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**ST. MARY'S UNIVERSITY  
SCHOOL OF GRADUATE STUDIES**

**INSTITUTE OF QUALITY AND PRODUCTIVITY  
MANAGEMENT**

**ASSESSING CRITICAL SUCCESS FACTORS IN IMPLIMENTING  
TOTAL QUALITY MANAGEMENT IN MECHANICAL ENGINEERING  
SERVICE PROVIDING COMPANY: THE CASE OF BERHAN  
ENGINEERING**

**BY**

**SHEWAMENE BEJITUAL(BSC)**

**ADDIS ABEBA ETHIOPIA**

**JULY 2023**

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A THESIS SUBMITTED TO ST. MARY'S UNIVERSITY, SCHOOL OF THE  
GRADUATE STUDIES, INSTITUTE OF QUALITY AND PRODUCTIVITY  
MANAGEMENT, IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE  
DEGREE OF MASTERS OF SCIENCE IN QUALITY AND PRODUCTIVITY  
MANAGEMENT.

**JULY 2023**

**Addis Ababa, Ethiopia**

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MANAGEMENT IN MECHANICAL ENGINEERING SERVICE PROVIDING COMPANY:  
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BY SHEWAMNE BEJITUAL

Approved by Board of examiners

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## **Declaration**

I, the undersigned, declare that this thesis is my original work, prepared under the guidance of Melaku Girma (PhD). All sources of material used for the thesis have been duly acknowledged. I further confirm that the thesis has not been submitted either in part or in full to any other higher learning institutions for the purpose of earning any degree.

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**Date:** **July, 2023**

## **Endorsement**

This thesis has been submitted to St. Mary's University, School of Graduate studies for examination with my approval as a university advisor.

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**St. Mary's University**

**Addis Ababa, Ethiopia**

**July, 2023**

## **Acknowledgment**

I praise Almighty God who has blessed my work and for giving me the health, strength, and endurance to accomplish this huge achievement.

In the preparation of this thesis many have contributed priceless data, idea, resource books as well as moral support. First and foremost, my deepest gratitude goes to my advisor, Melaku Girma (PhD), for his valuable and constructive professional guidance, building ideas as well as all his precious time spent in reviewing and improving the quality of the thesis from the starting to the accomplishment of this study.

Next, I would like to express my gratitude to my company who give me the chance to attend this MSC program by covering all the tuition fee and arranging time, especial thanks to Mr. Million Nigusse the vice president and shareholder of Berhan Engineering. In addition, I would like to acknowledge all the participants of this study who gave their time and provided their valuable information. Moreover, my heartfelt thanks, goes to everyone that has contributed to this thesis directly or indirectly

Lastly, I would like to thank, my family and my close friends who took part in this research paper one way or another. I would like to wish God blessed all these peoples. The moral support from my wife (Abaynesh Sisay) will never be forgotten. This work is dedicated to my wife and my Grandfather Mekite W/aregay.

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## **Abbreviations and Acronyms**

ASQ = American Society for Quality

CA = Competitive advantage

CF= customer focus

CI = Continuous improvement

CSFs = critical success factors

CSR= Consumer Supplier relationship

ISO = International Organization for Standardization

ME = Mechanical Engineering

MFG = Manufacturing

QM = quality management

TQM = total quality management

## Abstract

*This research has been conducted to assess critical success factors in implementing total quality management system in the mechanical engineering service sector in the case of Berhan Engineering which is certified ISO-9001-2015 Quality management System. A descriptive research approach was employed using a questionnaire and interview to get primary data from employees of Berhan Engineering. The data were collected with a response rate of 79.1% from the distributed forty three (43) questionnaires and analyzed using descriptive statistics focusing on the mean, standard deviation and percentages, which is calculated using Microsoft excel. The validity of the instrument was checked and internal consistency of the instrument was measured using Cronbach's Alpha and the result was 0.93, which signifies that reliability of data was good. The results of this study identify CSFs in implementing TQM the case of Berhan Engineering. Among the five CSFs identified in the literature Supplier management and employee training and education were critical problem in implementing TQM. The research work has identified lack of employee's commitment and willingness for quality service, lack of effective supervision, suppliers were not willing to delivered recommended raw materials and products, lack financial resources, Insufficient knowledge about QMS, lack of QMS training, lack of proper equipment and tool available for use, and lack of a quality assurance team and documentations problem were the challenges in implementing QMS in the company. The benefits of the company from implementation of QMS practices also listed in this study such as, the company achieves improvement in productivity and efficiency, reduction in cost and waste, strength cooperation and team work between employee, builds good customer relations and increase customer satisfaction, Internal communication between departments and personnel's increase. Finally this study recommended that the company has to deliver organized training and education programs to employee, work on supplier management and all the challenges identified in the implementation of QMS to be given a due attention.*

**Key words:** *Critical Success Factors, assessment, Total Quality Management*

# CHAPTER ONE

## 1. INTRODUCTION

This chapter will present the background of the study, a statement of the problem, basic research questions, and objectives of the study, the significance of the study, the scope of the study, and the operational definition of basic terms that are explained each other and presented.

### 1.1 Background of the study

Today, one of the most important factors in global competition is quality. Customer's increasing demand for higher-quality products in the market has encouraged many businesses to provide high-quality goods and services in order to compete successfully. Many businesses have invested significant resources in adapting and implementing quality management practices in their operations to meet the challenge of global competition. According to (Omachonu, V., & Ross, J, 1994) quality has become an important solution to business firms' objectives in gaining a competitive advantage. In today's business world, organizations are in aggressive competition for survival, which has driven companies to constantly strive to improve the quality of their products while lowering costs.

Total Quality Management (TQM) is a management philosophy that has spread throughout the world with the goal of improving the operative and business performance of organizations by providing a systemic approach to continually improving operative activities in order to meet the needs of customers (Alghamdi, 2018). The Philosophy is particularly appealing due to its emphasis on quality, which offers the opportunity to improve an organization's performance. To provide a basis for the survival and success today and in the future, companies have to pay more attention to the needs of customers as competition intensifies, and offer them quality products to satisfy their increasing expectations. TQM as a potential source to achieve this objective produces value, through improved understanding of customer's needs, improved customer satisfaction, improved internal communication, better problem solving, greater employee commitment and motivation, stronger relationships with suppliers, fewer errors, and reduce waste. The TQM concept requires an effective involvement of all members of organization in decision making because their participation is considered as critical role in all business activities for providing services to customers with high quality products. However, there is no standard method as to how TQM should be implemented (Jens J. Dahlgaard, Kai Kristensen and Ghopal K. Kanji, 1998).

Empirical studies on TQM started to grow by 1989 when the critical success factors (CSFs) of TQM were first introduced and operationalized by (Saraph, J.V., Benson, P.G., and Schroeder, R.G., 1989). Later, some authors have developed a similar approach to identify and investigate the CSFs in implementing TQM. (Oakland, J.S. and Leslie, J.P, 1996) Explained CSFs as a term used to mean the most important sub-goals of a business organization. (Saraph, J.V., Benson, P.G., and Schroeder, R.G., 1989), (Black, S.A. and Porter, L.J, 1996), (Ahire, S., Golhar, D., & Waller, M. ., 1996), (Flynn, B.B, Schroeder, R.G. and Sakabara S, 1994), (Sila, I. & Ebrahimpour, M. , 2002), (Harjeev K. Khanna, D.D. Sharma and S.C. Larooya, 2011), (Ali K. and Johl S.K., 2022), (Jiju Antony, Kevin Lueng, Greame Knowles, Sid Gosh, 2002)and (Zhang, Z., Waszink, Ab. and Wijngaard, J. , 2000) identifies core CSFs in TQM implementation in both manufacturing and service organizations.

### **1.1.1 Background of the case company**

#### **A. Company profile**

Berhan engineering p.l.c. was re-established in 1993 E.C with a paid capital of birr 2.5 million. The beginning of company dates back to 1958 when the founder was 12 years old boy, Mr. Nigussie Goitom, was visioning a complex engineering company though he was repairing bicycles at that time. Berhan engineering is a Mechanical Engineering (ME) service-providing company, specializes in the repair and maintenance of critical mechanical components having mission to be recognized as a modern high tech, innovative and reliable Ethiopian company that pass dawn to generations providing high quality mechanical engineering service for estimated domestic and foreign customers by created innovative working environment to employees and that generates adequate return owner investment. During these years the company has accumulated experiences, expertise, technologies, manpower, and loyal customers. The company is also certified for the implementation and maintaining of Quality Management System (ISO 9001, 2015) starting from January 17, 2019.

#### **B. Companies' services**

Berhan Engineering is engaged in repair and maintenance of essential mechanical parts including engines parts for different kinds of machinery, equipment's, vehicles, and others. Its service includes:- Engine overhaul and Inspection of vehicles and machinery for insurances companies and others, Manufacturing of different types of gears and mechanical parts as per customer order, Reconditioning of different



mechanical parts of vehicles and machinery, Modification of different mechanical parts, Consultancy services for companies and individuals that purchases machines and parts etc. The company repairs and maintains parts of All construction machinery, Heavy vehicles-trucks Medium vehicles-trucks, Light vehicles –autos and minibuses, Factory machines flour factories, edible oil factories, soap and detergent factories, plastic factories, and many others.

## **1.2 Statement of the problem**

Now days the service industry is growing at an accelerating pace, there is strong demand for quality of services, and companies are in the need of continuous improvement of processes to survive and grow in this competitive arena. Implementing TQM will strengthen organizational business performance and competitive advantage by achieving improved communication, improved employee participation, increased productivity, improved product quality and less rework, improved customer satisfaction, and reduce cost of poor production, (Netsanet, 2019) , (Serawit Handiso, Seid Mohammed and, Yibeltal Ayalew, 2018) and (Jiju Antony, Kevin Lueng, Greame Knowles, Sid Gosh, 2002). To get these potential benefits, companies have to implement TQM effectively. The implementation of new approaches of TQM usually involves high risk due to relatively high costs. So, it is common practice to select and then adopt a process very carefully.

The successful implementation of TQM is often linked with the critical dimensions or CSFs which are responsible for achieving effective results. While studying critical success factors, there is no universal research method. Scholars and researchers used various critical success factor methods such as a priority list of critical success factors based on literature sources, interviews, analysis of related organizational activities, mailed questionnaires, a combination of interviews and with subsequent questionnaires. Several authors and researchers like (Ali K. and Johl S.K., 2022), (Sanjiv Gupta and Dr. Nilesh Arora , 2021), (Ahire, S., Golhar, D., & Waller, M. ., 1996), (Black, S.A. and Porter, L.J, 1996) have identified several CSFs that are important to effective implementation of TQM philosophy in any service company. These CSFs are: Top management commitment, Employees involvement, Customers focus and Customer satisfaction, management, Employee empowerment, continuous improvement, Training and education, Process management, Effective Communication across various business stakeholders, Team Work, etc. But the factors are not equally important and differ sector to sector and company to company. In many cases, among various factors, there are a vital few that determine success of TQM implementation.

(Sureshchander, G. S., Rajendran, C., & Anantharaman, R. N, 2002) Identifies five significant factors of service quality which are: human resource management, service culture, social responsibility, customer focus and employee satisfaction. In addition, (Mariam, 2021) on her research finds that, training and education for TQM, supply and process management, contract selection, top management commitment on TQM are the vital CSFs in implementation of TQM.

Berhan Engineering is one of private ME service providers focusing on repair and maintenance of critical mechanical components which consists of four basic processes: acquiring customer orders, purchasing raw materials and components from suppliers, producing products or taking proper maintenance, and fulfilling or executing customer orders. To sustain its service quality the company has implemented and maintain ISO 9001, 2015 (QMS). But as the last year annual customer satisfaction report indicates that customers are not satisfied as expected in the case of delivery time, cost of service and service quality. This can only be achieved through, improvement in product quality and continuous improvement. Implementing and maintaining QMS provides the foundation for effective implementation of TQM philosophy by fulfilling the requirements of quality control and quality assurance (Alghamdi, 2018), (Shafiq.M, Mirza.K , Abid.K , Naeem.M.A, 2014).

Since the business environment, organizational culture and legal laws in Ethiopia are different from other countries, a study needs to be conducted to assess the CSFs in implementing TQM. The main problem to be addressed in this research paper is, Assessing Critical Success Factors in Implementing TQM in the ME service sector, the case of Berhan Engineering. The research will examine the current quality management practice, challenges and benefits of implementing TQM and identifying CSFs that need to be taken into consideration while implementing TQM. The research paper will explore the relationship between the critical success factors and their impact on the successful implementation of TQM in the case company.

### **1.3 Basic Research Questions**

As discussed in the back ground of company, Brehan Engineering is a Mechanical service-provider who has implemented quality management system ISO 9001:2015 in 2019 and continues in the maintaining of QMS practices. The company determines quality policy, strategic plans, quality control, quality assurance and quality improvement process. Due to technological advancement in the sector new machine parts are delivered by customers for Inspection, maintenance and modification of parts. But the company is giving

this service with old machines using long time experience. Due to this Brehan Engineering is challenged with reworks, scraps, returned material repair, supplier management problems and machine failure. Still customer raise questions on quality of service, delivery time and cost of service. To overcome this challenge the company has to work on service quality improvement which is emphasized by implementing TQM.

To achieve the purpose of this paper the following research questions are formulated:

- I. What is the current service quality management practice in the case company?
- II. Which CSFs are practiced well in the case company?
- III. What are the benefits of implementing TQM?
- IV. What are the challenges of implementing TQM?

#### **1.4 Objectives of the study**

The general and specific objectives of the research are presented here in the following subsections:

##### **1.4.1 General objectives**

The general objective of this study is to identify and interpret the CSFs in implementing TQM that can help service organization to achieve business excellence in the case of Berhan engineering Addis Abeba, Ethiopia.

##### **1.4.2 Specific objectives**

Keeping the above in mind, a study is planned to achieve the following specific objectives:

- I. To assess the current service quality management practice in the case company.
- II. To identify the CSFs in implementation of TQM.
- III. To indicate the benefits of TQM implementation.
- IV. To indicate the challenges of TQM implementation.

### **1.5 Significance of the study**

The results of the study help the management of the company to evaluate the current organizational quality practice and to create awareness on the benefits and challenges of implementing TQM to enhance their organizational performance. The study also helps managers to see the vital CSFs in the implementation of TQM. The study can also serve as a reference to conduct further and more detailed study in the area.

### **1.6 Delimitation /Scope of the study**

This study was focused on assessing CSFs in implementing TQM in ME service providing companies. To conduct the research within the given time frame and to reduce the cost of conducting the study, the researcher has limited the population to Brehan Engineering, addis abeba Ethiopia. The company is chosen because it implements QMS and it is dominant company in the ME service sector. Although, there are different principles that can be analyzing concerning CSFs in implementing TQM, but this study is delimited to the CSFs of TQM implementation, top management commitment, employee training and education, customer focus, continues improvement of product and service and supplier management. This study has not included the external customer and supplier of this company.

### **1.7 Limitations of the study**

This research is not free from limitations. There is no adequate research study done on this title in the country. The small sample size puts constraints on the ability to generalize findings of this study for other companies. Exclusion of other ME service providers which may have a negative impact in the conclusion on the analyzing CSFs in implementing TQM. Future research should focus on different ME service providing companies and use a larger sample size and application of other methods of data Analysis.

## 1.8 Operational Definitions of Basic Terms used in the Research

- ✚ Quality is defined as the degree to which a set of inherent characteristics fulfills requirements. ISO 9000: 2000.
- ✚ A Quality Management is the organizational structure, processes, procedures, and resources needed to implement, maintain, and continually improve the management of quality. American Society for Quality (ASQ)
- ✚ Total quality management is a management philosophy that helps the organization to improve its business performance continuously, which is based on leadership, vision and plan statement, evolution, process control and improvement, quality system improvement, employee participation, recognition and reward, education and training, and customer focus. (Flynn, B.B, Schroeder, R.G. and Sakabara S, 1994).
- ✚ Critical Success factors are “the critical areas which organization must accomplish to achieve its mission by examination and categorization of their impacts” (Oakland J. S., 1995).
- ✚ Implementation is the realization of an application, or execution of a plan, idea, model, design, specification, standard, algorithm, or policy.

## 1.9 Organization of the Study

The researcher organized the entire study into five chapters. Chapter one is all about introduction to the study. This provides a background to the study, background of the study area, statement of the problem, research questions, objectives, and significance of the study and scope. Chapter two is a literature Review. This discusses CSFs in implementing TQM and benefits of implementing TQM and other related topics provided by previous literatures. Chapter three is about the research design and methodology. This chapter discusses the research design, sampling procedures, data collection methods, and analyses that will be used in the research. Chapter four discusses data analysis and interpretation. Finally chapter five focuses on summery of finding, conclusion, recommendation and suggestion for future research.

## CHAPTER TWO

### LITERATURE REVIEW

#### 2.1. Concept of Quality

The word quality itself stems from the Latin *qua litas*, which means “of what kind”. The concept is also often used in this sense: the quality of a particular fabric could be a statement about what kind of material it consists of. Another way of using the concept is to consider quality as ‘good’ as opposed to ‘bad’. It connotes a variety of meanings and implies different things to different people. A more definitive definition of quality is given in ISO 9000: 2000. It is defined as the degree to which a set of inherent characteristics fulfills requirements. Degree means that quality can be used with adjectives such as poor, good, and excellent. Inherent is defined as existing in something, especially as a permanent characteristic. Characteristics can be quantitative or qualitative. Requirement is a need or expectation that is stated; generally implied by the organization, its customers, and other interested parties; or obligatory.

(Oakland J. S., 2003) In his text book defines that Quality is simply meeting the customer requirements. In technical usage, quality can have two meanings: (1) the characteristics of a product or service that bear on its ability to satisfy stated or implied needs and (2) a product or service free of deficiencies. (ASQ). Quality is the total composite product and service characteristics of marketing, engineering, manufacturing and maintenance through which the product and service in use will meet the expectation of the customer. (Feigenbaum A. V., 1991)-

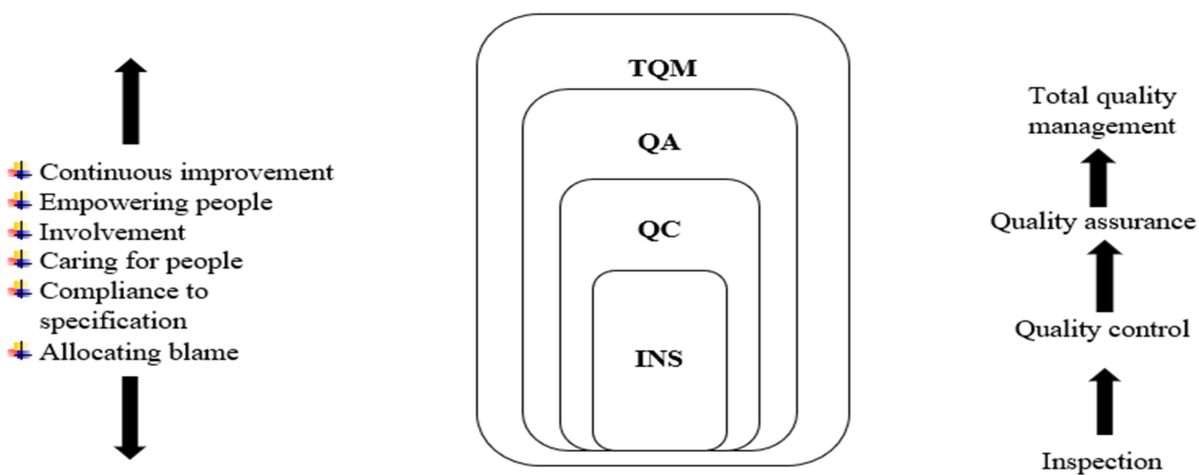
After the United States entered World War II, quality became a critical component of the war effort: Bullets manufactured in one state, for example, had to work consistently in rifles made in another. The armed forces initially inspected virtually every unit of product; then to simplify and speed up this process without compromising safety, the military began to use sampling techniques for inspection, aided by the publication of military-specification standards and training courses in Walter Shewhart’s statistical process control techniques.

The Japanese welcomed the input of Americans Joseph M. Juran and W. Edwards Deming and rather than concentrating on inspection, focused on improving all organizational processes through the people who used them. (Amare, 2014) Therefore, improvements to the inspection era developed during the Quality Control (QC) phase where standards for products and services were established and everyone worked to

ensure conformance to these standards. Statistical Quality Control (SQC) built upon the QC phase. The SQC concept began in 1924 when Walter A. Shewhart, a statistician at Bell Laboratories, introduced the X-bar and R control charts. These charts were used to map the results of inspection process in an attempt to interpret and solve process problems. (Summers, 2010). Deming’s contributions placed more emphasis on management of a system for improving quality and his thinking was based on the use of statistical tools for continual improvement. In appreciation of Deming’s work the Union of Japanese Scientists and Engineers (JUSE) created the Deming Prize to commemorate his contributions and friendship and to promote the continued development of quality control in Japan. (Goodman, J., G. Bargatze, and C. Grimm, 1994).

The founder of JUSE was business leader Ichiro Ishikawa and his son Kaoru Ishikawa is well known for his development of the basic seven tools of quality. During this same time back in the U.S., Armand Feigenbaum wrote a famous book Total Quality Control whose primary contribution to quality thinking was his assertion that the entire organization should be involved in quality improvement efforts. Juran followed Deming's arrival in Japan in 1954 to give another series of lectures. Juran a more strategic and planning based approach to improvement and he is well known for The Juran Trilogy and Pareto’s law. Juran and Deming’s work at this time contributed to the development of what is now known as TQM.

Most writers have described the development of TQM in four stages. (Amare, 2014) and (Dale, 2003) has discussed the four stages of TQM evolution as: - quality inspection (INS), quality control (QC), quality assurance (QA) and TQM.



**Figure 1** the four levels in the evolution of TQM. (Source: (Amare, 2014) and (Dale, 2003))

### **2.1.1 Inspection**

Quality management starts with simple inspection-based system. Inspection is the process of examining a product, item, or service to ensure it meets a certain standard of quality or safety. It involves carefully checking for any defects, irregularities, or discrepancies, as well as paying attention to detail to ensure the product performs as expected. This system is used to appraise incoming products, manufactured components and assemblies at appropriate points in the production process. It is undertaken mainly by staff members employed specifically for this purpose.

Inspections can be conducted before, during, or after a product or service is produced or provided. The finished products were inspected for quality and Products which do not conform to specification may be scrapped, reworked or sold as lower quality items. (Evans, James R. and William M. Lindsay, 2005). In some cases, inspection is used to grade the finished products. The system is an after-the-fact screening process with no prevention content: but perhaps the identification of suppliers, operations, or workers manufacturing non-conforming products. Simple inspection-based systems are usually wholly in-house and do not directly involve suppliers or customers.

### **2.1.2 Quality Control**

Under a system of quality control, product-testing and documentation control become the ways to ensure greater process control and reduce non-conformance. Quality control is the process of maintaining standards in products and services by testing them and making sure they meet the set criteria. Quality control covers a variety of activities from inspection and testing to making sure the product is produced according to specified standards. It also includes ensuring that the product is safe, meets customer expectations and is suitable for its intended use. Typical characteristics of such systems were performance-data collection, feedback to earlier stages in the process, and self-inspection. While screening, inspection was again the main mechanism for preventing products which were outside the specification from being shipped to customers. Quality control measures led to greater process control and a lower incidence of nonconformance.



### **2.1.3 Quality Assurance**

The quality assurance stage came with the change away from product quality towards system quality. In this stage, an organization sets up a system for controlling what is being done and the system is audited to ensure that it is adequate both in design and use. Quality Assurance is a process used to ensure that products or services meet certain standards of quality before they are released. Quality Assurance also involves the use of various tools, process metrics, and automation to measure and manage quality to evaluate the development process, test the finished product, and verify that the product meets all the requirements established by the customer or other stakeholders. This includes the use of code reviews, static analysis tools, performance testing, and automated testing. Quality Assurance is an ongoing process that typically begins with the design phase and continues through to the delivery, installation, and maintenance of the product.

Quality Assurance teams are also responsible for setting up and maintaining the processes necessary to ensure the quality of the product, including creating standards and procedures, developing test plans, and tracking defects. Quality Assurance is an essential part of the product development life cycle, and it helps to ensure the quality of the product before it is released to the customer. The approach stressed detection of error at source. Emphasis was on the entire production chain from design to market, and the contribution of all functional departments. Quality planning and improvement certainly begin when top management include prevention, as opposed to detection, in organizational policy and objectives, and start to integrate the improvement efforts of various department (Garvin, 1988).

A major part of this change is the use of both second-party and third-party audits to assess the efficiency of the system. The major characteristics of this stage are the use of quality manuals, procedures, work instructions, quality planning, quality audits, etc. The fundamental difference is that quality assurance is prevention-based while quality control is inspection-based.

## **2.2 Total Quality Management concept**

Total quality management is an enhancement to the traditional way of doing business. It is a proven technique to guarantee survival in world-class competition. Only by changing the actions of management will the culture and actions of an entire organization be transformed. Total quality management is an approach designed to improve the effectiveness and flexibility of an organization. This is possible only

when each stakeholder develops an attitude of improvement in his/her field of operation. Teamwork, involvement, ownership, and communication are the keywords of this methodology. Total quality can be achieved by infusing this culture into each employee of the organization. The concept of total quality management developed as a catchall phrase for strategies that are quality-focused for the broad spectrum. It has been specified in the research study that total quality management refers to making and installing permanent changes in the climate of the organization to ensure that employees can improve their ability to provide demanded services and products that might create value for the consumers. According to a study it had been determined that there is no significant concrete definition and uniform approach to the notion of Total Quality Management; it has been defined by different authors in different ways.

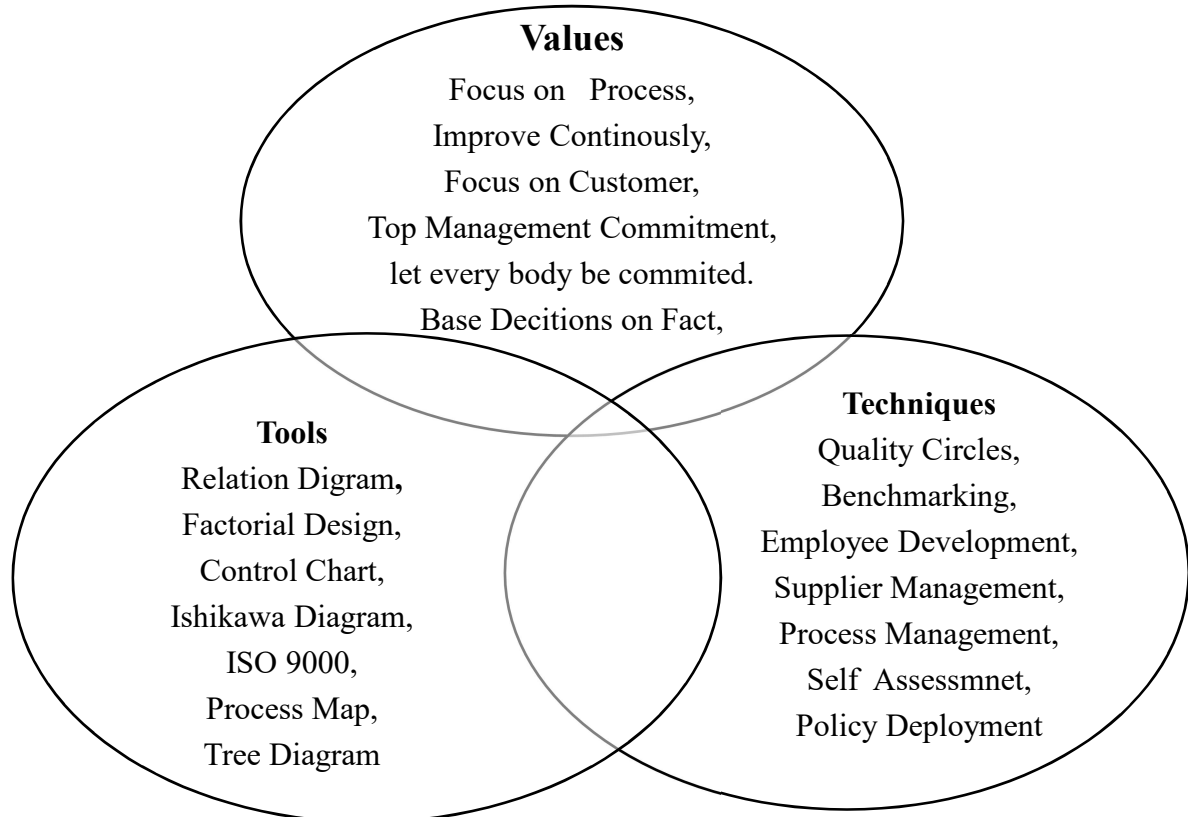
**Table 1 Key TQM definitions**

No.	Author	Definition of TQM
1	(Besterfield, Dale H.; Besterfield-Michna, Carol; Besterfield, Glen H. and BesterfieldSacre, 2012)	TQM is an enhancement to the traditional way of doing business. It is a proven technique to guarantee survival in world-class competition. Only by changing the actions of management will the culture and actions of an entire organization be transformed. TQM is for the most part common sense by analyzing the three words, we have: - Total - Made up of the whole, Quality - Degree of excellence a product or service provides and Management - Act, art, or manner of handling, controlling, directing, etc. TQM - is the art of managing the whole to achieve excellence.
2	(Michael J. Prowse, It col, usaf, 1992)	TQM is an all-encompassing concept that combines technical aspects of quality, qualitative methods, and human resources in a system designed to provide the very best product. Processes and techniques are integrated within a system that is focused on continuous improvement through highly trained and motivated system members.
3	(Dr. Latha Pillai and Lukose Vallatharai, 1999)	TQM deals with process orientation and continuous improvement of the process. It strives for the empowerment and autonomy of the people involved in using processes of production. It asks people to continuously look for new ways to adapt to the changing environment. It is a continuous improvement plan, with an effort to bring out the best for the stakeholders as well as for the institution.

4	(Oakland J. S., 1995)	TQM is an approach to improve the competitiveness, effectiveness and flexibility of the whole organization. It is essentially a way of planning, organizing and understanding each activity, and depends on each individual at each level. TQM requires that the company maintain this quality standard in all aspects of its business which requires ensuring that things are done right the first time and that defects and waste are eliminated from operations.
5	(Gopal K. Kanji and Mike Asher , 1996)	TQM is a continuous process of improvement for individuals, groups of people and whole organizations. What makes TQM different from other management processes is the concentrated focus on continuous improvement and is not a quick management fix; it is about changing the way things are done within the organization's lifetime.
6	(Dale, 2003)	TQM is the mutual co-operation of everyone in an organization and associated business processes to produce value-for-money products and services which meet and hopefully exceed the needs and expectations of customers.

Generally, TQM is a management approach for an organization, centered on quality, based on the participation of all its members, and aiming at long-term success through customer satisfaction, and benefits to all members of the organization and society. TQM requires organizations to focus on continuous improvement. It focuses on process improvements over the long term, rather than simply emphasizing short-term financial gains.

TQM consists three interdependent units, namely core values, techniques and tools (Ulrika Hellsten and Bengt Klefsijo, 2000) with the aim of increasing internal and external customer satisfaction by reduced amount of resources. The idea is that, the core values must be supported by techniques, such as process management, bench marking, customer focus management and tools such as quality charts, Ishikawa diagrams in order to be part of a culture



**Figure 2 Three components of TQM (Ulrika Hellsten and Bengt Klefsijo, 2000).**

The origins of the theory and practice of TQM can be traced back to the 1920s where Walter Shewhart in 1924 began to apply statistical process control (SPC) in the Bell Telephone Company’s Hawthorne Plant. He stated that SPC is a good way to learn and understand why and how performance changes over time ( Lovitt, 1997). This adoption and promotion of SPC, which uses data as evidence of knowledge, helped to establish the importance of having a management control function and a related learning process as a necessary part of quality improvement efforts.

Later, in the 1950s and 1960s, the Japanese – with support from experts like W. Edward Deming, Armand V. Feigenbaum, Kaoru Ishikawa, and Joseph Juran – interpreted, understood, practiced, and further developed the concepts of Statistical Quality Control and Total Quality Control (TQC). This term is coined by (Feigenbaum F. , 1961) and (Ishikawa, 1985) who created the new term Company Wide Quality Control (CWQC) for the Japanese version of TQC. CWQC was further developed and re-branded in the West as TQM (Total Quality Management) during the 1980s (Dahlgaard-Park Su Mi, Chen Chi-Kung, Jang Jiun-Yi, & Dahlgaard Jens J. . , 2013). The above-mentioned quality experts/ gurus as well as others contributed and helped transitioning the movement from SQC to TQM carrying over the learning

methodologies developed in Japan, such as the basic quality tools, quality control circles (QCC), and quality control stories.

The existing literature globally has shown that research has been done on TQM practices in the manufacturing and service sector. Having its roots partly in the USA and partly in Japan, it was primarily adopted by some Japanese companies in the decades immediately after World War II. With the greater successes of Japanese companies during the 1980s, companies all over the world found that it was necessary to have good quality management practices to stay competitive. A major boost to the growth of TQM is the promotion of quality award models in many countries and the success of quality programs such as Six Sigma, quality function deployment, and quality circle.

### **2.3 TQM in Mechanical Engineering**

TQM is a systematic approach to improving the quality of products and services in the mechanical engineering service sector. It involves making sure that all employees are working together towards the common goal of delivering quality products and services to the customer. Parallel to quality management, quality engineering has developed. Research done by V. A. Feigenbaum shows that prevention of quality defects and quality costs actually start with the engineering designs of products. These designs determine the material and often the machines, processes and skills required to manufacture a product for the marketplace. (Huggins, Lawrence P. , 1998). TQM focuses on eliminating defects and reducing variation in the processes used to produce and deliver the product or service. This is achieved by implementing processes and procedures that are designed to ensure that the product or service meets customer expectations.

The implementation of TQM in the mechanical engineering service sector involves every employee from the management team to the front-line workers. All employees must be trained in TQM principles and understand the importance of quality and customer satisfaction. Management must ensure that all processes and procedures are regularly reviewed and updated. This includes making sure that all employees are working in a safe and efficient manner and that all equipment is properly maintained and functioning correctly. Additionally, management must ensure that all customer feedback is taken into consideration and that changes are made to improve the quality of the product or service.

It is necessary to provide a distinction between quality management (soft aspects of quality) and quality engineering (technical aspects of quality) for setting the focus and the direction for further development. This is also necessary to gain better understanding on issues affecting each aspect. Putting everything under the quality management banner may be proper when addressing quality issues from integration and conceptual perspectives. Quality management and quality engineering may be addressing similar quality issues but their treatment is normally different in terms of depth and breadth.

## **2.4 Why Total Quality Management**

The basic goal of TQM is to involve all levels and functions of an organization in continually meeting and exceeding the customer's expectations of their daily operations, products or services. In many organizations today, there remains an outdated belief that the quality department is solely responsible to assure that the product or service meets quality standards. Within TQM, organizations are viewed as a collection of processes that must be continuously improved through utilization of the knowledge and experience of associates in all functions and at all levels. TQM philosophy deems that everyone within the organization should focus their efforts on meeting the needs of the customer and achieving the goals of the organization. The focus should not only be on doing things right, but doing them right every time. Generally, TQM approach differs from traditional management in the following ways: (Lakhe, R.R. and Mohanty, R.P., 1994).

- ✓ TQM focuses on customers absolutely. The firm customer focus brings competitive edge to the organization.
- ✓ "Products conquer markets" is the basic edifice of TQM.
- ✓ TQM takes the view that profits follow quality, not the other way around.
- ✓ TQM views total quality as having multi-dimensional attributes.
- ✓ TQM creates goal-directed connections between customers, managers and workers. Everyone is motivated to contribute towards quality.
- ✓ TQM is process-oriented, as against the traditional result-oriented approach.
- ✓ TQM favors a long span of control, with authority pushed down almost to the lowest level, as against short spans of control and many layers of authority in traditional management cultures. Accountability for quality is embedded at every level.
- ✓ TQM requires a multi skilled workforce with job rotation, in contrast to division of labor

There are many different definitions and variations of application regarding TQM. However, the mission should always remain the same. Quality is everyone's job, all the time. The simple truth is that effectively implemented TQM methodology will provide significant financial benefits. The benefits is not only to customers, but also the company itself will become more efficient, effective and through continually meeting the customers need, the brand equity of the company will increase. The stronger brand equity the more likely the organization will experience long-term success.

TQM allow companies to: Understand their customer's wants and needs or the Voice of the Customer (VOC), Improve customer focus and increase customer loyalty, Be more adaptable to changing market conditions and government regulations, Allocate proper resources and ensure capability to deliver high quality products or services, Focus on processes, measure performance and use data to drive continuous improvement, Reduce costs by reducing and eliminating waste in its many forms (quality-one.com, browsed on January 10,2023).

Through implementation of TQM methodology, the company will realize many benefits beyond the list above. The involvement of all divisions, departments, functions, processes and individuals in the TQM activities will help in building a continuous improvement culture within your organization, which could have a tremendous positive impact on the bottom line.

## **2.5 Implementation of TQM**

Implementation of TQM is an elaborate process that takes time and resources. It is a process that must be initiated and managed by the top management. The top management must make available all critical resources required as well as the organizational structure and culture required. The process must focus on finding out, meeting, and exceeding customer needs and expectations through the total involvement of everyone in the organization through continuous improvement. The literature mentions that TQM implementation is a complex, difficult, lengthy, involving huge efforts from organizations. While the TQM has been suggested, in principle, to improve the performance of the practical application involves several difficulties.

To achieve TQM implementation desire, it is necessary to be aware the following issues:- Involvement of management, Changes in organizational culture: implementing a philosophy that confirms this focus, encourages the involvement of all staff, as well as internal customers, continuous improvement.

Introducing the change through instruction, communication recognition performance; managers' behavior; teamwork; program to meet customer expectations, Developing quality strategy by defining the mission and quality policy formulation to achieve the strategic objectives of quality and Incorporate of TQM in strategic planning, allowing for allocation of adequate resources for improvement, Promote employee involvement, Determining quality costs as a measure of poor quality , Development of systems to facilitate continuous improvement, Fact-based decision making based on data acquired through process monitoring and controls, Celebration and recognition of achievements when improvements are successfully implemented. (Ilieş, L.,Crişan, E, 2011) and (quality-one.com, browsed on January 10,2023).

At the stage of the implementation process, it is important to communicate TQM to the entire organization. Communication is important throughout the implementation stage. Communication is necessary to create TQM awareness interest, desire, and action. Everyone needs to be trained in quality awareness and problem solving. This training is conducted when the employee is placed on a project team or the work group is ready for the training. Customer, employee, and supplier surveys must be conducted to benchmark the attitudes of these three stakeholders. Information from these surveys provides ideas for quality improvement projects.

It is important to note that any organization can implement TQM irrespective of the size or operations. However, the success of the implementation process depends on how well the organization understands the process and the strategies adopted. Effective TQM implementation involves defining and deploying CSFs. These include both the soft factors like leadership and employee commitment, and the hard factors which include systems, tools, and techniques. Different authors have stated different success factors for the successful implementation of TQM such as strong and committed leadership, change in culture through training and education of employees, customer focus, and quality culture through continuous improvement. These factors provide a framework for organizations that are implementing TQM.

## **2.6 Benefits of Total Quality Management**

In the competitive environment, companies are forced to formulate and implement strategies within global context. TQM has been described as a management philosophy and a way of thinking that has helped many organizations move towards achieving excellent businesses. TQM create a culture of trust, participation, teamwork, quality-mindedness, regulate for continuous improvement, continuous learning and innovation, a working culture that contributes towards a firm's success and existence (Yusof, S.M.



and Aspinwall, E., 2000). As long as TQM is adopted fully and practiced effectively in a company, many advantages will be delivered. Companies that practice TQM develop Well-defined cultural values and nurture core values around quality management and continuous improvement.

The benefits of the total quality management system (McIntyre & Kirschenman, 2000 (cited in (Hoonakker et al., 2010); (Love, P.E.D., Mandal, P., & Li, H, 1999)includes but not limited to: - Strengthened competitive position, Higher productivity, reduced rework, defects, and waste, Reduced costs and better cost management, Higher profitability, Improved customer focus and satisfaction, Increased customer loyalty and retention, Improved employee morale, Enhanced shareholder and stakeholder value, and Improved and innovative processes.

TQM can have an important and beneficial effect on employee and organizational development. By having all employees focus on quality management and continuous improvement, companies can establish and uphold cultural values that create long-term success for both customers and the organization itself. TQM focus on quality that helps to identify skills deficiencies in employees, along with the necessary training, education, or mentoring to address those deficiencies. With a focus on teamwork, TQM leads to the creation of cross-functional teams and knowledge sharing. The increased communication and coordination across disparate groups deepen institutional knowledge and gives companies more flexibility in deploying personnel.

## **2.7 Critical success factors in implementing TQM**

Empirical studies conducted on TQM define CSFs in different ways. The importance of defining the CSFs in implementing TQM is to increase the success rate and reduce costs. CSFs are the factors that can seriously affect the company for better or worse and thus require special attention for implementation of TQM. (Harjeev K. Khanna, D.D. Sharma and S.C. Laroia, 2011). (Pardeep Gupta and Ankesh Mittal, 2020) Also defines as Success factors are a set of significant elements that help the organization in achieving its objectives for better business performance.

Generally speaking, the CSFs can be defined as the critical areas which companies must accomplish to achieve its mission by examination and categorization of their impacts (Oakland J. S., 2003). Thus, in the current study, they can be viewed as those things that must go right to ensure the successful implementation of TQM. Hence, better management of such CSFs will result in effective implementation

of TQM. CSFs different from other management tools due to:- CSFs looks at a company as a totality, require careful consideration of priorities to identify what is critical, involving new development normally demand higher priority than those monitoring existing situations, define assumptions that are implied when goals are set and plans drawn, are constantly evolving, providing greater flexibility in decision making (Harjeev K. Khanna, D.D. Sharma and S.C. Laroia, 2011).

(Harjeev K. Khanna, D.D. Sharma and S.C. Laroia, 2011) Revided five CSFs in TQM implementation such as Process Management, Top Management Commitment, Customer Focus, Product Design, and Role of Quality Department. Whereas (Mudassar, 2020) states that Quality Policy, Top Management Commitment, Continuous Improvement, Quality Improvement, Training, and Education are the main CSFs.

**Table 2 Major TQM CSFs in the key literature from reported studies and empirical research.**

No	Authors	No. CSFs	TQM CSFs
1	(Ahire, S., Golhar, D., & Waller, M. ., 1996)	9	Top management commitment, customer focus, supplier quality management, design quality management, benchmarking, SPC usage, internal quality information usage, employee empowerment, and Employee Involvement.
2	(Black, S.A. and Porter, L.J, 1996)	10	Strategic quality management, people and customer management, supplier partnerships, communication of improvement information, customer satisfaction orientation, external interface management, teamwork structures for process improvement, operational quality planning, quality improvement measurement systems, and corporate quality culture.
3	(Jiju Antony, Kevin Lueng, Greame Knowles, Sid Gosh, 2002)	7	Training and Education, Quality data and reporting, Management Commitment, customer satisfaction orientation, Role of the Quality department, Communication to improve Quality, and continuous improvement.

4	(Badri, M. A., Davis, D., & Donald, D. , 1995)	8	Role of divisional top management and quality policy, Role of the quality department, Training, Product/service design, Supplier quality management, Process management/operating procedures, Quality data and reporting, Employee relations
5	(Ali K. and Johl S.K., 2022)	8	Process improvement, Top Management commitment, Customer Focus, teamwork/recognition, Training and learning, supplier quality partnership, strategic quality planning, and quality information and analysis.
6	(Mariam, 2021).	7	Continuous Improvement, Awareness of TQM, Understanding of TQM, Top Management, Training and Education, Process Management, and Supply Management
7	(Harjeev K. Khanna, D.D. Sharma and S.C. Laroiya, 2011)	9	Top Management Commitment, Suppliers Management, Human resource management, Process management, Customer focus, Role of Quality Department, Quality Information System, Training, Quality citizenship
8	(Netsanet, 2019)	7	Top management commitment, Customer Focus, Process Management, Peoples management, Continuous Improvement, Close relationship with customers, Competitive advantage
9	(Sila, I. & Ebrahimpour, M. , 2002)	7	Top management commitment, Customer focus and satisfaction, quality information and performance measure, training, employee involvement, teamwork, continuous improvement, and innovation
10	(Samat, N., Ramayah, T., & Saad, N. H., 2006)	4	Information and communication, customer focus, continuous improvement, and employee empowerment
11	(Brah S.A, Wong J.L, and Rao B.M, 2000)	5	Top management commitment, customer focus, employee empowerment, employee involvement, and quality improvement rewards
12	(Darryl D.Wilson and	7	Leadership, information and analysis, strategic planning, human resource management, process management, business result, and

	David A Collier, 2000)		customer focus and satisfaction.
13	(Pardeep Gupta and Ankesh Mittal, 2020)	8	Top Management Commitment, Rewards, and Recognition, Education and Training, Total Employee Participation, Review and Monitoring, Strategic Planning and Management, Quality Management, and Communication.

To assess the CSFs that affect the implementation of TQM in the selected company, the following factors were identified. The measurement statements of each factor are identified based on the various studies and the researcher’s hands-on experience. The impact of CSFs will assess using the five factors that are the Independent Variables namely:

1. Top Management Commitment
2. Employee Training & Education
3. Continuous Improvement of product and service
4. Customer focus
5. Supplier management

### 2.7.1 Top management commitment and implementation of TQM

Top management commitment represents the main driving force behind the TQM implementation thus; it is a responsibility to create an appropriate environment for TQM implementation. The top management ensures that sufficient resources are available for quality-related activities. The top management itself must have clarity of quality goals.

The management takes a long-term strategic view of quality and not only of production targets. Sometimes TQM fails due to there being a gap between the top management’s skill about their intentions to TQM and the reality of implementation in various subunits of the organizations (Lakhal, L., Pasin, F., & Limam, M, 2006). If an organization is serious about implementing TQM, the lead has to be taken by the top management with full commitment. It must initiate quality improvement programs. The top management should continue all the efforts and provide the resources to continue quality improvement programs. This is provided by collecting, reporting, and using quality-related cost information.

(Juran, 1989) Notes that TQM-based leadership puts companies far ahead of their competitors in terms of sales, profits, and employee morale. Effective leadership for TQM involves everyone in the organization in value-adding activities. He also adds that the most important prerequisite to practicing TQM is that the senior management should firmly believe that TQM is the only way to do business and manage the organization. To be successful in promoting business efficiency and effectiveness, TQM must be truly organization-wide, and it must start at the top with the chief executive or equivalent.

(Massoud M. Arshida, Syed Omar Agil, 2012) and (Sha'ri Mohad Yusof and Eliane Aspinwall, 1999), Points out top management commitment as an essential element for ensuring successful TQM implementation. The top management must be on the fore front of the quality management process starting from the initial stages. Adoption of TQM for the first time is associated with development of new organizational policy, new procedures and new tools that must be learned.

Top management commitment concerning its vital role in implementing TQM demands the company away from 'Management by Control' to 'Management by Commitment'. This principle includes participative management, empowerment of all an organization's members to focus on and achieve total quality objectives, and commitment to organizational systems that are designed to ensure total quality. Generally, the top management must play a leading role by: -making available the critical resources, establishing an organization-wide quality policy that is well communicated to all stakeholders, managing the entire process through close monitoring and evaluation, Developing specific improvement plans for the department and processes for which they are responsible, Take into account feedback from first-line managers and employees on potential difficulties or obstacles etc.

### **2.7.2 Training & Education (TE) and implementation of TQM**

Training and education are essential to provide employees with new techniques and practices necessary to implement TQM successfully. Training and education are also necessary for teaching the TQM philosophy that requires a permanent change in individual behaviors and attitudes. Training should focus on building quality skills with equal attention paid to behavioral skills and quality tools needed for change in performance management and recognition, which leads to strengthening the organization's culture. If trained well and given the responsibility to inspect the quality of their work it would eliminate inspection.

As (Amare, 2014) writes in his book, training that employees require are interpersonal skills, the ability to function within teams, problem solving, decision making, job management performance analysis and improvement, business economics and technical skills. Employees at all levels must accept quality education and training as it helps employees at their levels to understand quality management initiatives and their roles in implementing TQM (Massoud M. Arshida, Syed Omar Agil, 2012). An empirical study conducted by (Mariam, 2021) entitled with Analysis of Total Quality Management (TQM) Implementation in Addis Ababa Construction Road Authority (AACRA) showed employees training and education is essential for successful implementation of TQM.

(Esin Sadikoglu and Hilal Olcay, 2014) states in their study “It has been found that training is positively related to operational performance, employee performance, and customer results. Furthermore, treating employees as a valuable resource increases their loyalty to the firm, motivates them and makes them proud of their jobs, improves their work related performances, decreases absenteeism, and reduces intentions to quit. This leads to increase quality, reliability, and timely delivery of the products/services. With effective training, employees know the industry and the Structure of the company better. Effective training on quality also increases employees’ skills to work effectively and efficiently. Furthermore, it will improve employees’ loyalty to the firm, their motivation, and work-related performances”

Training empowers employees to take part in continuous improvement initiatives that are essential in TQM implementation. Employees at all levels must accept quality education and training as it helps employees at their levels to understand quality management initiatives and their roles in implementing TQM (Massoud M. Arshida, Syed Omar Agil, 2012). An empirical study conducted by (Mudassar Hussain and Junaid Khan, 2020) key success factors of total quality management for the hospitality sector showed a positive relationship between employee training and education and the successful implementation of TQM.

Employee training and education is associated with employee empowerment and improved performance of their roles in quality management. Employees feel involved in quality management initiatives when given timely quality programs and therefore give it a positive approach to reducing employee resistance. Specific measures for evaluating training include the time and money spent by the company to training employees and management in quality principles, problem-solving skills, and teamwork (Black, S.A. and Porter, L.J, 1996).

### **2.7.3 Continuous Improvement (CI) and implementation of TQM**

Continuous improvement is the planned, organized, and systematic process of continuing, incremental and company-wide change of current practices meant to enhance company. (Amare, 2014) defines continuous improvement as a permanent objective of a company that considers all work as process which leads to reduce resources, Reduce errors, Meet expectations of downstream customers, Make process safer, make process more satisfying to the person doing. As (Rechar M. Hodgetts, 1998) Explain the aim of continuous improvement is about learning from the current processes to improve them in the future. Continuous improvement means commitment to the constant examination of technical and administrative processes in search of better methods and the main objective behind continuous improvement is customer satisfaction. The principle of continuous improvement is keeping the never-ending change concept in everyone's mind and in every job.

Continuous improvement of services and products involves process planning, product design, process design, production & service, assessment & action, and resource procurement. Action is the feedback mechanism for the evaluation of compliance for external and internal satisfaction. Resource procurement supports all processes by obtaining the resources (materials, suppliers, equipment, personnel, outside services, etc.) required to achieve the planned results of the processes. TQM making sure everything and everyone in the organization is subject to improvement. Since improvement is never-ending journey, the process has to be done daily and it needs to be integrated with other organizational improvement initiatives and business strategies. This infrastructure must be integrated into the existing structure. A sound Quality policy, together with the organization and facilities to put it into effect, is a fundamental requirement if an organization is to fully implement TQM. Every organization should develop and state its policy on quality, together with arrangements for its implementation.

Continual improvement of the organization's overall performance should be a permanent objective of the company: Key benefits of continuous improvement include performance advantage through improved organizational capabilities, alignment of improvement activities at all levels to an organization's strategic intent, flexibility to react quickly to opportunities, applying the principle of continual improvement typically leads to employing a consistent organization wide approach to continual improvement of the organization's performance and providing people with training in the methods and tools to continual improvement. It also helps an organization in making continual improvement of products, processes and

systems on objectives for individual in the organization, establishing goals to guide, and measures to track continual improvement while recognizing and acknowledging improvements.

As (Hyland, P., Mellor, R., & Donepadi, R, 2000) states in their study, continuous improvement in the service quality are one of the major dimensions factors of the TQM implementation program. It helps in eliminating lead times in delivery, as well as reducing rework, error, and unnecessary slack and variability in the processes. Thus, the company can attain long-term survival and development. According to TQM philosophy, the best way to improve organizational output is to continuously improve performance.

#### **2.7.4 Customer focus (CF) and implementation of TQM**

The first of TQM principles puts the focus back on the people buying the product or services. Customers determine the quality of product or service. If the product or service fulfills a need and lasts as long as or longer than expected, customers know that they have spent their money on a quality product. (Dale, 2003), Defines Customer focus as organizations depend on their customers and therefore should understand current and future customer needs, meet customer requirements and strive to exceed customer expectations. Customer satisfaction is found to be an important measure of quality. So, implementation of TQM requires a great emphasis on CF, thus achieving high customer satisfaction. This requires that there must be proper systems to receive and deal with customers' complaints. Companies needs to systematically capture customer requirements and ensure satisfaction levels after sales.

Studies emphasize that quality is defined by the customer but not by the organization or the product or service manufacturer since quality is what the end user need or expect. No matter what an organization does to foster quality improvement-training employees, integrating quality into the design process, or upgrade computers or software, the customer determines whether the efforts were worthwhile. The field of customer focus is viewed as the most important TQM value. It thus forms part of all major studies that have analyzed important TQM constructs (Ahire, S., Golhar, D., & Waller, M. ., 1996) and (Black, S.A. and Porter, L.J, 1996). Central to this dimension is the belief that customer orientation is the prime factor for an organization's long-term success in the market place. When organizations understand what their customer wants or needs, they have a better chance of figuring out how to get the right materials, people, and processes in place to meet and exceed their expectations.



Customer satisfaction the success of any organization in near future would depend upon the satisfaction of its customers' needs efficiently and effectively continuously in the same regard, stress that customer focus is the extent to which an organization continuously satisfies customer needs and expectations. Thus, it is one of the major means of TQM for improving and enhancing business performance. TQM is designed in such a manner that the expectations of customers. In the present era, the customer is the king. It must be recognized that customers are the most important persons for any business. The very existence of an organization depends on them. They are the lifeblood of a business and deserve the most courteous and affectionate treatment. Benefits of being customer-focused include: More sales, increased revenue, and, market share, Strong customer loyalty leading to repeat business and increased possibility that satisfied customers will tell others about your products and services.

### **2.7.5 Supplier management and implementation of TQM**

The quality of purchased supplies is crucial to an organization's products and services and consequently to its success in the marketplace. As (Dale, 2003) states in many cases, as outsourcing has become the norm, bought-in components and services can account for some 70 to 80 per cent of the final cost of a product. It is therefore clear that suppliers are critical to the competitiveness and performance of the purchaser's products and services.

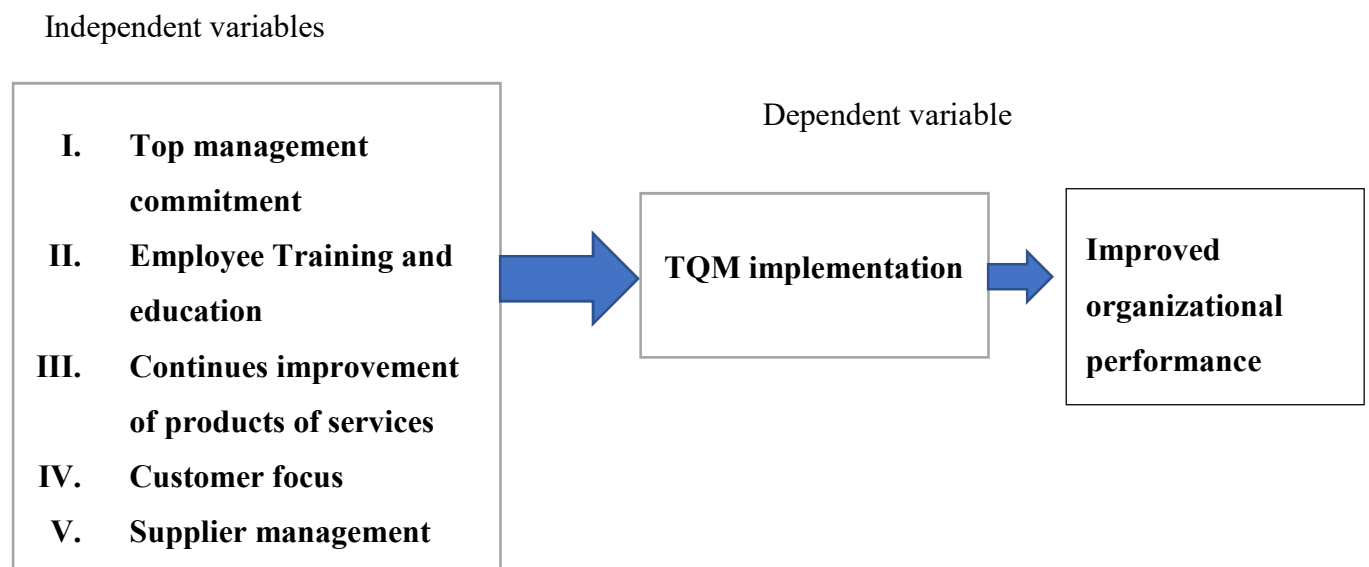
Supply chain management in TQM implies to reducing and streamlining the supplier base to facilitate managing supplier relationships, developing strategic alliances with suppliers, working with suppliers to ensure that expectations are met, and involving suppliers early in the product development process to take advantage of their capabilities and expertise. Inputs from suppliers constitute the first phase of producing the products and/or services in a firm. High quality inputs provide high quality products and/or services. Effective supply management practices enable the suppliers to adopt quality management and deliver reliable and high quality products and/or services timely. In effective supply chain management partners works together towards common aims and aspirations. It is based on the principle that both parties can gain more through co-operation than conflict. Partnerships are characterized by mutual trust and commitment, integrity, integration, co-operation, honesty, a willingness to openly declare problems and work together to find answers, the sharing of data and ideas, improvements and best practices, clearly understood responsibilities, and a desire to continuously improve products and services (Burnes, B. and Dale, B. G. (eds), 1998).

Companies who develop a long-term business partnership with suppliers will gain benefits like:- elimination of inspection of supplied parts and materials, Improved productivity, increased stock turns and lower inventory carrying cost and reduced costs per piece, exchanges of ideas, expertise and technology between customer and supplier.

Developing partnerships is not without difficulties. As (Dale, 2003) writes in his book by referring Lascelles and Dale (1990) certain aspects of the customer–supplier relationship can act as a barrier to supplier development. These include: Poor communication and feedback, Supplier complacency. Misguided supplier improvement objectives, Lack of customer credibility as viewed by their suppliers, and Misconceptions regarding purchasing power.

## 2.8 Conceptual Framework

A conceptual framework is a basic structure that consists of certain abstract blocks which represent the observational, experiential, and analytical aspects of a process or system conceived. It is a set of broad ideas and principles taken from relevant fields of inquiry and used to structure a subsequent presentation. The interconnection of independent and dependent variables completes the framework for certain expected outcomes. Independent variables are Top management commitment, customer focus, continuous improvement, communication, and employee training. The dependent variable is the implementation of TQM. The proposed framework for this research is illustrated in Figure 3.



**Figure 3 Conceptual Framework**

## CHAPTER THREE

### RESEARCH DESIGN AND METHODOLOGY

#### INTRODUCTION

This chapter describes the research design, type, and source of data in the study, the target population and sampling methods, and the techniques that are going to be used to select the sample size. It also describes how data will be collected, analyzed, and presented, validity and reliability, and ethical consideration.

#### 3.1 Research Approach and Method

This study was developed to determine the CSFs in implementation of TQM in mechanical engineering service-providing companies. This study employed mixed methods design which is a procedure for collecting, analyzing and producing of results by mixing both quantitative and qualitative data at some stage of the research process within a single study. This approach comprised two complimentary methods: questionnaire survey and interview. The questionnaire generated quantitative data, this quantitative approach is used to generate and analyze data on respondents' knowledge and opinion about CSFs in implementing TQM, whereas the second provides explanations about possible challenges existing in sustaining QMS and future challenges in the improvement process.

Since the objective of this study was to assess the CSFs in implementing TQM, the study uses descriptive type of research. A descriptive survey method was used to measure the characteristics described in the research question. In connection with the application of descriptive survey method, it was stated that this method is a method of investigation which attempts to describe and interpret what exists at present in the form of conditions, practice, process, trends, effects, attitudes, beliefs, etc

#### 3.2 Population of the Study

The target population for this study was Berhan Engineering which is found in Addis Ababa, Nifas silik lafto sub city. The company is selected Berhan Engineering is ISO certified company that has a good practice on quality management in ME service sector. The company is well organized and provides ME services including: - Engine overhaul and Inspection of vehicles and machinery, Manufacturing of different types of gears and mechanical parts as per customer order, Reconditioning of different mechanical parts of vehicles and machinery, Modification of different mechanical parts, Consultancy

services for companies and individuals that purchases machines and parts etc. population size of the study was all of the permanent employees of Berhan Engineering. The case company has a total of 43 employees.

### **3.3 Sample Size and Techniques**

Sample size of the study was all of the permanent employees of Berhan Engineering out of which managers, supervisors, and all quality assurance and quality control department employees are selected purposively. The study used a purposive sampling technique from the population of interest. The reason for choosing this technique is that the selected participants are more responsible persons in the practice and implementation of QMS in their organization. In addition to that the population size of the case company is small and the research's topic needs participation of all members of the company. Moreover, these samples helped to understand the problem and the research question since they are assumed to be rich in information in QMS.

### **3.4 Source of Data and Data Collection Tools**

#### **3.4.1 Source of data**

To acquire data on the CSFs in implementation of TQM at Berhan Engineering, the researcher use primary data sources from Self-administered close ended questionnaire to all permanent employee of Berhan Engineering and semi structured interview to top management, production planner and medium management of the company.

#### **3.4.2. Data Collection Tools**

In this study, the data was gathered using two data collection tools, self-administered close-ended questioner and semi-structured interview. A questionnaire is the main data collection instruments to conduct the study. A separate five-point Likert scale questionnaires have been developed to the respondents. Therefore questionnaire were adopted and constructed according to (Jiju Antony, Kevin Lueng, Greame Knowles, Sid Gosh, 2002), (Netsanet, 2019), (Badri, M. A., Davis, D., & Donald, D. , 1995), (Mariam, 2021), and (Gloria.Ma, Talavera.V and Gadjah Mada., 2004). For the selected CSFs of TQM implementation such as training and education, continuous improvement, top management commitment, supplier management and customer focus. Those TQM CSFs are constructed by the researcher.

Interview was the second data collection instruments to conduct the study. The interviews were developed for supervisors, tom management representatives, production planning and control, customer care, medium management personnel of the company. The study uses Semi-structured interview style so as to deal with key themes of the study topic. In addition, it helps to allows flexibility for the researcher to reply to the answers of the interviewees. The interview was provided face to face interaction.

### **3.5 Data Analysis**

The data analysis for this research has be descriptive type of data analysis. The quantitative data were analyzed by employing descriptive statistics such as percentages, frequencies and tables. Microsoft Excel was used in data analysis. The researcher preferred Microsoft Excel because of the sample size were small and it is capable of calculating percentage, frequencies, mean and standard deviation. The information is presented and discussed as per the objectives and research questions of the study. Data were presented in the form of tables to show frequencies, percentages and correlation of the variables hence facilitating logical interpretation and discussion of the study findings. The results of the study were then compared with the reviewed literature to assess the extent to which the identified CSFs influenced implementation of TQM in Berhan Engineering as ME Service providing Company.

### **3.6 Validity of the research instruments**

Validity is how accurate the data obtained in the study represents the variables of the study and is a true reflection of the variables (Creswell., 2014). In order to ensure content validity of the items incorporated in the instrument, the instrument were given to the advisor and the colleagues to comment on it before distributed it. Finally, an adjustment of questionnaires was made depends on the forwarded comments before distributed to full sample respondents. In addition to these, the study questionnaire found unsuitable for measuring the variables in the study was rejected.

### **3.7 Reliability test**

Reliability is measure of the degree of questionnaire consistent. If the same results are gained time after time, no matter how many times you conduct a piece of research, then the data collected is said to be reliable. Thus, Cronbach's Alpha has been employed to test the reliability of the study instrument in data collection process. It is commonly used as a measure of the internal consistence or reliability of a

psychometric test score for a sample of examinees. Cronbach's alpha coefficient was computed by Microsoft Excel using the formula

$$\alpha = \frac{(K)}{(K-1)} * \frac{(Sy)^2 - (\sum Si)^2}{(Sy)^2}$$

Where:

$\alpha$  = Cronbach's Alpha

K = the number of items in the scale

Si = the sum of the item scores for the each item

S = the sum of the total scores for all items

As shown in the table 3 the cronsbach's alpha calculated for this study produced a value of 0.93. Reliability coefficient of 0.7 or higher is considered acceptable (Creswell., 2014). This result tells that there was high degree of internal consistency among the items. It also indicates that the items were closely related in terms of idea and do not create confusion or cause of misunderstanding to the respondents.

**Table 3 Reliability statistics**

Cronbach's Alpha	No. of items
0.93	5

The closer Cronbach's alpha coefficient is to 1.0 the greater the internal consistency of the items in the scale using the rules of thumb if the value of alpha is >0.9 = Excellent, >0.8 =Good, >0.7 = Acceptable, >0.6 = Questionable, >0.5 =Poor, and <0.5 = Unacceptable (Creswell., 2014). For this study since the all the values of Cronbach alpha for is each item is greater than 0.7 it can we said this study is reliable.

**Table 4 Reliability analysis score**

No	CSF in implementing TQM	Mean	Cronbach's Alpha	no. item
1	Top Management Commitment	3.873	0.73	6
2	Employee Training & Education	3.727	0.8	7
3	Continuous Improvement of product and service	3.798	0.714	7

4	Customer focus	3.809	0.71	6
5	Supplier management	2.828	0.7	7
	Total		0.93	33

Source: Own survey, 2023

### 3.7 Ethical Consideration

The researcher will clearly explain the purpose of the study to the participants before data gathering. The Confidentiality was explicitly written as part of the instruction on the questionnaire and verbally indicated at the time of data collection in that the data was only used for the intended purpose of the study. In addition to this, the researcher informed participants not to write their names on the questionnaires to keep their level of confidence and trust and secure genuine data.

## CHAPTER FOUR

### DATA ANALYSIS AND INTERPRETATION

#### 4.1 INTRODUCTION

This chapter presents the results of the study with data analysis and interpretation. The part of data analysis and interpretation conducted on the information gathered from primary data sources through the distribution of printed questionnaire to employees of Berhan Engineering. The data has been analyzed and then presented in the form of tables showing frequencies, percentages and mean then interpreted. Discussion on the key findings against relevant literature is also provided.

#### 4.2 Questionnaire Return Rate

**Table 5 Questionnaire return rate**

		frequency	percentage
Returned	Completed	34	79.1
	Uncompleted	2	4.6
not returned		7	16.3

Source: Own survey, 2023

According to Table 4. , a total of 43 questionnaires were distributed to the identified respondents. 36 questionnaires were returned but 7 questionnaires were not returned. However, among 36 the researcher was rejected 2 questionnaires because of incomplete. This was a response of 79% which the researcher considered adequate for analysis. Therefore, total response rate was 34 (79%) that used to analysis the response of participants.

#### 4.3 Demographic Information

Demographic information of the respondents was based on gender, age, position held by the respondents, experience in the company and the highest level of education achieved by the respondents.

**Table 6, Demographic analysis**

No	Item		Response	
			Frequency	Percent (%)
1	Gender	Male	22	64.7
		Female	12	35.3
	Total		34	100



2	Age of respondents	20 - 30	22	64.7
		31 – 40	5	14.7
		Above 40	7	20.6
	Total		34	100
3	Educational background of the respondent 1	High school	4	11.8
		Diploma	12	35.2
		BSC	14	41.2
		MSC and above	4	11.8
	Total		34	100
4	Experience in year	Less than 5 years	17	50
		5 to 10 years	9	26.5
		11 to 15 years	3	8.8
		above 15 years	5	14.7
	Total		34	100
5	Position held	Support staff	25	73.5
		Supervisor	2	5.9
		Medium management	5	14.7
		Top management	2	5.9
	Total		34	100

Source: Own survey, 2023

From Table 6, 64.7% of the respondents were male while 35.3% were female. This shows that majority of the respondents who participated in the study were male. In addition, the results also show a good representation of either gender. Age profile of the participants shows, 64.7% of participants are between 20 and 30 years which was the majority age group, 20.6% of participants was above 40 years and 14.7% of the respondents were between 30 and 40 years. This indicates that, much of the study respondents are fall under productive age. Regarding educational background, large numbers of the respondents i.e. 41.2 % are BSC degree holder, while diploma comes after with 35.3 % and MSC and high school Certificate holder's shares 23.6 % of them equally. This shows that, respondents are addressed from different educational background mostly bachelor degree holders.

In addition on work experience 50% of the respondents had worked in the company for less than 5years, 26.5% had worked between 5 and 10 years, 14.7% had worked over 15 years while 8.8% between 10 and 15 years. Since 50% had worked in the company over five years, it therefore indicates that they had adequate work experience and understanding of the company. The other thing which can be reviled from

the result is that respondents which have work experience less than 10 years are bachelor degree holders and that of greater than 10 years are diploma and high school certificate holders. These results may also imply that the company has been a well experienced and educational empowered team.

According to Table 6, 73.5% of the respondents were at supporting staff level, 5.9 % were supervisors level while 14.7% medium management level and 5.9% were top management level. This implies the company has well-structured and functioning department which can communicate and take immediate decisions whenever needed.

#### 4.4 Descriptive Analysis of variables

CSFs in implementing TQM were analyzed using five aspects; Top Management Commitment, Training & Education, Continuous Improvement of products and services, Customer focus and Supplier management. Respondents were asked to rate this CSFs using five scaled questioners. Each of the aspects are presented separately based on its mean score. The researcher sought to establish the respondents opinion on CSFs in TQM implementation based on the key (1 - Strongly disagree; 2 – Disagree; 3 – Indifferent; 4 – Agree; 5 – Strongly agree).

##### 4.4.1 Analysis of Top Management Commitment.

**Table 7 Responses on top management commitment.**

No.	Item		1	2	3	4	5	Mean	SD
1	Top management creates, communicate and sustain clear vision, mission, goals and policy concerning quality management Program.	Count	2	2	0	12	18	4.2	1.12
		%	5.88	5.88	0	35	52.9		
2	Top management involves in implementation, improvement process and in handling quality problems as a way to increase profit.	Count	2	2	1	21	8	3.9	1.02
		%	5.88	5.88	2.9	62	23.5		
3	Top management in your company allocates adequate resources (finance, time, equipment, and people) required for quality improvement activities.	Count	2	4	12	10	6	3.4	1.10
		%	5.88	11.8	35	29	17.6		
4	Top management review and evaluates the performance of QMS functioning	Count	1	3	6	21	3	3.6	0.88
		%	2.94	8.82	18	62	8.82		
5	Top management encourages employees to participate in quality related concepts and skills.	Count	2	3	2	8	19	4.1	1.23
		%	5.88	8.82	5.9	24	55.9		

6	Top management is strongly committed to improving product quality to meet customers' expectations.	Count	0	6	2	16	10	3.8	1.03
		%	0	17.6	5.9	47	29.4		

Source: Own survey, 2023

In the above table 7, regarding Top management creates, communicate and sustain clear vision, mission, goals and policy concerning quality management Program, 52.9% of the respondents strongly agree, while 35% of respondents agree on the issue with high mean value of 4.2. However remaining respondents were disagree and strongly disagree with equal percentage of 5.9%. This implies that Top management is committed in creating, communicating and sustaining the mission, vision, goals and policy of the company concerning the implemented quality management system.

Regarding” the involvement of Top management in implementation, improvement process and in handling quality problems as a way to increase profit”, majority of the respondents (62%) agreed and 23.5 % of them strongly agree with a mean value of 3.9. The rest respondents with disagree and strongly disagree scales with same percentage of 5.9%. The respondents opinion shows that the top management is leader in the handling, implementation and improvements of quality related problems which can increase the efficiency of company.

Top management facilitates employee empowerment and improved levels of job satisfaction through its leadership and commitment to the TQM implementation goal of customer satisfaction by creating an organizational climate that emphasizes total quality and customer satisfaction. Concerning “Top management in your company allocates adequate resources (finance, time, equipment, and people) required for quality improvement activities.” 35% of respondents stay indifferent which is followed by 29% agrees and 17.9% strongly agree with a mean value of 3.4.

These results therefore imply that top management commitment positively influences implementation of TQM. This is in agreement with the findings of (Sha’ri Mohad Yusof and Eliane Aspinwall, 1999) who pointed out that top management commitment as an essential element for ensuring successful TQM implementation. This therefore means that top management must be on the fore front of the quality management process starting from the initial stages.

#### 4.4.2 Analysis of Employees Training and education.

**Table 8 Response on Employee Training education**

No	Item		1	2	3	4	5	Mean	SD
1	Employees in the company are trained on quality management system.	Count	0	6	4	18	6	3.7	0.97
		%	0	17.7	11.8	52.9	17.6		
2	Training is given for developing team spirit.	Count	2	2	5	17	8	3.8	1.07
		%	5.9	5.9	14.7	50	23.5		
3	Training is given on new technology or equipment, methods, systems or procedures.	Count	1	4	11	9	9	3.6	1.10
		%	2.9	11.8	32.3	26.5	26.5		
4	Training is given for specific work skill (technical and vocational given to employee throughout the company).	Count	1	3	6	16	8	3.8	1.01
		%	2.9	8.8	17.7	47	23.5		
5	Training is given in problem identification and problem-solving skill.	Count	0	2	11	13	8	3.8	0.88
		%	0	5.9	32.4	38.2	23.5		
6	Training courses is given for employees in quality improvement skill and technique.	Count	1	3	3	18	9	3.9	0.99
		%	2.9	8.8	8.8	52.9	26.5		
7	Training was adequate to work on quality improvement.	Count	0	7	9	13	5	3.5	0.99
		%	0	20.6	26.47	38.2	14.7		

Source: Own survey, 2023

**Note.** 1 = Strongly Disagree; 2= Disagree; 3= indifferent; 4= Agree; and 5= Strongly Agree

As the table 8 in the above shows 52.9% of respondents agree and 17.6% strongly agree on Employees in the company are trained on quality management system. In similar manner majority of the respondents agree and strongly agree that delivered training aims were for developing team spirit, for specific work skill (technical and vocational), and in problem identification and problem-solving skill, for quality improvement skill and technique and Training was adequate to work on quality improvement with a mean value of 3.8 and above.

Concerning Training is given on new technology or equipment, methods, systems or procedures, 32.3% of respondents stay in neutral, agree and strongly agree with equal percentage of 26.5% with a mean value of 3.6. But regarding Training was adequate to work on quality improvement, 38.2% of respondents agree, 2.47% stay in neutral and 20.65 of respondents disagree with a mean value of 3.5. This result revealed that

the training given for employee is not up to the minimum to initiate continues improvement. Since Training empowers employees to take part in continuous improvement activities, Supervisors, management personnel and other employees to develop their skills and knowledge on quality dimensions and management as well as their roles which is essential in TQM implementation. , training that has to be delivered to employees are interpersonal skills, the ability to function within teams, problem solving, decision making, job management performance analysis and improvement, business economics and technical skills. This result revealed that the company had a good culture on Employee training and education, but the quality and continuity of delivered training programs are not sufficient.

These results are in agreement with the findings of (Samir, 2003) on critical factors of TQM in Palestinian organizations which showed a positive relationship between employees training and education and successful implementation of TQM. The results of the study done by (Jiju Antony, Kevin Lueng, Greame Knowles, Sid Gosh, 2002) clearly indicate that training and education is the most critical factor for the successful implementation of TQM.

#### 4.4.3 Analysis of Continuous Improvement of Products and Services.

**Note.** 1 = Strongly Disagree; 2= Disagree; 3= indifferent; 4= Agree; and 5= Strongly Agree

**Table 9 Response on Continuous Improvement of Products and Services.**

No	Item		1	2	3	4	5	Mean	SD
1	The company identifies area for quality improvement and implements them frequently.	Count	2	3	7	13	9	3.7	1.14
		%	5.9	8.8	20.6	38.2	26.5		
2	The company use standardized and documented operating procedures and manuals.	Count	1	0	4	15	14	4.2	0.88
		%	2.9	0	11.8	44.1	41.2		
3	Promotion and career development programmers emphasize quality management in the company	Count	3	9	6	8	8	3.3	1.33
		%	8.8	26.5	17.7	23.5	23.5		
4	Communication is open and continues in three directions: up, down and horizontal.	Count	1	1	2	13	17	4.3	0.94
		%	2.9	2.9	5.9	38.2	50		
5	The company concentrates on ongoing development of personnel by establishing extensive training and education programs.	Count	5	4	2	19	4	3.4	1.28
		%	14.7	11.8	5.9	55.9	11.8		
6	The company conducts performance	Count	0	6	6	17	5	3.6	0.95

	review for its services regularly and provides feedback to employee in their quality performance.	%	0	17.6	17.6	50	14.7		
7	The company identifies service defects, finds the root cause in the diagnosis of problems and ensures such faults do not occur in the future.	Count	2	0	2	18	12	4.1	0.98
		%	5.9	0	5.9	52.9	35.3		

Source: Own survey, 2023

As it can be seen from Table 9 majority of the Respondents inclined to agree and strongly agree on statements like, the company use standardized and documented operating procedures and manuals 44.1% and 41.2% with mean value of 4.2 and significant, Communication is open and continues in three directions: up, down and horizontal with 38.2% and 50% with mean value of 4.3 and significant and The company identifies service defects, find the root cause in the diagnosis of problems and ensures such faults do not occur in the future, 52.9% and 35.3% with mean value of 4.1 respectively which is significant.

But respondent’s opinion on the statement, Promotion and career development programmers emphasize quality management in the company shows 26.5% disagree, equal percentages of 23.5%, agree and strongly agree, 17.5% in different and 8.8% strongly dis agree with a mean value of 3.26 awarding to the lowest evaluation bidders. Concerning statement, The Company identifies area for quality improvement and implements them frequently respondents were inclined to 38.2% agree, 26.5% dis-agree, 20.5% in different, 8.8% disagree and 5.9% strongly dis agree with a mean value of 3.26 and significant.

Majority of 55.9% participants response were inclined to agree on, company concentrates on ongoing development of personnel by establishing extensive training and education programs, the rest 11.8% strongly agree, 14.7% strongly disagree, 11.8% dis-agree results with mean value of 3.4. Half of the percipients agrees on the company conducts performance review for its services regularly and provides feedback to employee in their quality performance, 17.65% dis-agree, 15% strongly agree and 17.65% indifferent in same percentage.

The study established that majority of the respondents agreed that continuous improvement of goods and services is very essential in companies through using standard and operating procedures, dedicated research team, identifying service defects and continuous reviews on performance if it aims to gain

competitive advantage in a very dynamic market. This shows that every company should develop and state its policy and how it will be implemented. Improvement in quality and productivity is a continuous cycle in TQM, and this can be done by measuring success and keeping on improving.

The results are in agreement with the findings of (Sanjiv Gupta and Dr. Nilesh Arora , 2021), which revealed that every company should develop and state its policy on quality, together with arrangements for its implementation. This means that continual improvement of the company’s overall performance should be a permanent objective of every organization.

#### 4.4.4 Analysis of Customer Focus

**Note.** 1 = Strongly Disagree; 2= Disagree; 3= indifferent; 4= Agree; and 5= Strongly Agree

**Table 10 Response on customer focus**

No	ITEM		1	2	3	4	5	Mean	SD
1	The company provides excellent service by determining and incorporating customer needs.	count	2	1	1	14	16	4.21	1.07
		%	5.9	2.9	2.9	41.2	47.1		
2	Customer satisfaction is measured and recorded in a regular basis.	count	1	5	5	9	14	3.88	1.2
		%	2.9	14.7	14.7	26.5	41.2		
3	Different means of communication platforms (email, phone, website, and social media) are available for customers to contact the company easily and effectively.	count	4	3	10	12	5	3.32	1.2
		%	11.8	8.8	29.4	35.3	14.7		
4	Customer gives feedback on quality and service delivery of the company.	count	1	5	2	18	8	3.79	1.0
		%	2.9	14.7	5.9	52.9	23.4		
5	A complaints process and guidelines are established; complaints are properly recorded, addressed in timely manner and recorded for future reference	count	1	2	7	9	15	4.03	1.0
		%	2.9	5.9	20.6	26.5	44.1		
6	Customer forecast strategies and approaches are continuously reviewed for further improvement.	count	1	4	9	13	7	3.62	1.0
		%	2.9	11.8	26.5	38.24	20.59		

Source: Own survey, 2023

The greatest agreement was achieved on the statement “The Company provides excellent service by determining and incorporating customer needs” shows that 47.1% and 41.2% were inclined to strongly agree and agree respectively, while 5.9% of respondents strongly disagree with a mean value of 4.21. This result shows that the company have good culture that priorities the need and experience of customers. In the other statement “Customer satisfaction is measured and recorded in a regular basis.” 41.2% strongly agree and 26.5% agree, 29.4% inclined to indifferent and disagree with equal percentage with a mean value of 3.88.

Regarding “Different means of communication platforms (email, phone, website, and social media) are available for customers to contact the company easily and effectively”, 35.3% of respondents agree, 29.4% indifferent, 14.7% strongly dis agree. The participant’s response agreement confirms mean value 3.32 and significant. Concerning “Customer gives feedback on quality and service delivery of the company”, majority of respondents 52.5% inclined to agree and 23.4% strongly agree with mean score of 3.79. This statement implies customer were actively gives their feed back to the company which can be used in the improvement process to satisfy their needs.

On the statement “A complaints process and guidelines are established; complaints are properly recorded, addressed in timely manner and recorded for future reference”, 44.1% strongly agree, 26.5% agree and 20.6% stay in different with a mean value of 4.03. On the other “Customer forecast strategies and approaches are continuously reviewed for further improvement.” 38.24% agree, 26.5% in different and 20.59% strongly agree with a mean score of 3.62.

(Birhanu Beshah and Eshetie Berhan, July 2016) Indicates in their research finding entitled with Critical success factors for TQM implementation, customers’ focus were one of the three most important parameters for success of TQM implementation.



#### 4.4.5 Analysis on Supplier Management

**Note.** 1 = Strongly Disagree; 2= Disagree; 3= indifferent; 4= Agree; and 5= Strongly Agree

**Table 11 Response on supplier management**

No	Item		1	2	3	4	5	Mean	SD
1	Suppliers are selected based on their quality specifications instead of price.	count	0	2	11	12	9	3.8	0.9
		%	0	5.9	32.4	35.3	26.5		
2	The company offers closer and long-term working relationship to suppliers.	count	1	9	8	13	1	3.2	1.0
		%	2.9	26.4	23.5	38.2	2.9		
3	The company works with supplier who adopt quality management program.	count	4	12	7	7	4	2.9	1.2
		%	11.8	35.3	20.6	20.6	11.7		
4	Suppliers supply good products and services in a time manner.	count	0	13	8	7	6	3.2	1.1
		%	0	38	23.7	20.6	17.7		
5	The company’s purchasing department assumes responsibility for the quality of incoming products.	count	2	13	13	4	2	2.7	0.96
		%	5.9	38	38	11.8	5.9		
6	The company Evaluate performance of a supplier and give regular feedback to suppliers in order to accomplish its goals.	count	4	23	3	3	1	2.2	0.89
		%	11.8	67.7	8.8	8.8	2.9		
7	The company regularly awards or incentives to suppliers for excellent performance	count	21	4	7	1	1	1.7	1.08
		%	61.8	11.8	20	2.94	2.94		

Source: Own survey, 2023

The above table result revealed concerning the statement “Suppliers are selected based on their quality specifications instead of price.” 35.3% agree, 32.4% in different and 26.5% strongly agree on the issue and the participant’s response agreement confirms mean value 3.8. While 38.2% agree, 26.4% disagree and 23.5% in different on the statement, “The company offers closer and long-term working relationship to suppliers.” with mean value of 3.2. The above two statements result implies that the company offers closer and long-term working relationship to suppliers who can supply products and services that can fulfill the required quality specifications.

Regarding “The company works with supplier who adopt quality management program.” 35.3% of respondents dis agree, 41.2% shears respondents who agree and stay indifferent in equal ratio. The participant’s agreement confirms with mean value of 2.9 which is insignificant. “Suppliers supply good

products and services in a time manner.” 38% of respondents disagree, 23.7% inclined to in different, 20.6% agree. Their response agreement confirms with mean value of 3.2.

On the other end 67.7% and 11.8% of respondents inclined to disagree and strongly disagree on the statement “Provision of awards or incentives to suppliers for excellent performance” with a mean score of 2.2. While 61.8% and 11.8% of response were responded to strongly disagree and disagree for the item statement, “The company regularly awards or incentives to suppliers for excellent performance”. Participant responses confirm their disagreement with mean value 1.7.

Supplier quality management is an important aspect of TQM since materials and purchased parts are often a major source of quality problems elimination of inspection of supplied parts and materials. Effective supplier management Leads to, improved productivity, increased stock turns and lower inventory carrying cost and reduced costs per piece, exchanges of ideas, expertise and technology between customer and supplier. The results are also in agreement with the findings of (Mariam, 2021) and (Netsanet, 2019) that revealed supplier management were the critical parameter in implementing TQM.

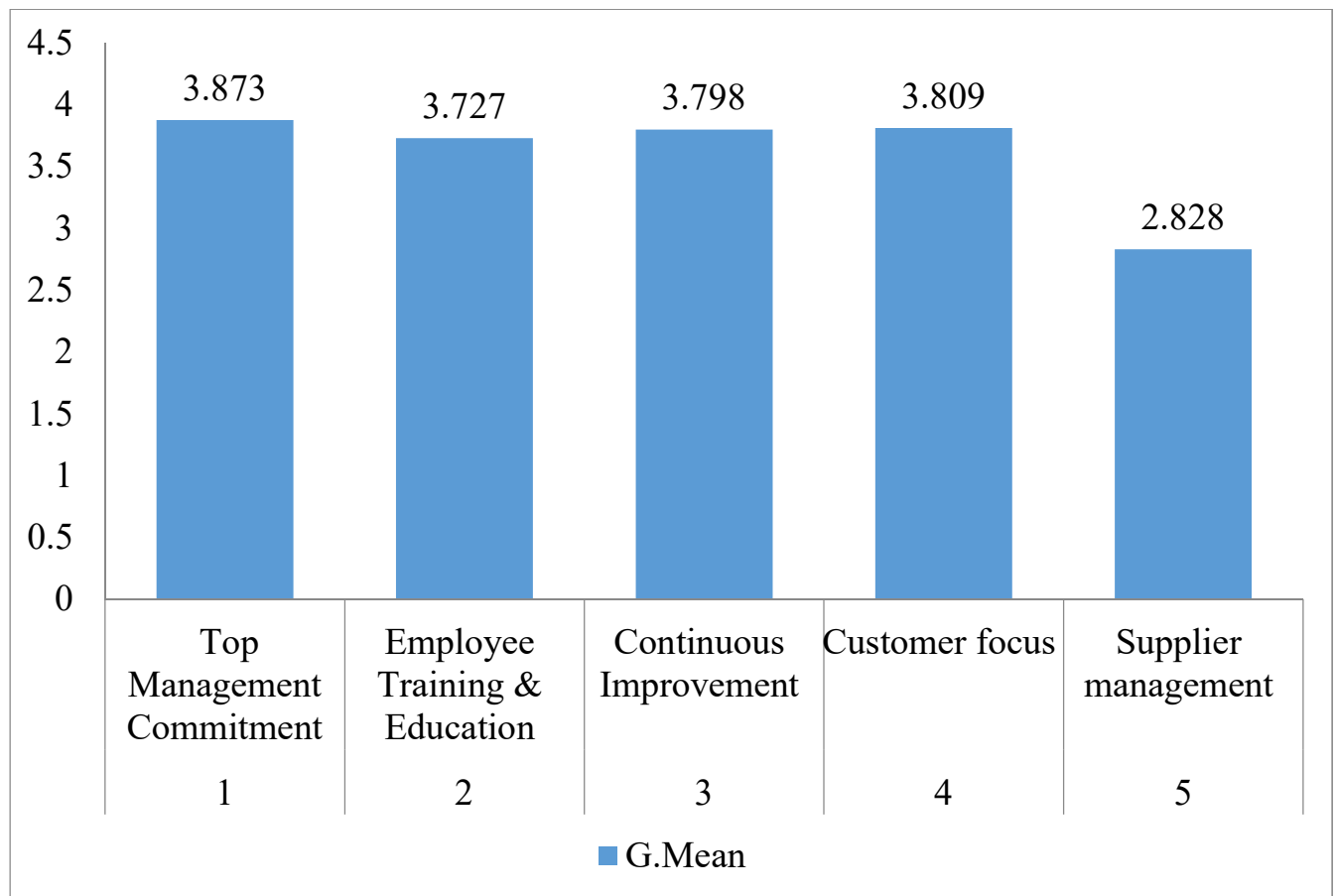
#### 4.5 Ranking of CSFs in implementing TQM in the case of Berhan Engineering

Even though, all CSFs be in the implementation of TQM including top management commitment, employee training and education, continues improvement of product and service, customer focus and supplier management have been observed. This does not necessarily mean that all have equal level of severity in to the implementation of TQM. The result of the mean value in the following table clearly compares the difference of all the CSFs.

**Table 12 Ranks of CSFs in implementing TQM**

No	CSF in implementing TQM	G.Mean	Rank
1	Top Management Commitment	3.873	1
2	Employee Training & Education	3.727	4
3	Continuous Improvement of product and services.	3.798	3
4	Customer focus	3.809	2
5	Supplier management	2.828	5

Source computed for the research



**Figure 4 CSFs in Implementing TQM in the case of Berhan Engineering.**

From the above lists of CSFs in implementing TQM, Supplier management and employee training and education with a mean value of 2.828 and 3.727 respectively were critical problem in implementing TQM. On the other hand top management commitment, continuous improvement and customer focus having a mean value of 3.873, 3.798 and 3.809 respectively are practically sever than the others.

Generally practices related to supplier management like:- selection and long term working relationship with suppliers, Evaluation of performance of a supplier and give regular feedback to suppliers in order to accomplish its goals, organizing the purchasing department to take responsibility for the quality of incoming products and regularly recognizing incentives to suppliers for excellent performance are more influential and critical issues needs to be solved by the company. And also related to employee training and education: - frequently of teaming on quality management system, contents of training like developing team spirit, training on new technology or equipment, methods, systems or procedures, in problem

identification and problem-solving skill and allocating adequate resources for employee training and education are the second more influential and critical issues needs to be corrected.

#### **4.6. Analyses of Data Gathered from Interview**

The respondents of the interview questions were supervisors, top management representatives, production plan and control, customer care, medium management personnel's.

As top management representative explains before getting the ISO 9001.2015 QMS certificate a lot of activities have been done such as preparing guidelines, working procedures and formats, developing quality policy, communication manuals between different function identifying customer needs and categorizing them, new functional structure is developed and strategic plans. After that all employee takes training on the concepts of QMS. After all the company gets this certificate from the DQS which is a German company working on QMS certification.

Most of the participants agree there is lack of adequate training systems in the company. When new employee joins the company, training on QMS has been provided before they start work. In addition to that one of the employees takes QM training at ESA.

The response of interviewee about Benefits Company gets from implementing QMS tells that: - the company achieves improvement in productivity and efficiency, reduction in cost and waste, strength cooperation and team work between employee, builds good customer relations and increase customer satisfaction, Internal communication between departments and personnel's increase.

As the other interviewee describes during the implementation of QMS the company faces challenges. among different challenges the main challenges were lack of employee's commitment and willingness for quality service, lack of effective supervision, suppliers were not willing to delivered recommended raw materials and products, lack financial resources, Insufficient knowledge about QMS, lack of QMS training, lack of proper equipment and tool available for use, and lack of a quality assurance team and documentations problem.

All interviewee describes currently Berhan Engineering is the only ISO 9001.2015 QMS certified company in the ME service sector. The company strives to meet the customer needs and achieve its

mission. Customers are satisfied with this and different companies from Insurances sector, Construction sector, manufacturing sector Import and Export sector are working with Berhan Engineering.

Regarding the main barriers facing the company to start implementing TQM practice, respondents explain different challenges both from external and internal. From External challenges such as current economical failure of the country, customers understanding and commitment for quality of products and services, the market supply chain is not easily traceable and shortages of identified and recommended raw material suppliers. On the other end internal challenges includes, the company has no marketing department, Consistency of employee performance improvement is limited, Reworks, the available machines are out dated and their capability are limited.

## CHAPTER FIVE

### SUMMARY OF FINDING, CONCLUSION AND RECOMMENDATION

#### 5.1 INTRODUCTION

The purposes of this study were to assess CSFs in implementing TQM in Mechanical Engineering service providing company, the case of Berhan Engineering. The study involves five chapters including the introduction, literature review, research methodology, the data analysis, the summary of findings, conclusion & recommendation parts. To conduct this research, descriptive type of research designed with quantitative and qualitative research approach has been adopted. 43 samples were distributed via Comprehensive sampling technique; where 34 questionnaires have been properly filed and collected.

The questionnaires were adopted from (Jiju Antony, Kevin Lueng, Greame Knowles, Sid Gosh, 2002), (Netsanet, 2019), (Badri, M. A., Davis, D., & Donald, D. ,1995), (Mariam, 2021), and (Gloria.Ma, Talavera.V and Gadjah Mada., 2004) to the proposed CSFs such as employee training and education, continuous improvement of products and services, top management commitment, supplier management and customer focus. Finally, the data has been analyzed using tables and graphs which are constructed using Microsoft excel. The reliability of the items has been done by using Chronbach's  $\alpha$  coefficient and got 0.93 which is acceptable to make further analysis.

#### 5.2 Summary of findings

Demographic characteristics of the respondent shown in the data analysis indicates that most of them have an adequate education level and work experiences in their assigned position to practice and implement TQM in the Company.

##### 5.2.1 Top management commitment

The major finding for Top Management Commitment revealed that, Top management creates, communicate and sustain the vision, mission, goals and policy concerning quality management Program and encourages employees to participate in quality related concepts and skills. In addition, the Top management allocates adequate resources (finance, time, equipment, and people) required for quality improvement activities and in reviewing and evaluating the performance of QMS functioning. This implies that top management must be on the front line of the quality management process starting from the

initial stages by allocating adequate resources required for quality improvement activities, and a good quality management structure to ensure successful implementation of TQM.

### **5.2.2 Employee training and education**

Implementing TQM brings new challenges for the employees. To understand those new challenges training and education becomes an inseparable part of implementing TQM. The research finding shows that Employees in the company are trained on quality management system. Training is given for developing team spirit, on new technology or equipment, methods and systems, in problem identification and problem-solving skill but they were not frequently trained and that the trainings were not timely. Generally the finding shows that training for employee in each level is not adequate. This Leads the employees lacked the knowledge and skills needed to do their jobs properly.

### **5.2.3 Continuous improvement of products and services**

Concerning continues improvement, optimal efficiency and complete customer satisfaction doesn't happen in a moment. It needs continually finding ways to improve processes and adapt products and services as the needs of customer. The study result indicated that the company use standardized and documented operating procedures and manuals, Communication is open and continues in three directions: up, down and horizontal. Beside this, the company identifies service defects, finds the root cause in the diagnosis of problems and ensures such faults do not occur in the future. On the other end, regular performance evaluation of service and providing feedback to employee in their quality performance were low. Promotion and career development programmers in the company also emphasize gap in the quality management. The study further summarizes that majority of the respondents agreed that continuous improvement of goods and services is very essential in companies through establishment of sound quality policy, dedicated research team and continuous reviews on performance if it aims to gain competitive edge in a very dynamic market.

### **5.2.4 Customer focus**

The other CSF in implementing TQM is customer focus. Customers determine the quality of product and service. If the product and service fulfills a need and lasts as long as or longer than expected, customers know that they have spent their money on a quality product. As result of finding indicates, the company provides excellent service by determining and incorporating customer needs. In addition to this complaints

process and guidelines are established; complaints are properly recorded, addressed in timely manner and recorded for future reference. But Different means of communication platforms (email, phone, website, and social media) are not available for customers to contact the company easily and effectively. Strategies and approaches are not sufficiently reviewed and forecasted continuously for further improvement. Customer satisfaction is measured and recorded but not in a regular basis.

### **5.2.5 Supplier management**

Supplier management is the major CSF revealed from the research finding. The company tries to select Suppliers based on their quality specifications instead of price. But suppliers who adopt quality management program are not available; most of them didn't supply products and services in a time manner. The other gap is the purchasing department leaves the responsibility for the quality of incoming products to the suppliers. The company also didn't develop culture of performance Evaluation, giving regular feedback and awards or incentives to suppliers for excellent performance.

Generally, Descriptive analysis of every CSFs has shown that the average mean value of top management commitment 3.873, employee training and education 3.727, continuous improvement of product and service 3.798, customer focus 3.809 and supplier management 2.828. From the research finding the minimum average mean was 2.828 which is supplier management and the maximum was 3.873 which is Top management commitment.

### **5.3 Conclusion**

Since the aim of this study is to assess the critical success factors in TQM implementation. Data from questioner and interview were used to identify these factors. The study concludes that top management commitment, employee training and education, continuous improvement of goods and services, customer focus and supplier management were all critical since they have a positive influence in the implementation of TQM. Implementation of TQM becomes successful when top management is in the front line right from the initial stages to provide direction. The finding shows that training for employee in each level is adequate. Training and education are primary levels for change, and they have e significant influence on the change process. Training should focus on building quality skills with equal attention paid to behavioral skills and quality tools needed for change in performance improvement. Continual improvement of the companies' overall performance should be a permanent objective of the company, and it is a never ending



journey, it has to be done on daily basis. The other CSF in implementation of TQM is supplier management; the study result indicated that, company had short term relationship with supplies because of inadequate and lack of equipment and material quality. Due to this the company did not properly get basic equipment and raw material on time. Beside of this, the company was suffered to get quality equipment and material with constant cost. Finally company must come up with customer focus that must be integrated with other dimensions of culture if it has to succeed in TQM implementation. For successful implementation, the company must encourage supplier management, training and education and continuous improvement of product and service.

#### **5.4 Recommendation**

From the conclusions of the research findings, the researcher strongly recommends the following:

- ✚ This study further recommends to the top management to commit themselves in providing leadership and key resources needed in quality management, Since the technology in the sector is very dynamic and customer needs are frequently changing Top management has to review and evaluates the performance of QMS functioning.
- ✚ The study also recommends the company to put a lot of emphasis in training employees on quality management cultures. The study recommends that the trainings should be relevant, timely and be conducted frequently at all levels in the company.
- ✚ The company has to establish marketing department to overcome the issues regarding supplier management. Suppliers were unwilling or unable to deliver quality products at the expected time. As a result, the company is challenged to meet the needs of its customers with superior goods and services. The company needs to work with them to create a win-win strategy for enhancing quality.
- ✚ The company has to communicate with customers to understand what were customer needs or expectation, measure satisfaction, and uses the results to find ways to improve processes.
- ✚ The study also recommends that managers and management to develop appropriate, effective and flexible communication systems that allow customers easily access the company.

### **5.5 Suggestions for further researchers**

This study assessed the CSFs in implementing TQM in Mechanical Engineering service providing companies and has identified top management commitment, employee training and education, continuous improvement of goods and services, customer focus and supplier management as CSFs in implementation of TQM. However, it could not be complete by itself and further investigations need to be made for better understanding of the sector. This study suggests further studies be done to explore other CSFs like communication, team work and quality culture and how they will influence implementation of TQM.

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## APPENDIX A

**ST. Marry University**  
**School of Graduate Studies**  
**Institution of Quality and Productivity Management**

Assessing critical success factors in implementing total quality management in Mechanical Engineering service providing organization: the case of Berhan engineering.

### QUESTIONNAIRE DISTRIBUTED TO EMPLOYEE

Dear Sir/Madam,


I am conducting research to examine the Critical success factors in implementing Total quality management at Berhan Engineering. The objective of my research is to identify and interpret the CSFs in implementing TQM that can help Mechanical Engineering service organization to achieve business excellence in the case of Berhan engineering Addis Abeba, Ethiopia. The research is conducted as part of my thesis in partial fulfilment for the requirement of a Master's degree program in quality and productivity management. Please take a moment to completely fill out the questionnaire to the best of your ability and return it to me within 3 days of receiving the questionnaire.

***Confidentiality: I confidently assure you that the information you provide in this survey will remain confidential and anonymous. The information you provide will only be used for academic purposes and reported in aggregated form.***

If you have any questions or concerns, please do not hesitate to directly contact me on my cell phone or email. I thank you in advance for your time in participating in the research.

Sincerely yours,

- Shewamene Bejital
- Cell phone: 0932403136
- E-mail: [shewamene11@gmail.com](mailto:shewamene11@gmail.com)
- Advisor: Dr. Melaku Girma

 *No need to write your name, please answer all the question.*

 *Please put a tick mark “√” on the space provided.*

## SECTION I: GENERAL INFORMATION

**Instruction:** Please indicate your answer by making a “√” mark or writing where it is necessary in space provided.

### 1. Gender

Male

Female

### 2. Age of respondent

20 to 30 years

31 to 40 years

Above 40 years

### 3. Education status

High School

Diploma

Bachelor’s degree

Master’s degree and above

### 4. Experience in year

Less than 5 years

5 Years to 9 years

10 Years to 15 years

Above 16 years

### 5. Position held

Support staff

Supervisor

Medium management

Top management

**SECTION II: CRITICAL SUCSESS FACTORS IN IMPLIMENTING TOTAL QUALITY MANAGEMENT**

**Instruction:** Kindly confirm your level of agreement by putting a Tick (√) in Space provided with the following attributes on CSFs of TQM implementation such as Top Management Commitment, training and education, Supplier management, continuous improvement and Customer focus at Berhan Engineering.

**PART 1: TOP MANAGEMENT COMMITMENT**

Kindly fill in the blank spaces or tick (√) appropriately the following questions and statements related to top management commitment. Using the key (Where: 1-Strongly disagree; 2- Disagree; 3-Indifferent; 4-Agree; 5-Strongly agree, please rate according to the extent to which you agree or disagree with the statements.

No	Statements on Top management commitment	Rating				
		1	2	3	4	5
1	Top management create, communicate and sustain clear vision, mission, goals and policy concerning quality management Program.					
2	Top management involves in implementation, improvement process and in handling quality problems as a way to increase profit.					
3	Top management in your company allocates adequate resources (finance, time, equipment, and people) required for quality improvement activities.					
4	Top management review and evaluates the performance of QMS functioning					
5	Top management encourages employees to participate in quality related concepts and skills.					
6	Top management is strongly committed to improving product quality to meet customers' expectations.					

**PART II: EMPLOYEES TRAINING AND EDUCATION**

Kindly fill in the blank spaces or tick appropriately the following questions and statements related to employees training. Using the key (Where: 1-Strongly disagree; 2-Disagree; 3- Indifferent; 4-Agree; 5 Strongly agree, please rate according to the extent to which you agree or disagree with the statements.

Statement on Training and Education		Rating				
		1	2	3	4	5
1	Employees in the company are trained on quality management system.					
2	Training is given for developing team spirit.					
3	Training is given on new technology or equipment, methods, systems or procedures.					
4	Training is given for specific work skill (technical and vocational given to employee throughout the company).					
5	Training is given in problem identification and problem-solving skill.					
6	Training courses is given for employees in quality improvement skill and technique.					
7	Training was adequate to work on quality improvement.					

**PART III: CONTINUOUS IMPROVEMENT OF PRODUCTS AND SERVICES**

Kindly fill in the blank spaces or tick appropriately the following questions and statements related to continuous improvement of products and services. Using the key (Where: 1- Strongly disagree; 2 Disagree; 3-Indifferent; 4-Agree; 5-Strongly agree. Please rate according to the extent to which you agree or disagree with the statements.

Statement on Continuous improvement		Rating				
		1	2	3	4	5
1	The company identifies area for quality improvement and implement them frequently.					
2	The company use standardized and documented operating procedures and manuals.					
3	Promotion and career development programmers emphasize quality					

	management in the company.					
4	Communication is open and continues in three directions: up, down and horizontal.					
5	The company concentrates on ongoing development of personnel by establishing extensive training and education programs.					
6	The company conducts performance review for its services regularly and provides feedback to employee in their quality performance.					
7	The company identifies service defects, find the root cause in the diagnosis of problems and ensures such faults do not occur in the future.					

**PART IV CUSTOMER FOCUS**

Kindly fill in the blank spaces or tick appropriately the following questions and statements related to customer focus. Using the key (Where: 1- Strongly disagree; 2 Disagree; 3-Indifferent; 4-Agree; 5- Strongly agree. Please rate according to the extent to which you agree or disagree with the statements.

Statement on Customer Focus		Rating				
		1	2	3	4	5
1	The company provides excellent service by determining and incorporating customer needs.					
2	Customer satisfaction is measured and recorded in a regular basis.					
3	Different means of communication platforms (email, phone, website, social media) are available for customers to contact the company easily and effectively.					
4	Customer give feedback on quality and service delivery of the company.					
5	A complaints process and guidelines are established; complaints are properly recorded, addressed in timely manner and recorded for future reference					
6	Customer forecast strategies and approaches are continuously reviewed for further improvement.					

**PART V SUPPLIER MANAGEMENT**

Kindly fill in the blank spaces or tick appropriately the following questions and statements related to supplier management. Using the key (Where: 1- Strongly disagree; 2 Disagree; 3-Indifferent; 4-Agree; 5- Strongly agree. Please rate according to the extent to which you agree or disagree with the statements.

Statement on supplier management		Rating				
		1	2	3	4	5
1	Suppliers are selected based on their quality specifications instead of price.					
2	The company offers closer and long-term working relationship to suppliers.					
3	The company works with supplier who adopt quality management program.					
4	Suppliers supply good products and services in a time manner.					
5	The company’s purchasing department assumes responsibility for the quality of incoming products.					
6	The company Evaluate performance of a supplier and give regular feedback to suppliers in order to accomplish its goals.					
7	The company regularly awards or incentives to suppliers for excellent performance					

**Thank you for your cooperation!!**

## APPENDIX B

### INTERVIEWS QUESTIONS

1. How the companies implement quality management system in your company?

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2. Does your company provide training on Quality management continuously? What types of training are delivered?

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3. What are the major challenges faced and benefits achieved by your Company in practicing quality management system?

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4. How is the company's performance with respect to closest (or major) competitor?

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5. What are the main barriers facing your company that wishes to start implementing TQM practice?

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**Thank you for your cooperation!!**