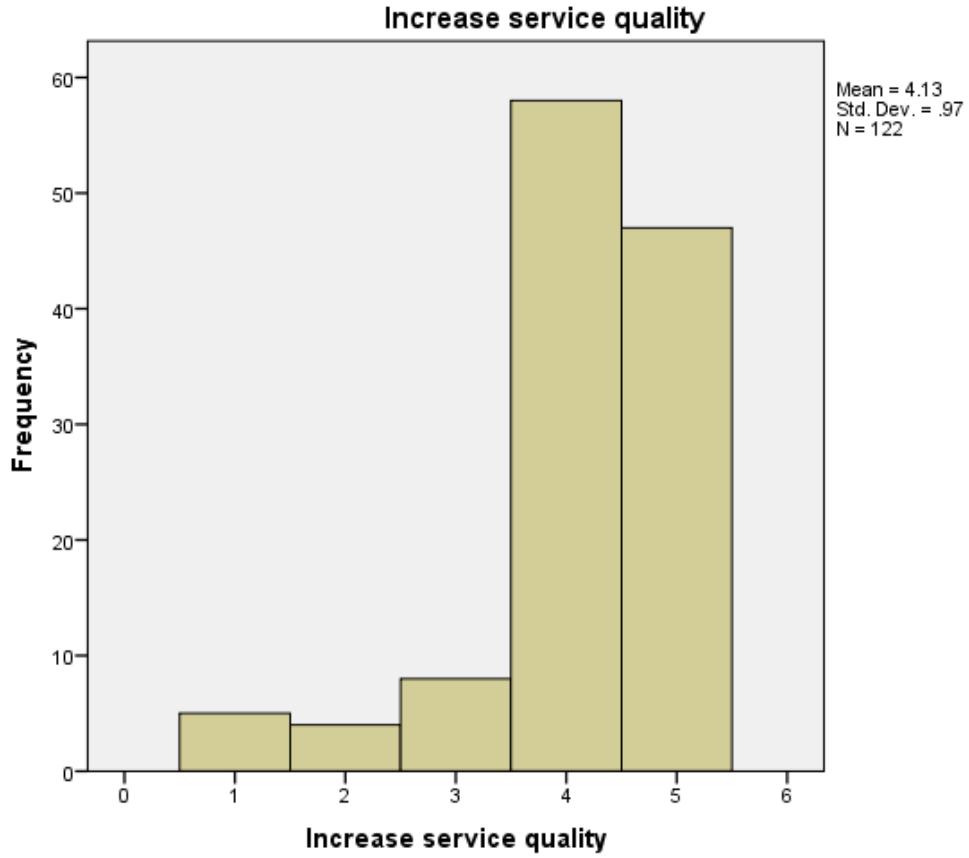
4
5
6
Improve working climate


Increase service quality
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Std. Dev. = .97
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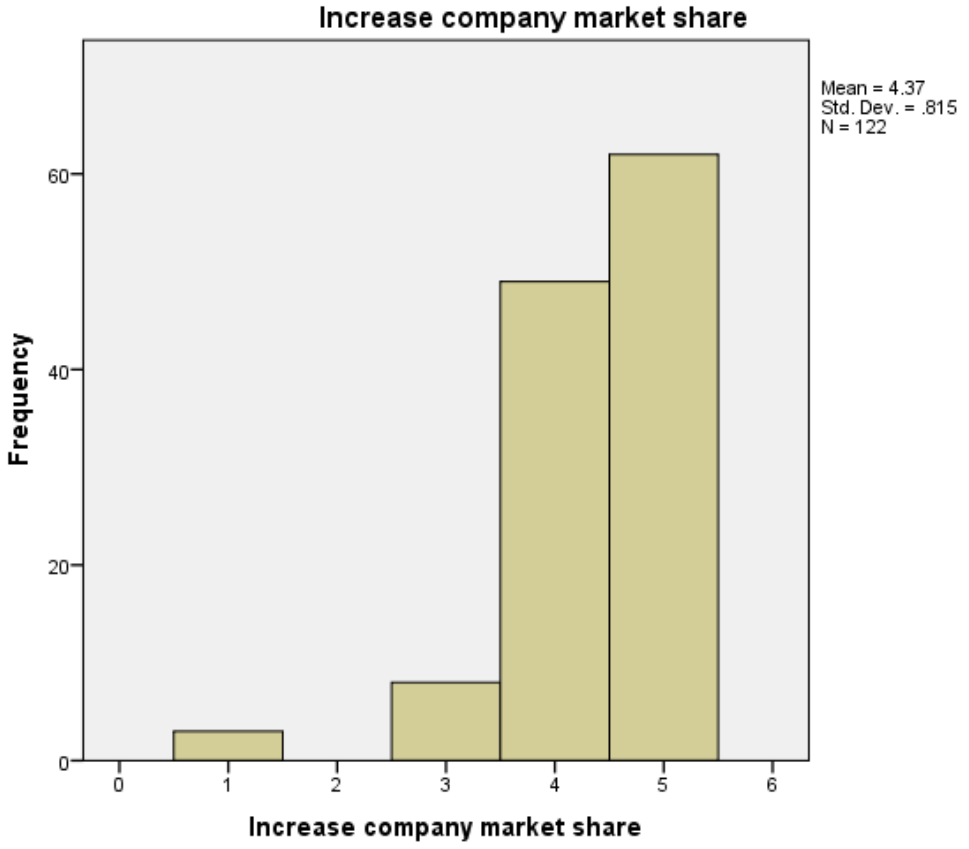
4
5
6
Increase service quality


Increase company market share
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1
2
3
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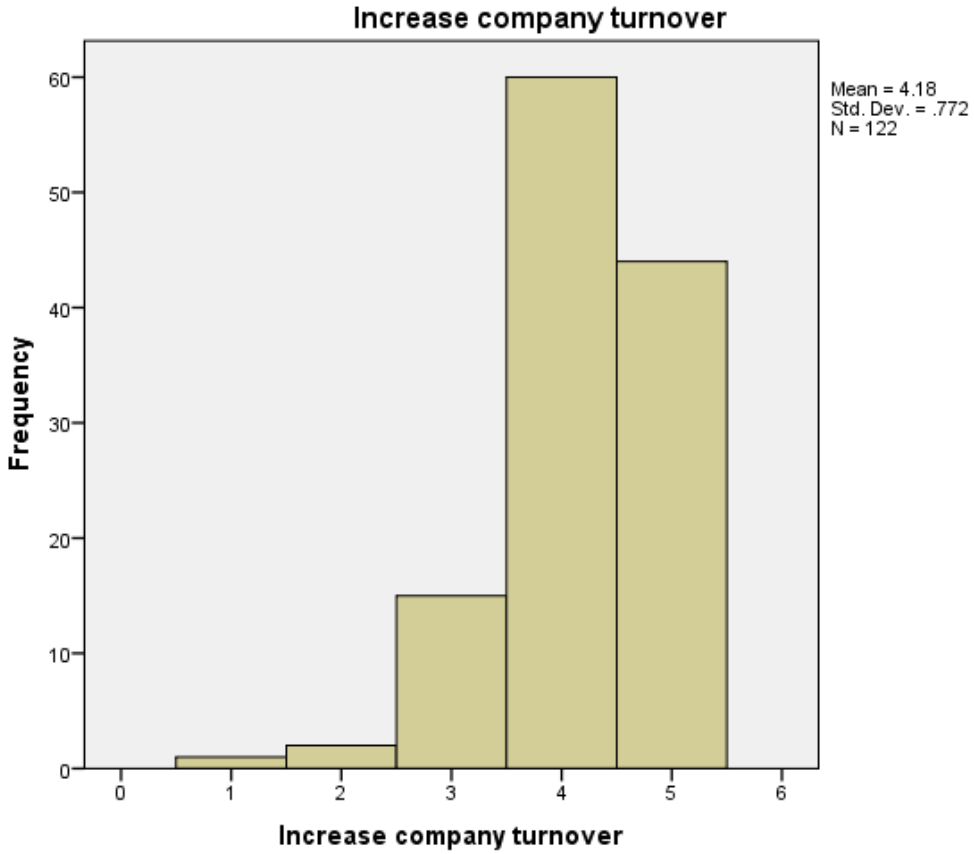
5
6
Increase company market share


Increase company turnover
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Std. Dev. = .772
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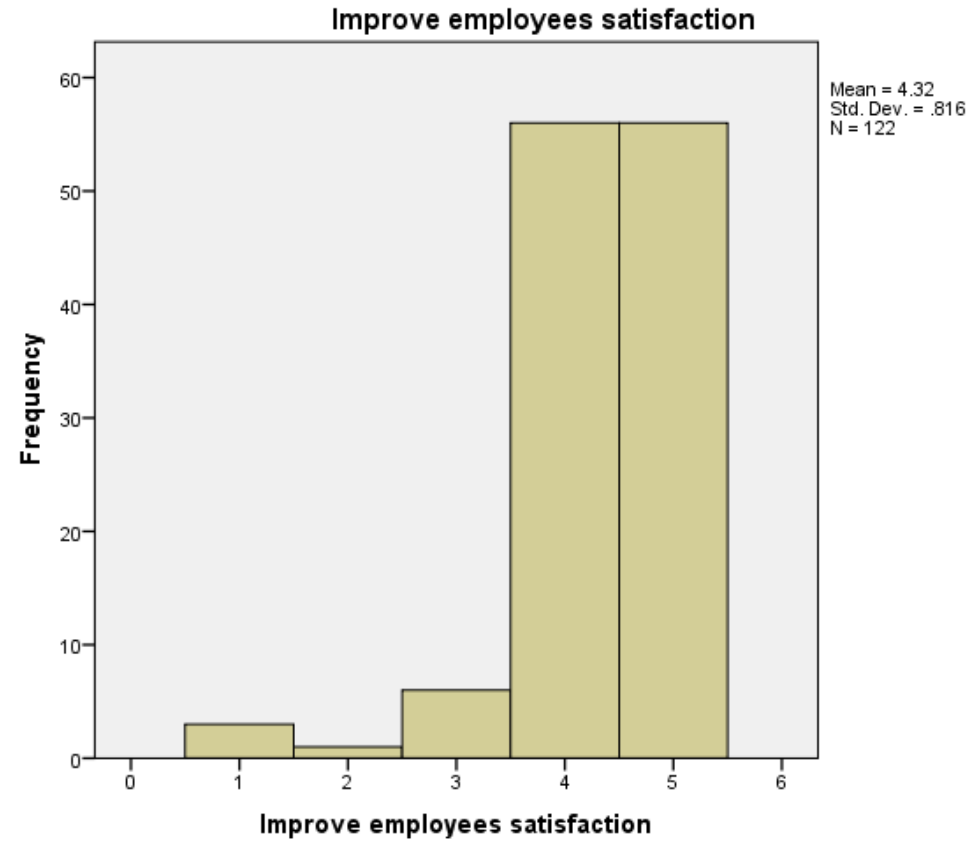
2
3
4
5
6
Increase company turnover


Improve employees satisfaction
Mean = 4.32
Std. Dev. = .816
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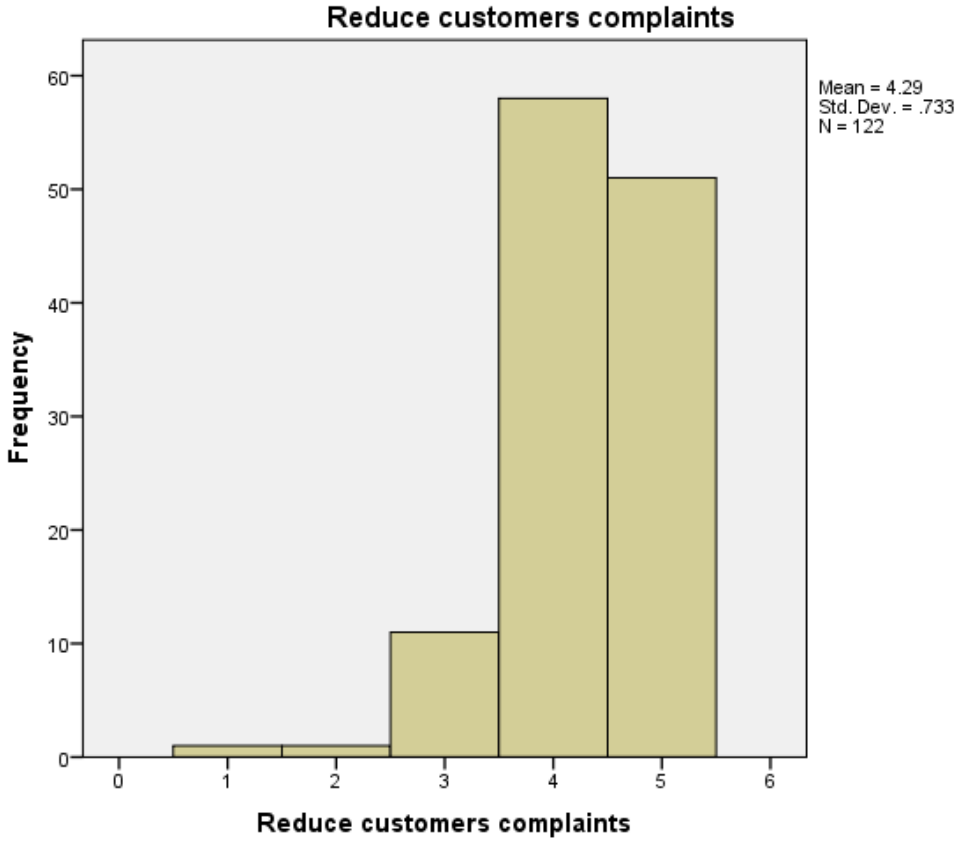
2
3
4
5
6
Improve employees satisfaction


Reduce customers complaints
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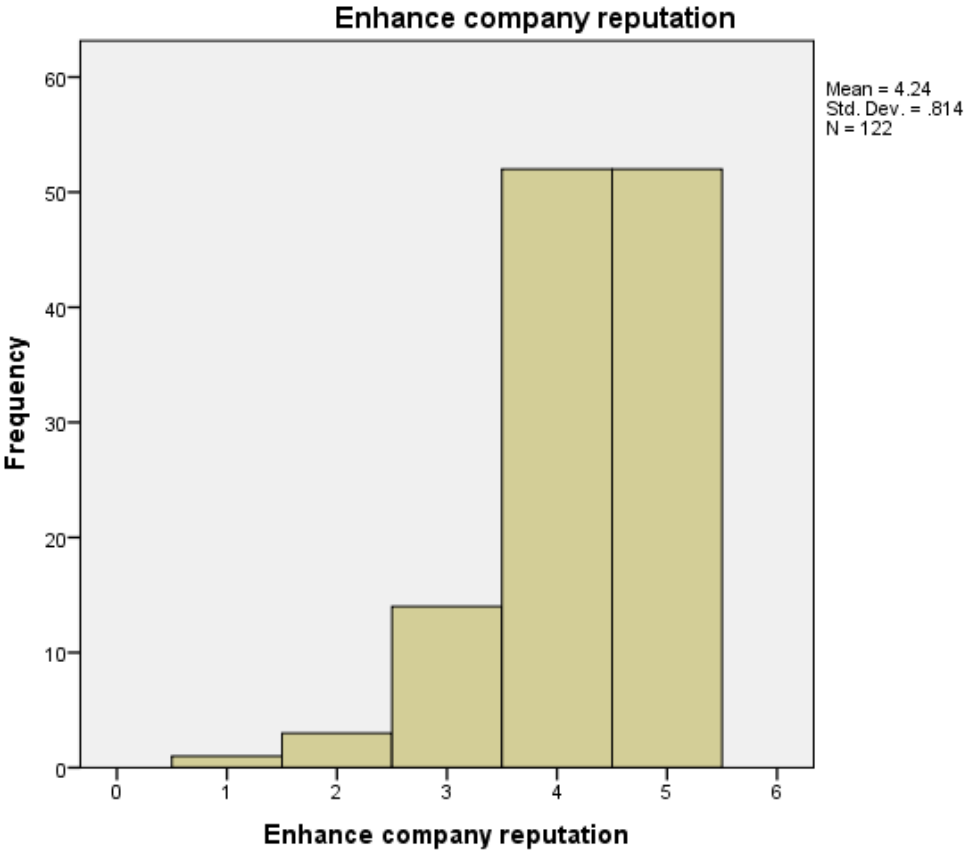
4
5
6
Reduce customers complaints


Enhance company reputation
Mean = 4.24
Std. Dev. = .814
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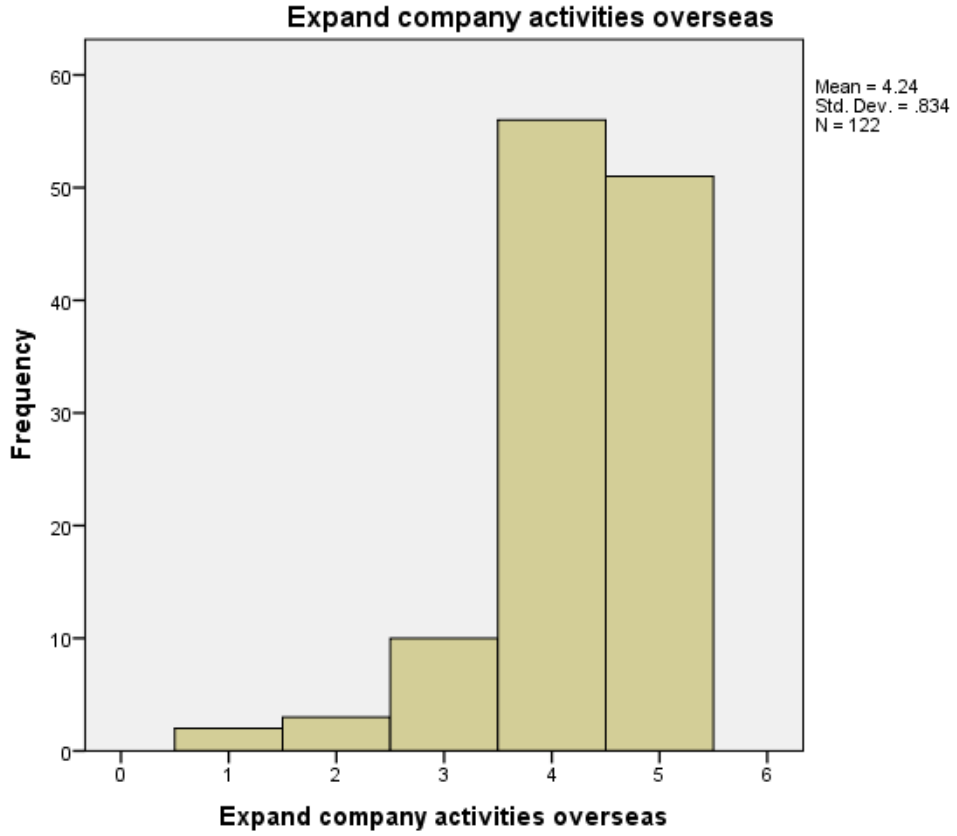
1
2
3
4
5
6
Enhance company reputation


Expand company activities overseas
Mean = 4.24
Std. Dev. = .834
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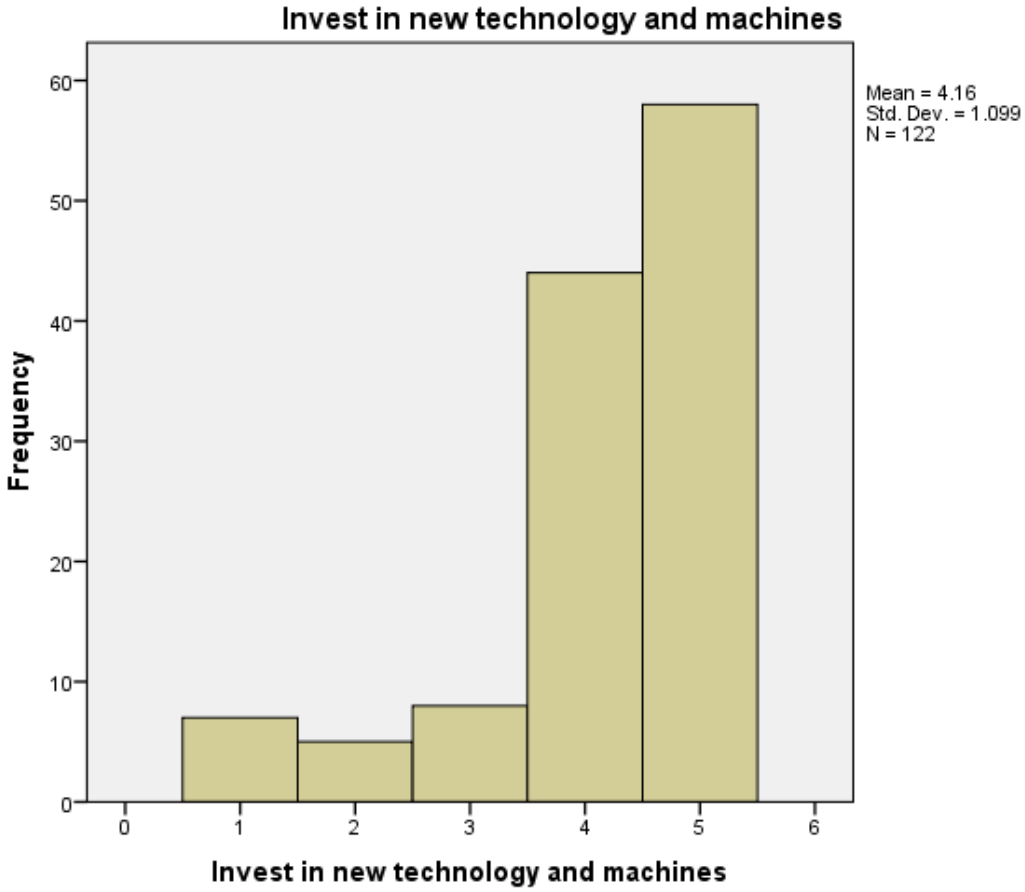
4
5
6
Expand company activities overseas


Invest in new technology and machines
Mean = 4.16
Std. Dev. = 1.099
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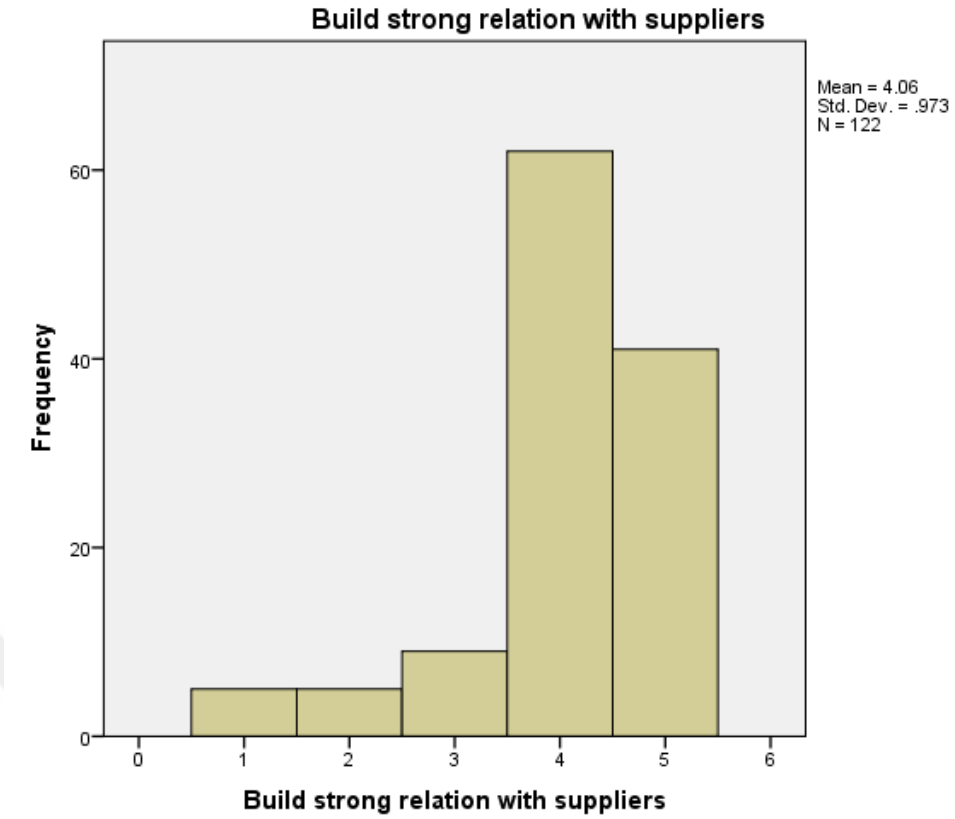
6
Invest in new technology and machines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Std. Dev. = .973
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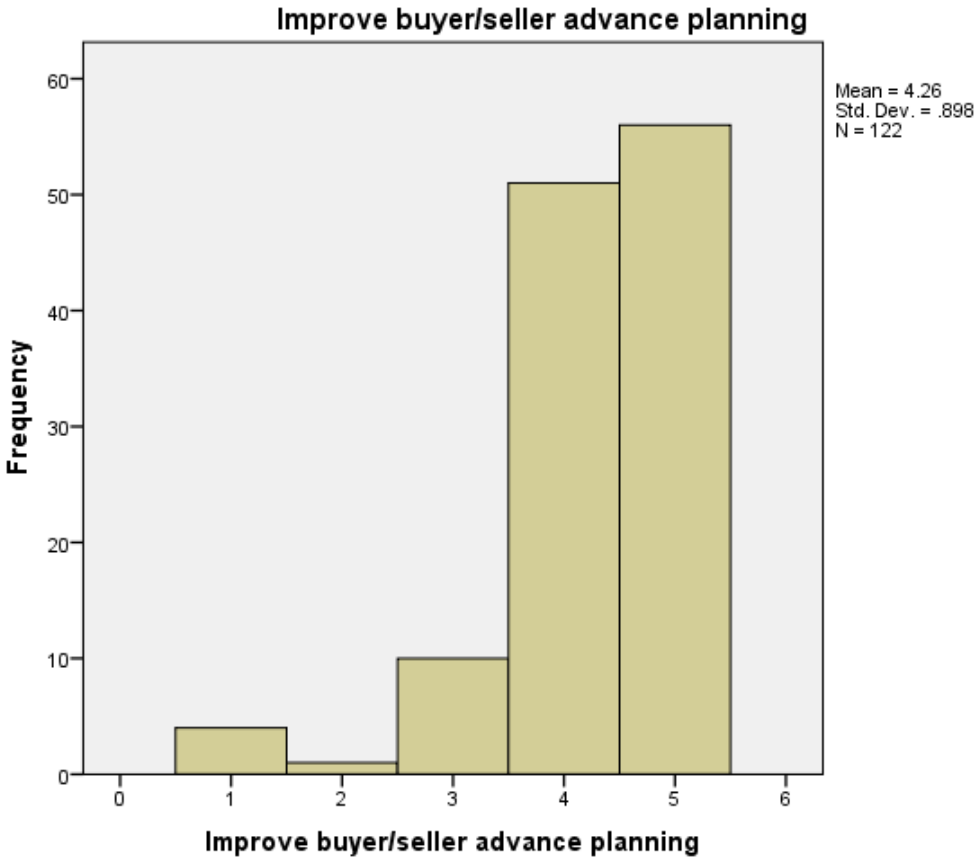
5
6
Build strong relation with suppliers


Improve buyer/seller advance planning
Mean = 4.26
Std. Dev. = .898
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30
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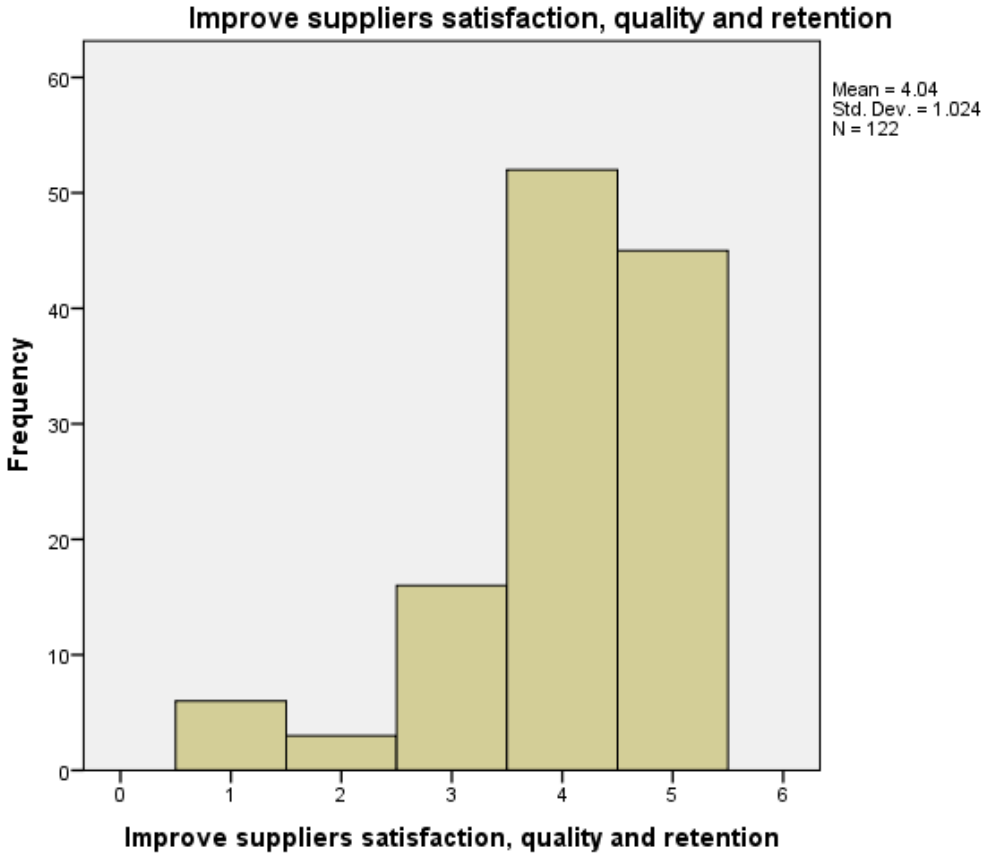
1
2
3
4
5
6
Improve buyer/seller advance planning


Improve suppliers satisfaction, quality and retention
Mean = 4.04
Std. Dev. = 1.024
N = 122
Frequency
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40
30
20
10
0
0
1
2
3
4
5
6
Improve suppliers satisfaction, quality and retention

FREQUENCIES VARIABLES=Qualitive1 Qualitive2 Qualitive3 Qualitive4 Qualitive5 Qualitive6 B1 B2 B3 B4 B5 B6 B7 B8 B9 B10 B11 B12 B13 B14

/STATISTICS=STDDEV VARIANCE SEMEAN MEAN MEDIAN MODE SUM

/HISTOGRAM

/ORDER=ANALYSIS.

Frequencies

Notes		
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Comments		
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	N of Rows in Working Data File	122
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on all cases with valid data.
Syntax		FREQUENCIES VARIABLES=Qualitive1 Qualitive2 Qualitive3 Qualitive4 Qualitive5 Qualitive6 B1 B2 B3 B4 B5 B6 B7 B8 B9 B10 B11 B12 B13 B14 /STATISTICS=STDDEV VARIANCE SEMEAN MEAN MEDIAN MODE SUM /HISTOGRAM /ORDER=ANALYSIS.
Resources	Processor Time	00:00:06.21
	Elapsed Time	00:00:06.22

Statistics					
		Have you participated in TQM implementation project?	Was YQM successful implantation?	How long did TQM remind successful ?	What best describe your position in company ?
N	Valid	122	122	122	122
	Missing	0	0	0	0
Mean		1.25	1.25	1.69	1.57
Std. Error of Mean		.040	.040	.078	.072
Median		1.00	1.00	1.00	1.00
Mode		1	1	1	1
Std. Deviation		.437	.437	.863	.792
Variance		.191	.191	.745	.627
Sum		153	153	206	192

Statistics					
		What best described your role when you participated in TQM ?	Qualifications Regarding Education	Top management compensation is directly linked to profitability ?	Top management compensation is directly linked to quality matrics such as defect rates ?
N	Valid	122	122	122	122
	Missing	0	0	0	0
Mean		1.69	1.57	4.05	4.25
Std. Error of Mean		.078	.072	.083	.079
Median		1.00	1.00	4.00	4.00
Mode		1	1	4	4
Std. Deviation		.863	.792	.917	.875
Variance		.745	.627	.841	.765
Sum		206	192	494	518

Statistics					
		Top management compensation is directly linked to costumer satisfaction level ?	Top management is engaged	Employees are trained in functional skills only	Performance reviews focus on past mistakes
N	Valid	122	122	122	122
	Missing	0	0	0	0
Mean		4.27	4.28	4.16	4.16
Std. Error of Mean		.066	.076	.070	.073
Median		4.00	4.00	4.00	4.00
Mode		4	4	4	4
Std. Deviation		.728	.836	.775	.803
Variance		.530	.699	.601	.645
Sum		521	522	508	507

Statistics					
		Employee selection process focuses only on individuals with the requisite skills	TQM has created more work	TQM was implemented all at once	Suppler relationships are collaborative
N	Valid	122	122	122	122
	Missing	0	0	0	0
Mean		4.28	4.20	4.35	4.13
Std. Error of Mean		.071	.072	.072	.074
Median		4.00	4.00	4.00	4.00
Mode		4	4	5	4
Std. Deviation		.785	.799	.792	.813
Variance		.616	.639	.627	.660
Sum		522	512	531	504

Statistics					
		Quality invites are static and inflexible	Quality initiatives focus only on the organizations production process	The role of the quality manager is limited to documentation efforts only	Quality initiatives test for consistency not continuous improvement or product performance
N	Valid	122	122	122	122
	Missing	0	0	0	0
Mean		4.32	4.20	4.19	4.20
Std. Error of Mean		.068	.075	.077	.076
Median		4.00	4.00	4.00	4.00
Mode		4	4	4	4
Std. Deviation		.753	.833	.856	.842
Variance		.566	.693	.733	.710
Sum		527	513	511	513

Frequency Table

Have you participated in TQM implementation project?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	91	74.6	74.6	74.6
	No	31	25.4	25.4	100.0
	Total	122	100.0	100.0	

Was YQM successful implantation?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	91	74.6	74.6	74.6
	No	31	25.4	25.4	100.0
	Total	122	100.0	100.0	

How long did TQM remind successful ?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-5 years	70	57.4	57.4	57.4
	5-10 years	20	16.4	16.4	73.8
	more then 10 years	32	26.2	26.2	100.0
	Total	122	100.0	100.0	

What best describe your position in company ?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Exclusive management	72	59.0	59.0	59.0
	Mid-level management	33	27.0	27.0	86.1
	Engineering support	14	11.5	11.5	97.5
	Other	3	2.5	2.5	100.0
	Total	122	100.0	100.0	

What best described your role when you participated in TQM ?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Leader	70	57.4	57.4	57.4
	Core team member	20	16.4	16.4	73.8
	Other	32	26.2	26.2	100.0
	Total	122	100.0	100.0	

Qualifications Regarding Education					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	BSC	72	59.0	59.0	59.0
	MSC	33	27.0	27.0	86.1
	PHD	14	11.5	11.5	97.5
	Other	3	2.5	2.5	100.0
	Total	122	100.0	100.0	

Top management compensation is directly linked to profitability ?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	1.6	1.6	1.6
	Disagree	8	6.6	6.6	8.2
	Neutral	12	9.8	9.8	18.0
	Agree	60	49.2	49.2	67.2
	Strongly agree	40	32.8	32.8	100.0
	Total	122	100.0	100.0	

Top management compensation is directly linked to quality matrics such as defect rates ?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	1.6	1.6	1.6
	Disagree	6	4.9	4.9	6.6
	Neutral	5	4.1	4.1	10.7
	Agree	56	45.9	45.9	56.6
	Strongly agree	53	43.4	43.4	100.0
	Total	122	100.0	100.0	

Top management compensation is directly linked to costumer satisfaction level ?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	.8	.8	.8
	Disagree	3	2.5	2.5	3.3
	Neutral	5	4.1	4.1	7.4
	Agree	66	54.1	54.1	61.5
	Strongly agree	47	38.5	38.5	100.0
	Total	122	100.0	100.0	

Top management is engaged					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	1.6	1.6	1.6
	Disagree	4	3.3	3.3	4.9
	Neutral	6	4.9	4.9	9.8
	Agree	56	45.9	45.9	55.7
	Strongly agree	54	44.3	44.3	100.0
	Total	122	100.0	100.0	

Employees are trained in functional skills only					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	.8	.8	.8
	Disagree	4	3.3	3.3	4.1
	Neutral	10	8.2	8.2	12.3
	Agree	66	54.1	54.1	66.4
	Strongly agree	41	33.6	33.6	100.0
	Total	122	100.0	100.0	

Performance reviews focus on past mistakes					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	.8	.8	.8
	Disagree	5	4.1	4.1	4.9
	Neutral	10	8.2	8.2	13.1
	Agree	64	52.5	52.5	65.6
	Strongly agree	42	34.4	34.4	100.0
	Total	122	100.0	100.0	

Employee selection process focuses only on individuals with the requisite skills					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	.8	.8	.8
	Disagree	4	3.3	3.3	4.1
	Neutral	7	5.7	5.7	9.8
	Agree	58	47.5	47.5	57.4
	Strongly agree	52	42.6	42.6	100.0
	Total	122	100.0	100.0	

TQM has created more work					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	1.6	1.6	1.6
	Disagree	3	2.5	2.5	4.1
	Neutral	8	6.6	6.6	10.7
	Agree	65	53.3	53.3	63.9
	Strongly agree	44	36.1	36.1	100.0
	Total	122	100.0	100.0	

TQM was implemented all at once					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	.8	.8	.8
	Disagree	4	3.3	3.3	4.1
	Neutral	6	4.9	4.9	9.0
	Agree	51	41.8	41.8	50.8
	Strongly agree	60	49.2	49.2	100.0
	Total	122	100.0	100.0	

Suppler relationships are collaborative					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	.8	.8	.8
	Disagree	4	3.3	3.3	4.1
	Neutral	15	12.3	12.3	16.4
	Agree	60	49.2	49.2	65.6
	Strongly agree	42	34.4	34.4	100.0
	Total	122	100.0	100.0	

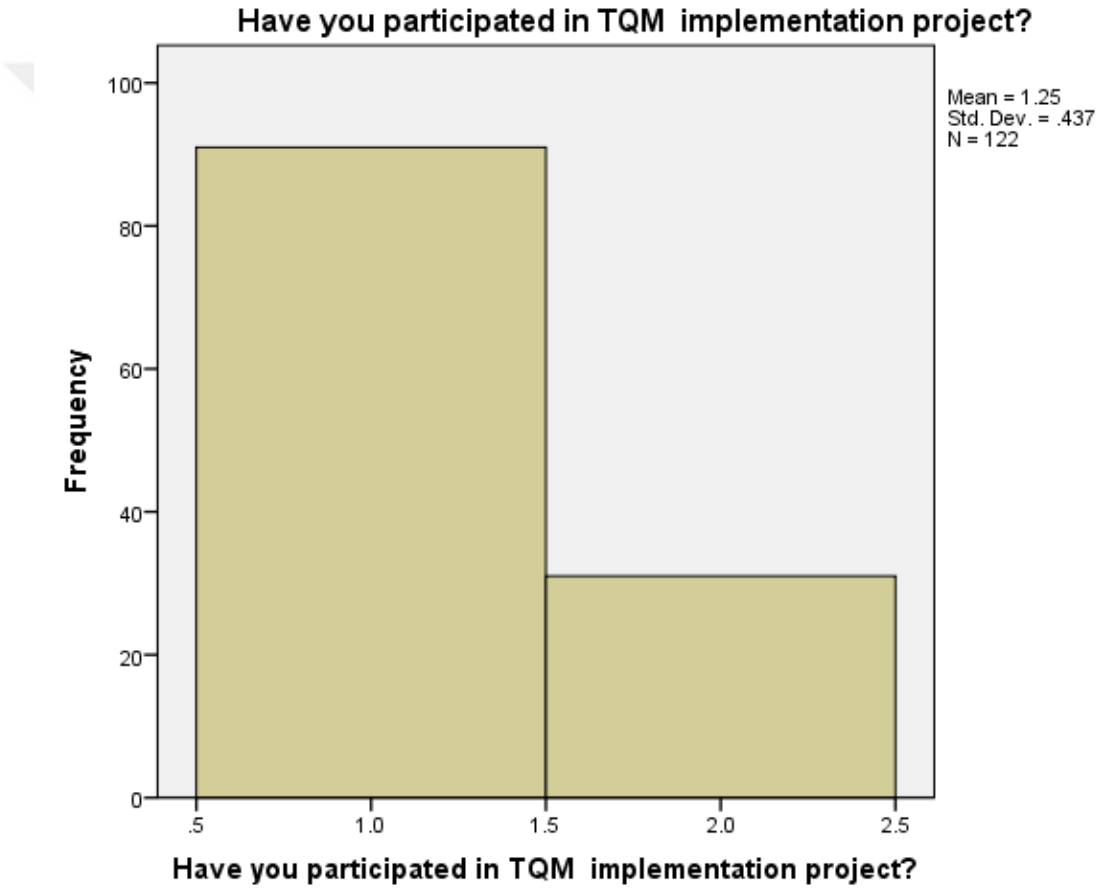
Quality invites are static and inflexible					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	.8	.8	.8
	Disagree	3	2.5	2.5	3.3
	Neutral	6	4.9	4.9	8.2
	Agree	58	47.5	47.5	55.7
	Strongly agree	54	44.3	44.3	100.0
	Total	122	100.0	100.0	

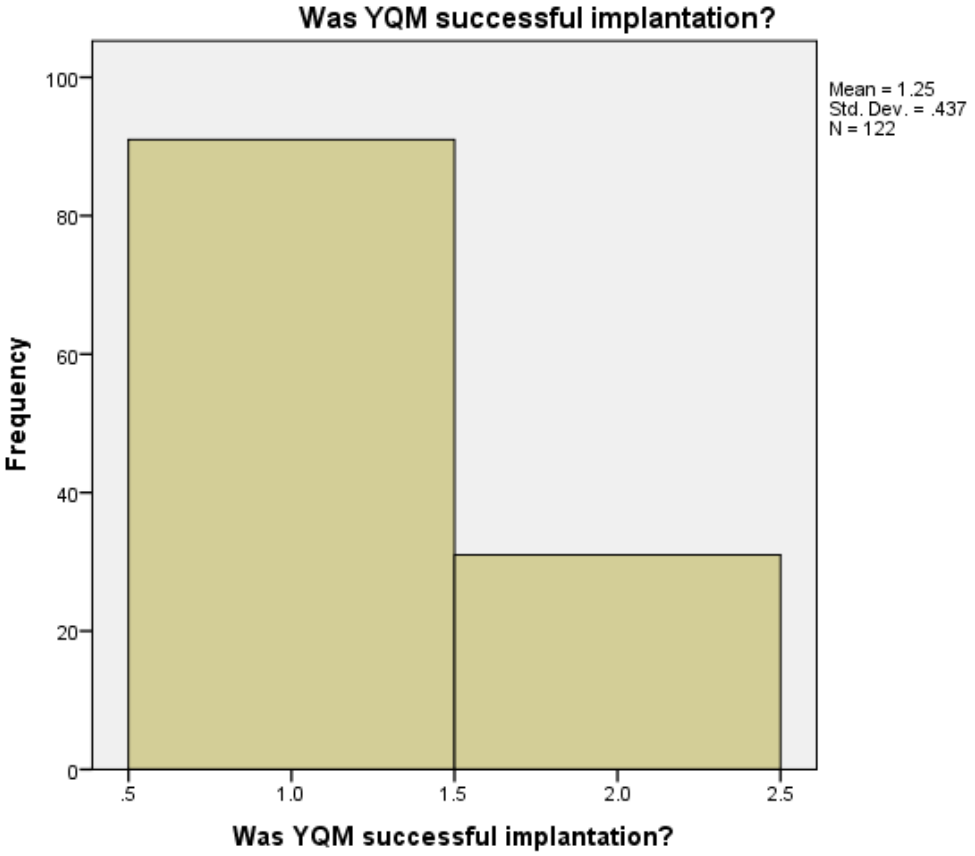
Quality initiatives focus only on the organizations production process					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	.8	.8	.8
	Disagree	5	4.1	4.1	4.9
	Neutral	11	9.0	9.0	13.9
	Agree	56	45.9	45.9	59.8
	Strongly agree	49	40.2	40.2	100.0
	Total	122	100.0	100.0	

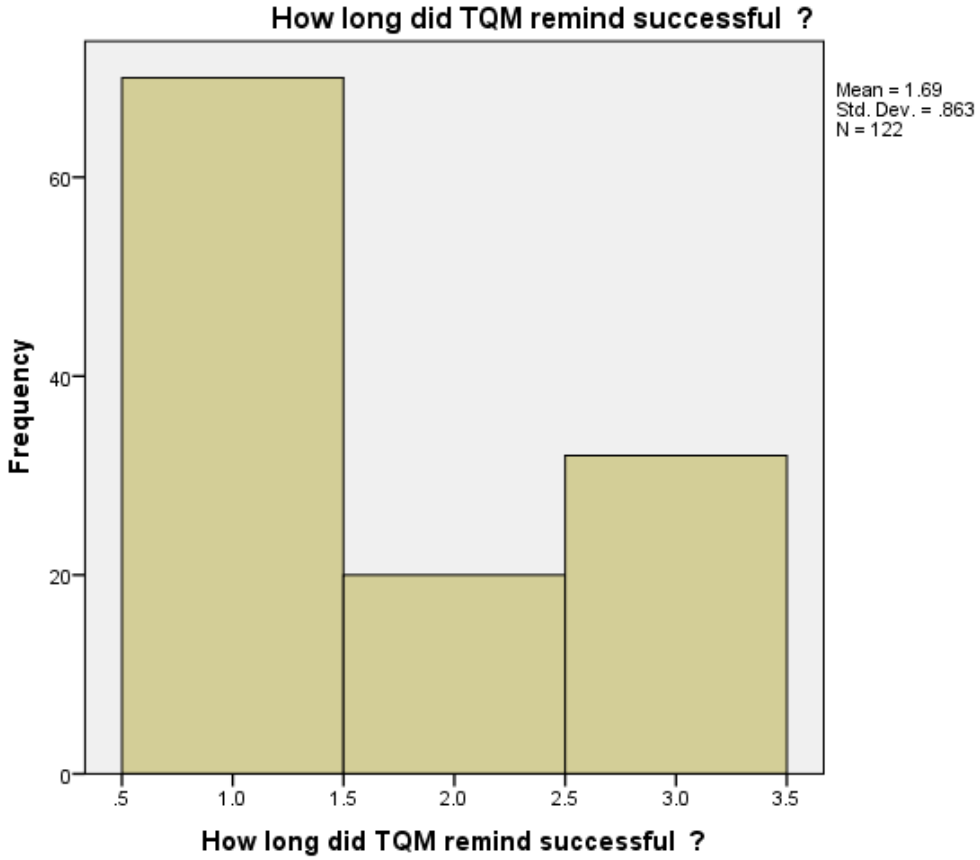
The role of the quality manager is limited to documentation efforts only					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	.8	.8	.8
	Disagree	5	4.1	4.1	4.9
	Neutral	14	11.5	11.5	16.4
	Agree	52	42.6	42.6	59.0
	Strongly agree	50	41.0	41.0	100.0
	Total	122	100.0	100.0	

Quality initiatives test for consistency not continuous improvement or product performance					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	.8	.8	.8
	Disagree	6	4.9	4.9	5.7
	Neutral	9	7.4	7.4	13.1
	Agree	57	46.7	46.7	59.8
	Strongly agree	49	40.2	40.2	100.0
	Total	122	100.0	100.0	

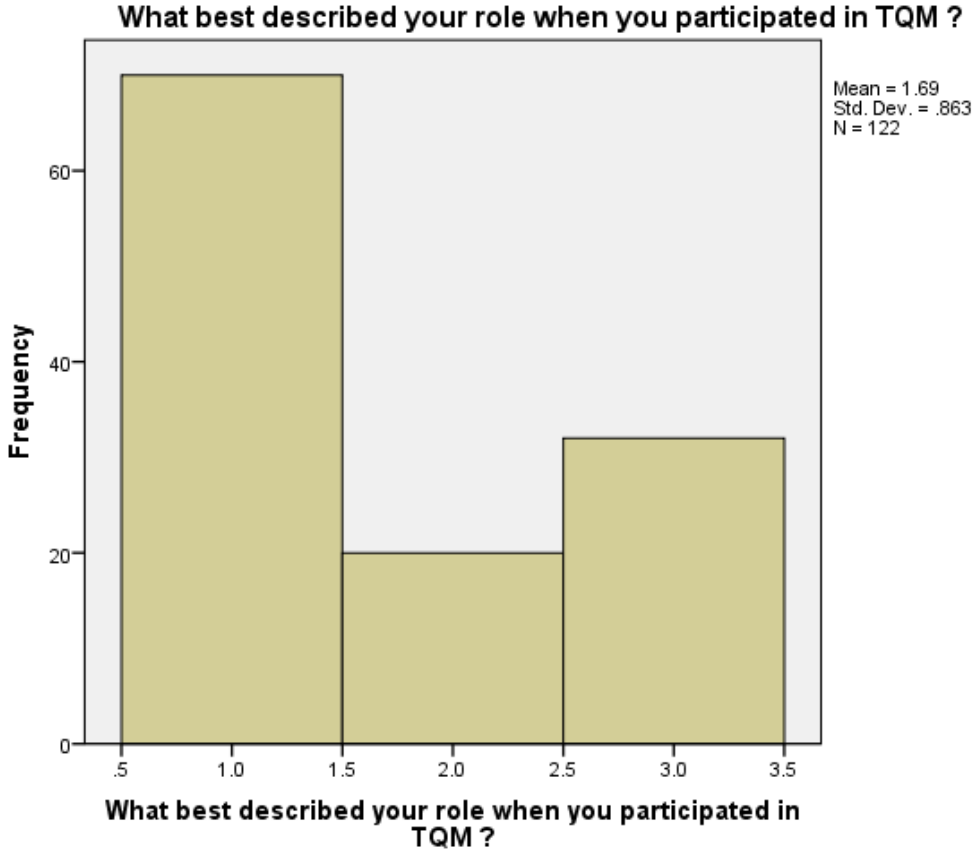
Histogram

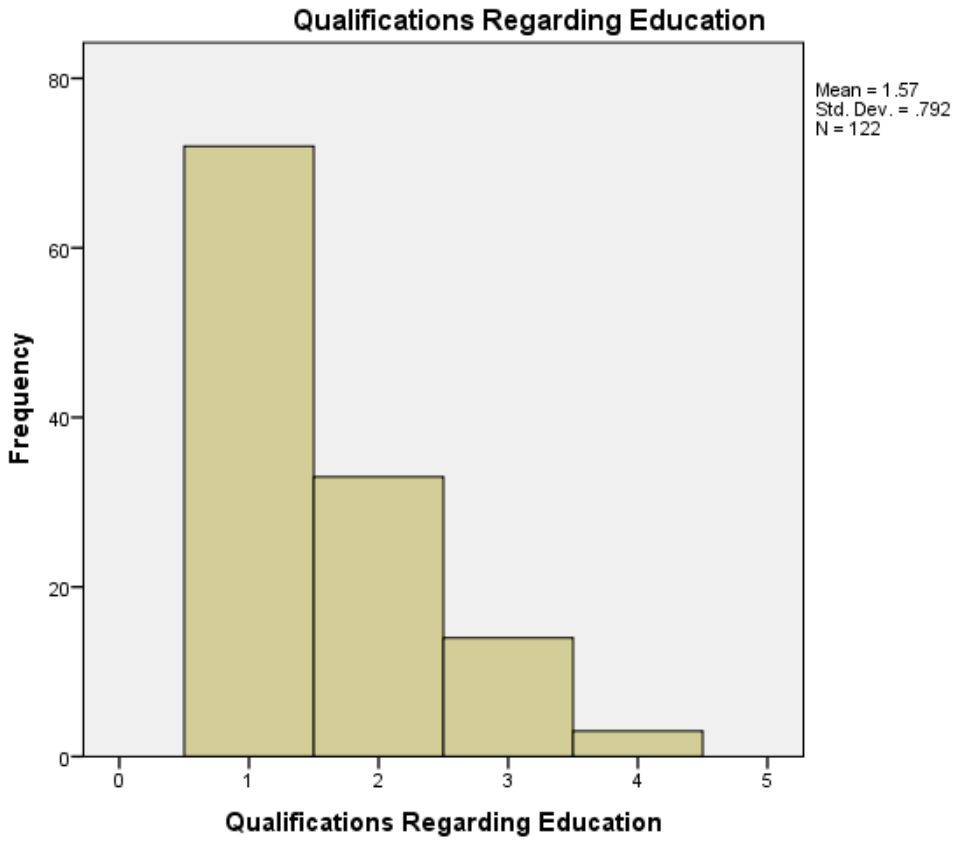


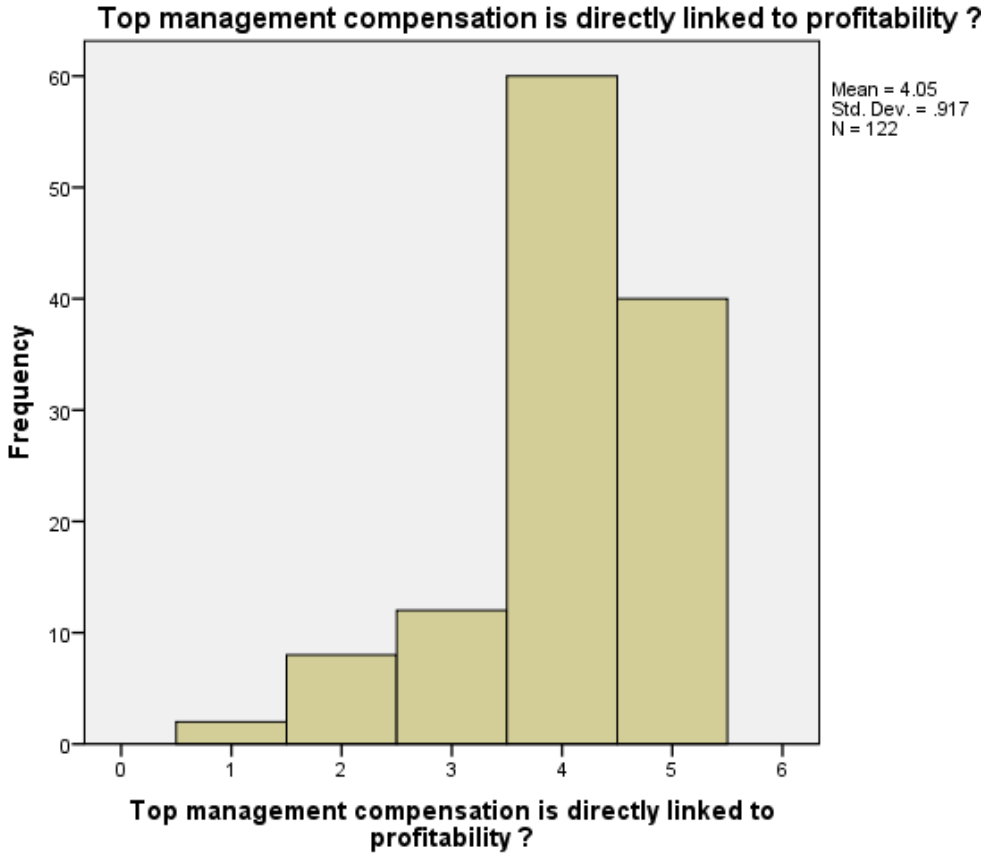

Was YQM successful implantation?
Mean = 1.25
Std. Dev. = .437
N = 122
Frequency
100
80
60
40
20
0
.5
1.0
1.5
2.0
2.5
Was YQM successful implantation?

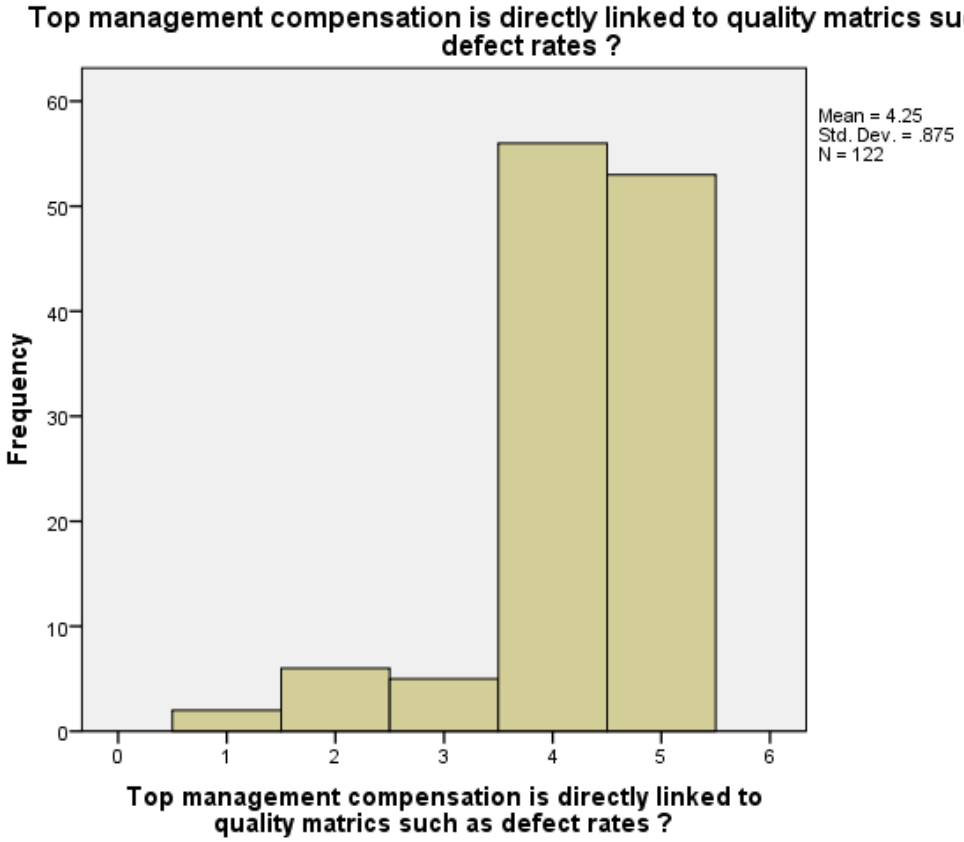

How long did TQM remind successful ?
Mean = 1.69
Std. Dev. = .863
N = 122
Frequency
60
40
20
0
.5
1.0
1.5
2.0
2.5
3.0
3.5
How long did TQM remind successful ?

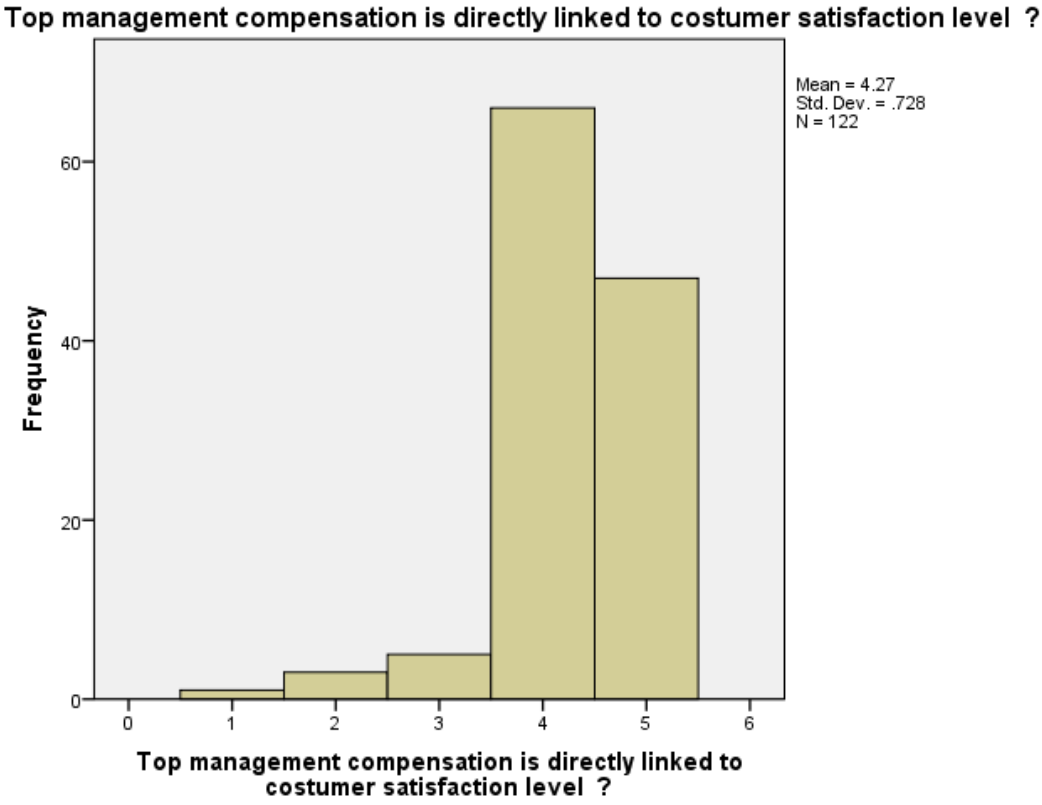

What best describe your position in company ?
Mean = 1.57
Std. Dev. = .792
N = 122
Frequency
80
60
40
20
0
0
1
2
3
4
5
What best describe your position in company ?

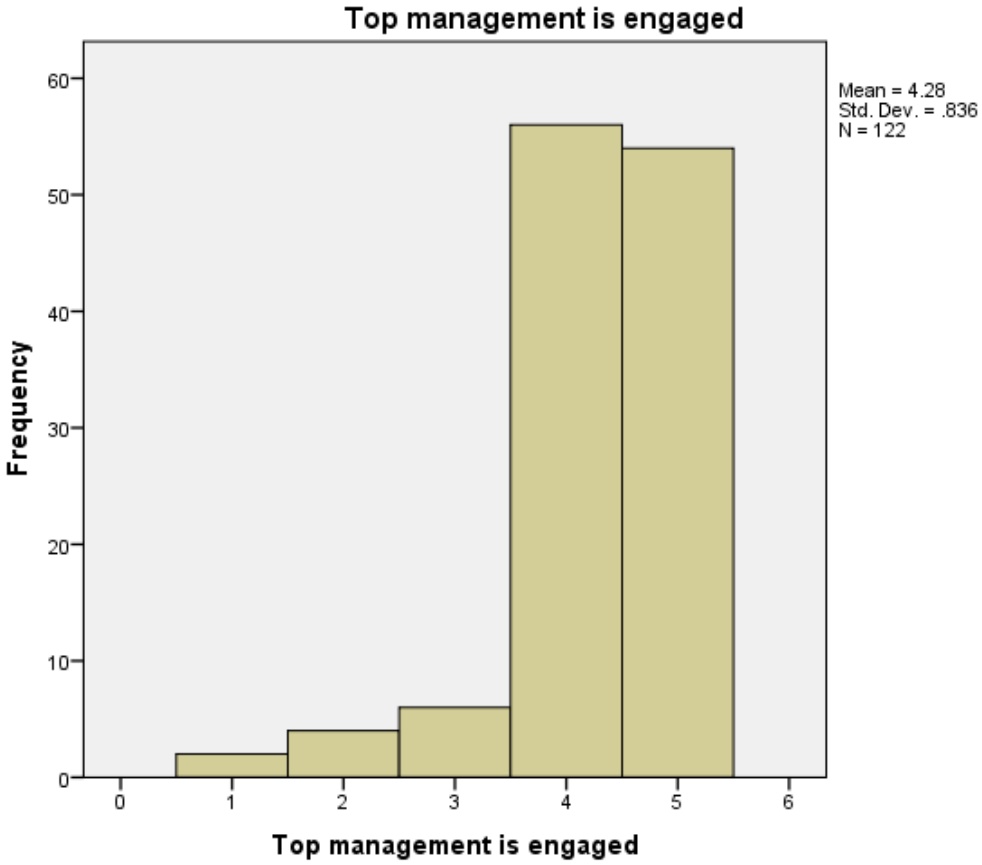

What best described your role when you participated in TQM ?
Mean = 1.69
Std. Dev. = .863
N = 122
Frequency
60
40
20
0
.5
1.0
1.5
2.0
2.5
3.0
3.5
What best described your role when you participated in TQM ?


Qualifications Regarding Education
Mean = 1.57
Std. Dev. = .792
N = 122
Frequency
80
60
40
20
0
0
1
2
3
4
5
Qualifications Regarding Education

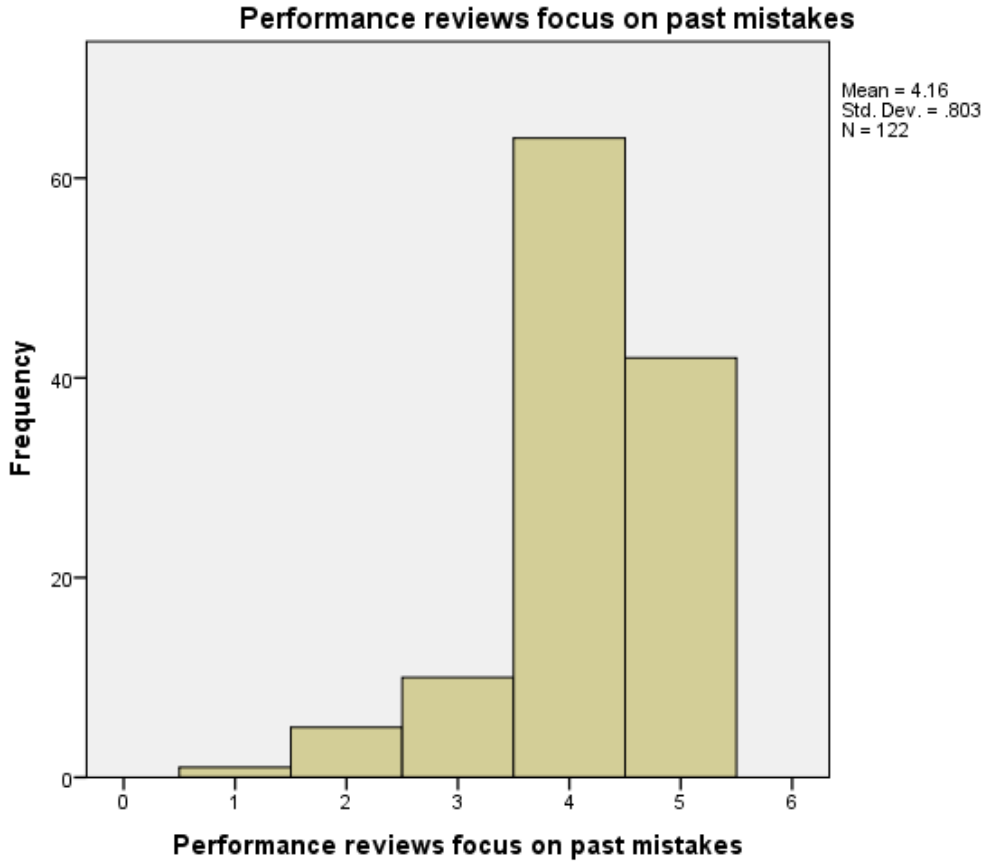

Top management compensation is directly linked to profitability ?
Mean = 4.05
Std. Dev. = .917
N = 122
Frequency
60
50
40
30
20
10
0
0
1
2
3
4
5
6
Top management compensation is directly linked to profitability ?

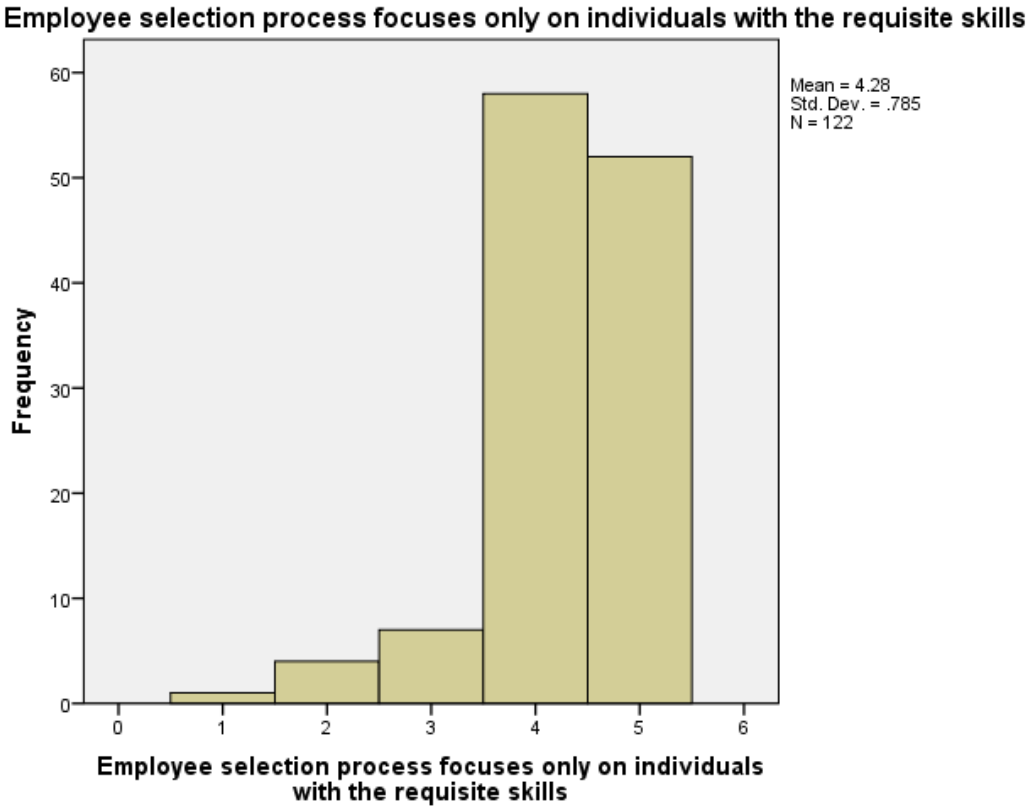

Top management compensation is directly linked to quality matrics such as defect rates ?
Mean = 4.25
Std. Dev. = .875
N = 122
Frequency
60
50
40
30
20
10
0
0
1
2
3
4
5
6
Top management compensation is directly linked to quality matrics such as defect rates ?

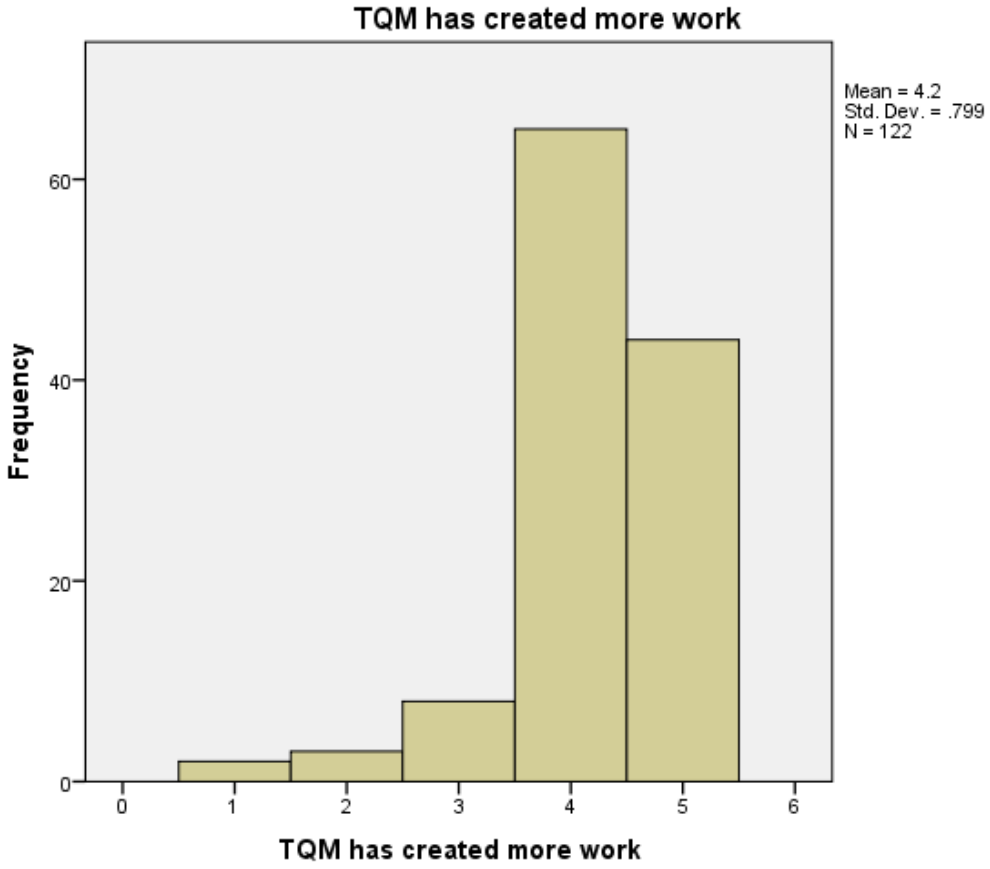

Top management compensation is directly linked to costumer satisfaction level ?
Mean = 4.27
Std. Dev. = .728
N = 122
Frequency
60
40
20
0
0
1
2
3
4
5
6
Top management compensation is directly linked to costumer satisfaction level ?

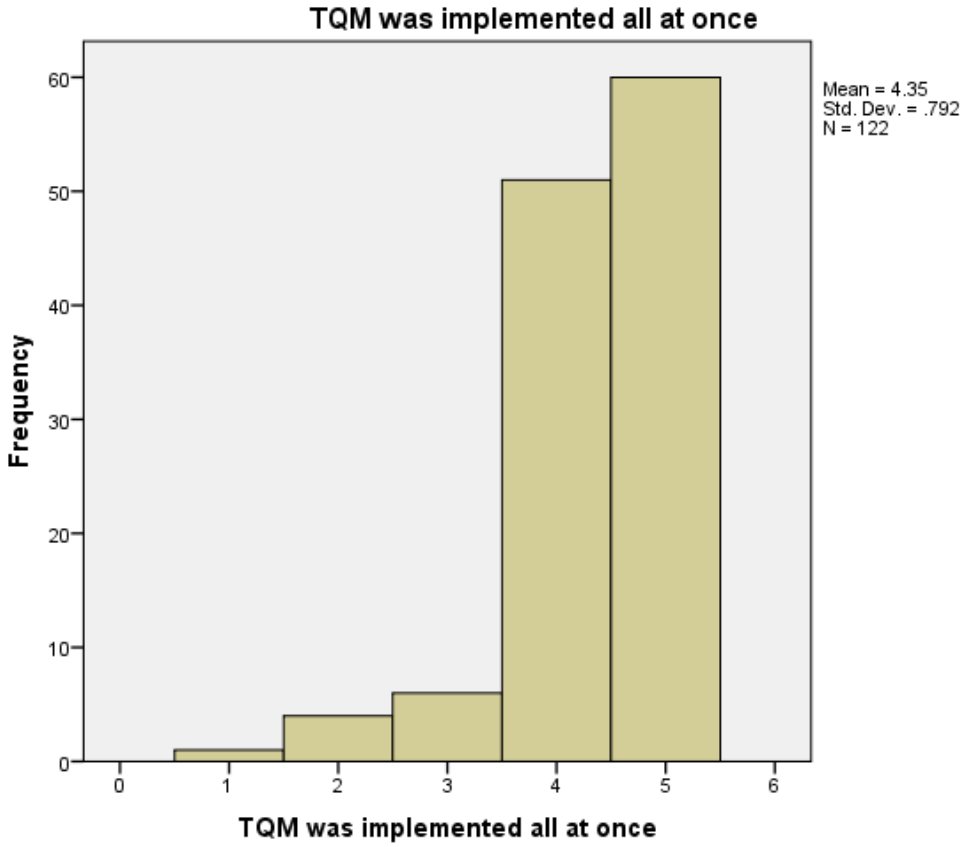

Top management is engaged
Mean = 4.28
Std. Dev. = .836
N = 122
Frequency
60
50
40
30
20
10
0
0
1
2
3
4
5
6
Top management is engaged

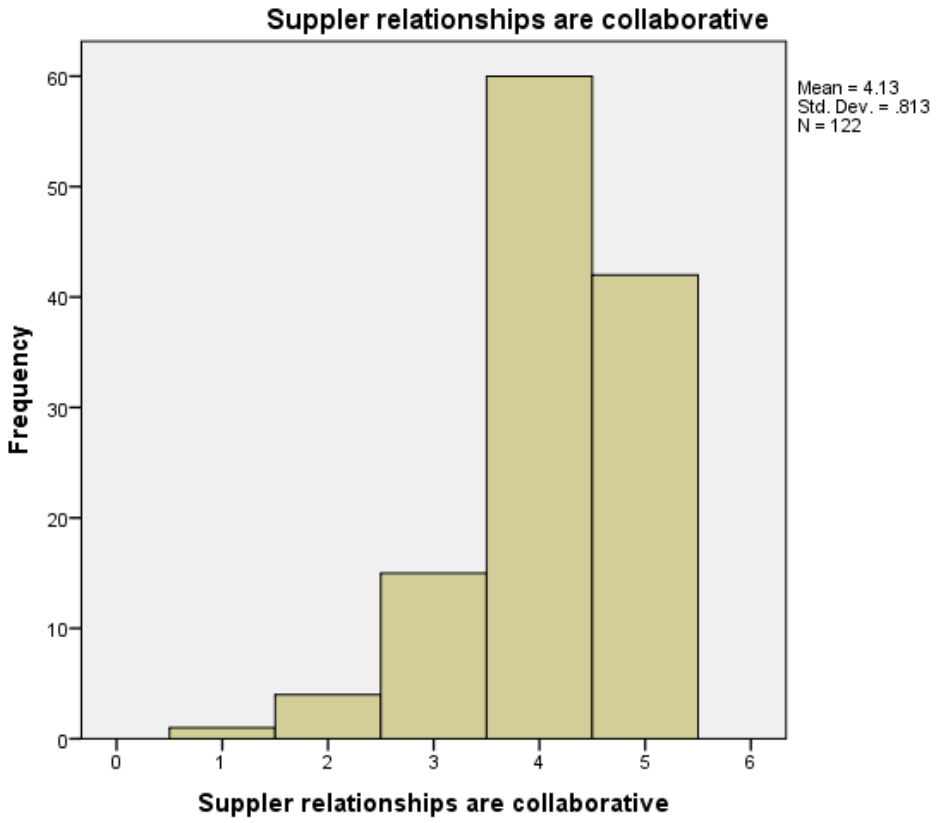

Employees are trained in functional skills only
Mean = 4.16
Std. Dev. = .775
N = 122
Frequency
60
40
20
0
0
1
2
3
4
5
6
Employees are trained in functional skills only

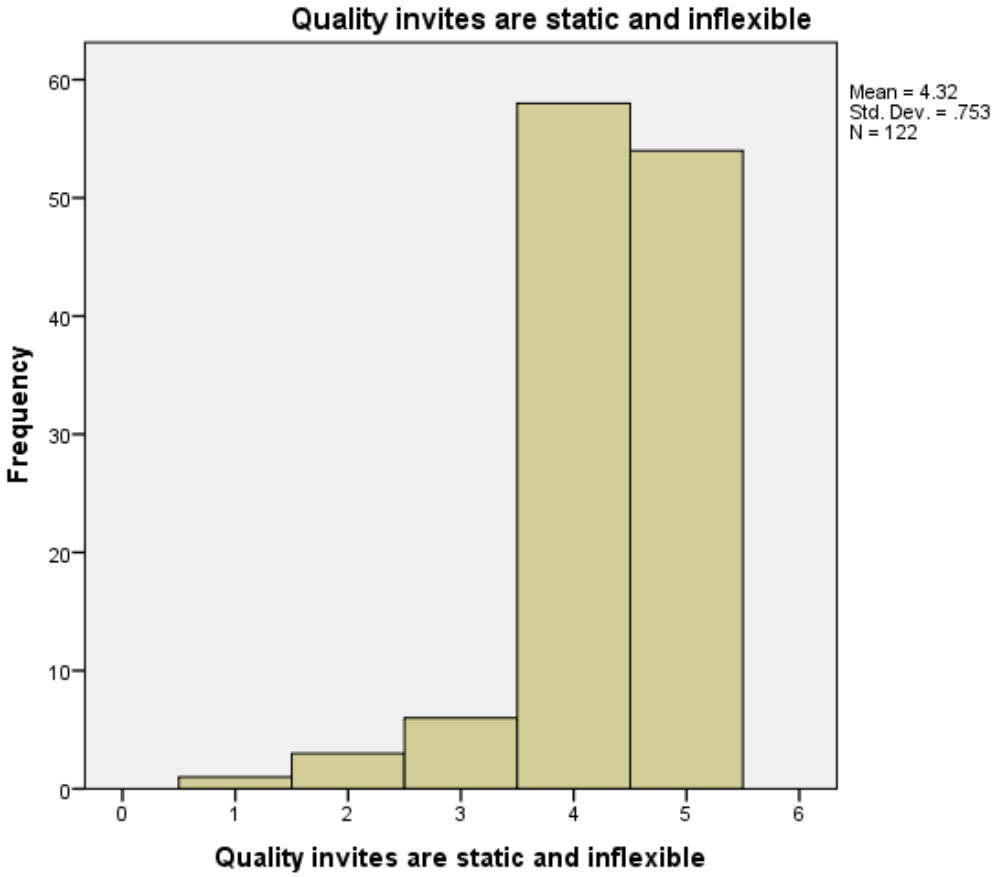

Performance reviews focus on past mistakes
Mean = 4.16
Std. Dev. = .803
N = 122
Frequency
60
40
20
0
0
1
2
3
4
5
6
Performance reviews focus on past mistakes


Employee selection process focuses only on individuals with the requisite skills
Mean = 4.28
Std. Dev. = .785
N = 122
Frequency
60
50
40
30
20
10
0
0
1
2
3
4
5
6
Employee selection process focuses only on individuals with the requisite skills


TQM has created more work
Mean = 4.2
Std. Dev. = .799
N = 122
Frequency
0
20
40
60
0
1
2
3
4
5
6
TQM has created more work

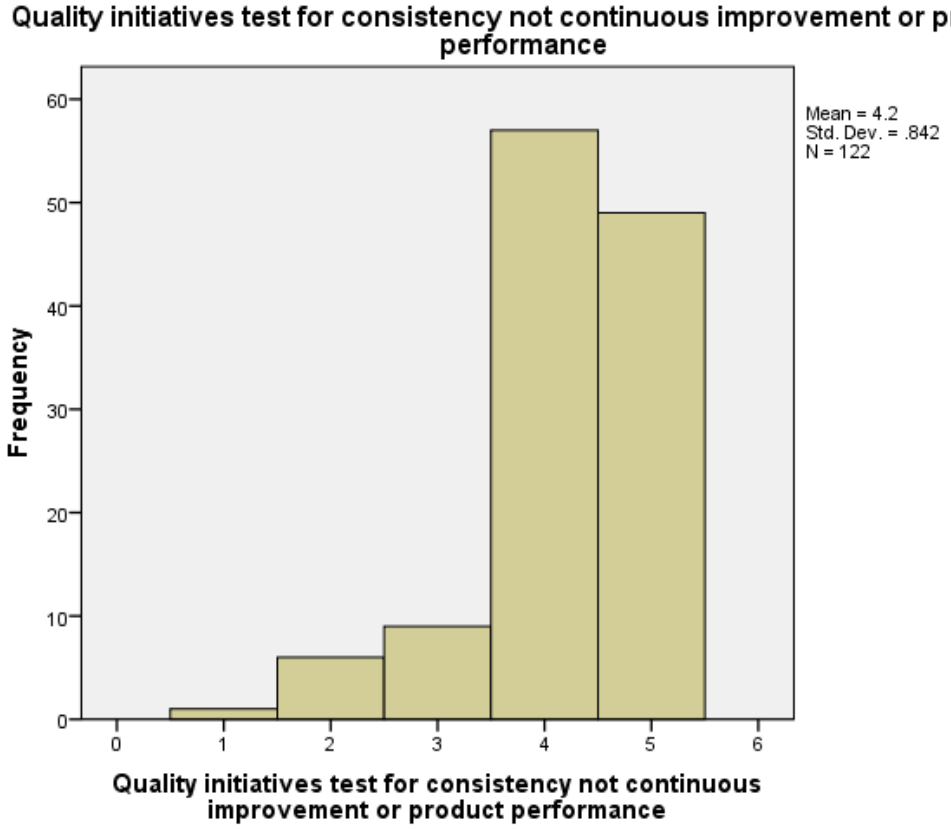

TQM was implemented all at once
Mean = 4.35
Std. Dev. = .792
N = 122
Frequency
0
10
20
30
40
50
60
0
1
2
3
4
5
6
TQM was implemented all at once


Suppler relationships are collaborative
Mean = 4.13
Std. Dev. = .813
N = 122
Frequency
0
10
20
30
40
50
60
0
1
2
3
4
5
6
Suppler relationships are collaborative


Quality invites are static and inflexible
Mean = 4.32
Std. Dev. = .753
N = 122
Frequency
0
10
20
30
40
50
60
0
1
2
3
4
5
6
Quality invites are static and inflexible


Quality initiatives focus only on the organizations production process
Mean = 4.2
Std. Dev. = .833
N = 122
Frequency
0
10
20
30
40
50
60
0
1
2
3
4
5
6
Quality initiatives focus only on the organizations production process


The role of the quality manager is limited to documentation efforts only
Mean = 4.19
Std. Dev. = .856
N = 122
Frequency
0
10
20
30
40
50
60
0
1
2
3
4
5
6
The role of the quality manager is limited to documentation efforts only


Quality initiatives test for consistency not continuous improvement or product performance
Mean = 4.2
Std. Dev. = .842
N = 122
Frequency
60
50
40
30
20
10
0
0
1
2
3
4
5
6
Quality initiatives test for consistency not continuous improvement or product performance

RESUME

Alaa Mohammed ABDULRAZZAQ

OBJECTIVE:

- I'm seeking a challenging position in a reputable company where my academic background and interpersonal skills are well developed and utilized.

EDUCATION:

University Degree : Bachelor of civil engineering 2007

University : Alanbar

Department : Civil Engineering

WORK EXPERIENCE:

- Work in the project of constructing the eastern entrance to the city of Fallujah Park.
- Construction of the youth center in the Garma area.
- Work in Anbar province, in the form of a contract to supervise a number of projects..
- Work on the construction of 60 m Street in the city of Ramadi.
- Work on the construction of a 40-meter street in Ramadi..
- Work with a lot of companies to set up many of the schools in the cities of Fallujah and Ramadi.
- I currently work as an engineer in the Anbar Governorate Office.

LANGUAGES:

- Arabic : Mother tongue
- English : Good

COMPUTER SKILLS:

- Excellent knowledge of Internet.
- Excellent knowledge of office .
- Excellent knowledge of auto CAD

COMMUNICATION SKILLS:

- Work pressure, Co-operative, Work with the team, Ambitious, Self-confidence and Skills to learn quickly