Arab American University
Faculty of Graduate Studies

Using Analytic Hierarchy Process in Identification of Total Quality Management Implementation Critical Success Factors in Automotive Spare Parts Suppliers Performance in Palestine

By
Alaa Jawdat Tomeh

Supervisor
Dr. Yahya Saleh

This thesis was submitted in partial fulfillment of the requirements for the Master's Degree in Quality Management

June / 2023

I

Thesis Approval

Using Analytic Hierarchy Process in Identification of Total Quality Management Implementation Critical Success Factors in Automotive Spare Parts Suppliers Performance in Palestine

By

Alaa Tomeh

This thesis was defended successfully on 15/07/2023 and approved by:

Committee Member	Signature
1. Dr. Yahya Saleh /Supervisor	
2. Dr. Ashraf Almimi /Internal Examiner	
3. Dr. Ahmad Zaid /External Examiner	

Declaration

I am the undersigned who submitted the thesis entitled

Using Analytic Hierarchy Process in Identification of Total Quality Management Implementation Critical Success Factors in Automotive Spare Parts Suppliers Performance in Palestine

I declare that the work that has been composed in this thesis, in whole or in part, is the my own work and has not been submitted by others elsewhere for any other degree or qualification, except where states by reference or acknowledgment.

Students name: Alaa Jawdat Khader Tomeh

Signature: 

Date: 31/10/2023

Student ID: 202012142

Dedication

I dedicate this achievement to my beloved wife, Tahreer for her encouragement, and endless support, and to roses of my life; my daughters Lamees, Karmel and Kenda.

Acknowledgment

I address my gratitude to God Almighty for his incredible generosity and grace and for giving me the strength, health, and knowledge to finish my studies.

Special thanks and appreciation to Dr. Yahya Saleh for agreeing to be my supervisor and giving me his time and knowledge. His valuable comments guided me throughout my work on the thesis, which have made outstanding contributions in finalizing my study.

I extend my thanks to the examination committee for their efforts in reviewing the thesis and suggesting modifications to improve it.

My sincerest appreciation is to the Faculty of Graduate Studies and the Quality Management Master Program's staff in the Arab American University-Palestine (AAUP).

Finally, I would like to express my warm thanks and gratitude to my family members for their unconditional patience and love.

Abstract

The automotive industry has remarkable position in Palestinian economy; therefore, the automotive spare parts organizations seek for continuous improvement methods to increase their market share and achieve customer satisfaction. Total Quality Management (TQM) is considered to be one of the proved methods that achieve the organization's goals, the benefits of implementing the TQM practices in the auto spare parts organizations and the TQM success factors are well published in the literature review. However, rarely empirical studies are known about implementing the TQM critical success factors in the Palestinian automotive spare parts companies. This study assesses the implementation TQM practices in Palestinian automotive spare parts and their impact on their suppliers' performance to achieve this objective, relevant data on TQM critical success factors have been collected from a sample of 33 local automotive spare parts companies. The Analytic Hierarchy Process (AHP) method has been applied to categorize the TQM success factors that defined by literature and TQM experts. Expert Choice software was used to analyze the collected data. Depending on the analysis performed, the study represented several essential results which are, Internal environment, top management involvement, process management, supplier relationship management, and external environment, are factors that assigned to be critical for implementing the TQM approach, nine factors prioritized as important and five other factors are categorized as minor importance factors. According to the findings, conceptual framework for the TQM success factors was developed, moreover, challenges that face the automotive spare parts organizations in Palestine were defined, such as limited resources of TQM practices, political and economic instability. Several recommendations have been reached, includes the encouragement of automotive spare parts suppliers to pay more attention to their

internal and external environment, appointing TQM consultant, and conducting more trainings of TQM practices and success factors and their impact on the suppliers' performance. Finally, the study clarified the limitations of research work like, the limited awareness of TQM approach by respondents, and the data collected from the spare parts suppliers' manager's opinions, where it can be more efficient to collect more data form other stakeholders like suppliers, manufacturers and end customers.

Keywords: AHP, TQM, Palestinian Spare Parts Supplier, TQM Critical Success Factors, TQM implementation.

Table of Contents

List of Tables

List of Figures

List of Abbreviations

AHP	Analytic Hierarchy Process
AI	Artificial Intelligence
BEMs	Business Excellence Models
BM	Benchmarking
CI	Continuous Improvement
CM	Communications
CQ	Cost of Quality
CS	Customer Satisfaction
CSFs	Critical Success Factors
EE	Employee Empowerment
EF	External Factors
EQA	European Quality Award
EFQM	European Foundation of Quality Management
ES	Employee Satisfaction
ET	Employee Training
$\mathbf{f^2}$	Effect Size
HRM	Human Resources Management
I4.0	Industry 4.0
IF	Internal Factors
MBNQA	Malcolm Baldrige National Quality Award
NT	Using New Technology
OEM	Original Equipment Manufacturer
PCBS	Palestinian Central Bureau of Statistics
PLS-SEM	Partial Least Square Structural Equation Modeling
PM	Process Management
PSI	Palestinian Standards Institution
$\boldsymbol{Q^2}$	Blindfolding and Predictive Relevance
QP	Quality Policy
$\boldsymbol{R^2}$	Coefficient of Determination
SA	Self- Assessment
SM	Supplier Management
SP	Strategic Planning
SPSS	Statistical Package of the Social Science
TM	Top Management Involvement
TQC	Total Quality Control
TQIMS	Total Quality Information Management System
TQM	Total Quality Management
TW	Teamwork
VIF	Variance Inflation Rate
VR	Virtual Reality
ZD	Zero-Defect Process

Chapter One

Introduction

1.1 Overview

The first section of this chapter represents the background of the research; the following sections address the problem statement, aim and objectives, the significance of the study and the research questions and proposed hypotheses to be revealed. The thesis structure is presented in the final section.

1.2 Background

Automotive spare parts business in Palestine encounters different challenges in the business environment. Management of the spare parts businesses strive to overcome these challenges and stay in market using many management approaches; one of the most effective and active approaches is Total Quality Management (TQM). TQM is a management philosophy and organizational culture that an organization will adopt for continuous improvement in order to produce or deliver the high-quality products or services to increase profit and reduce cost (Kanji and Wallace, 2000). By successful implementing of the TQM approach, organizations can achieve the customer satisfaction and employee satisfaction. There are many Critical Success Factors (CSFs) that have positive impact on the implementation of TQM. These CSFs are practices that have been well researched and defined by many TQM experts and Business Excellence Models (BEMs). More specifically, the following are some of CSFs in TQM: Top Management Involvement, Customer Satisfaction, Strategic Planning, Quality Culture, Employee Satisfaction and Empowerment, Communications, Process Management, Benchmarking, Supplier relationship Management, Continuous Improvement, and Training (Saraph et

al., 1989; Zairi, 1994; Yousef and Zairi, 1995; Baidoun, 2003; Najeh and Kara-Zaitri, 2007; Awan et al., 2009; Herzallah et al., 2014; Sabella et al., 2014; Kumar and Sharma, 2017; Sayyad, 2017; Oschman,2017). Automotive spare parts organizations need to identify and prioritize the CSFs that have the greatest positive impact on implementing the TQM within their organizational environment to optimize the competitiveness, and increase their market share and achieve customer satisfaction. Few studies reported the implementation of the TQM in the automotive spare parts organizations in Palestine. This study aims at assessing the current status of adopting TQM approach in automotive spare parts organization and identifying the TQM critical success factors and eventually prioritizing them according to their weight of contribution to the TQM implementation.

1.3 Problem Statement

Customer needs and expectations drive the organizations to seek for continuous improvements of their products, services and operation processes (Al-Awlaqi and Alkibsi, 2017). One of the most important and effective methodology that has been applied in many organizations around the globe is Total Quality Management (TQM), which approves, when successfully implemented in both service and manufacturing sectors, to have a strong influence on active improvements in effectiveness, efficiency and customer satisfaction, and positively influence the total organization performance (Kruger, 2001). Palestinian Spare parts suppliers strive to find proper management solutions for the challenges arising from logistic problems, in addition to the problems from the Israeli occupation restrictions and regulations which leads to the long lead time and paying extra costs to deliver the spare parts to the end customers with proper prices and time (Saleh, 2015). Automotive sector has an important impact on Palestinian economy as there are

more than 410,000 licensed vehicles in Palestine (Palestinian Ministry of Transportation, 2021), which makes the need for after-sales servicing to become more important and potential to many Palestinian organizations who work in automotive sector in Palestine. The spare parts are essential to make services for these vehicles during their life cycle of operation, both preventive and corrective maintenance are in need of the spare parts (Sun et al., 2022). The spare parts suppliers in Palestine are going through major changes globally, including new technology in vehicles, demand forecasting, spare parts inventory, and changing in customer culture (Saleh, 2015).

Although there are many studies in TQM success factors and their relationship to performance of auto spare parts organizations are found in developed countries. These studies are found to be very few in the developing countries. Specifically, in Palestine, few studies of TQM success factors and spare parts performance are known. Hence, this study was conducted to bridge this research gap and enhance the automotive spare parts suppliers to overcome the challenges they examine through assessing the TQM implementation CSFs and examine their impact on their suppliers' performance. More specifically, defining, analyzing and classifying those CSFs that mostly influence the performance of auto spare parts suppliers in Palestine were performed.

1.4 The Objectives of the Study

The overall objective in this study is to identify and prioritize the TQM success factors that is mostly affect the suppliers' performance of the auto spare parts organizations in Palestine. Moreover, to develop a framework of TQM that can be applied in the automotive spare parts organizations in Palestine. To reach this goal, the following objectives have been developed:

- To assess the current state of TQM implementation and suppliers' performance of automotive spare parts in Palestine.
- Using Analytic Hierarchy Process (AHP) approach, to identify the critical success factors of TQM implementation in automotive spare parts suppliers' performance in Palestine.
- To develop a conceptual framework that includes the critical success factors of TQM implementation and performance of automotive spare parts suppliers' performance in Palestine.

1.5 Significance of the Research

Based on the statement of problem for this study, it was realized that there is a need to study and asses the performance of the automotive spare parts supplier's organizations in Palestinian market with regards TQM. This research sheds the light on performance of the automotive spare parts suppliers' organizations who supply the Palestinian market with all the needed parts which are essential to perform the required after-sales services for the vehicles. Therefore, this research defines and analyzes the TQM success factors and classify them to three main categories, critical success factors, important success factors and minor importance success factors by applying AHP method. Research questionnaire is conducted as a tool to collect the data from the auto spare parts organization's managers or spare parts department managers. The analysis of collected data and conclusions are provided as prioritizing the TQM success factors, and a framework of TQM critical success factors to the Palestinian spare parts suppliers along with practical suggestions of implementing the TQM success factors that influence the

future growth for auto spare parts organizations and win the customer satisfaction and increase their effectiveness and efficiency.

1.6 Research Questions

This research will aim to answer the following questions:

- What is the current state of TQM implementation and performance of automotive spare suppliers in Palestine?
- What are the critical success factors of TQM that can be implemented in automotive spare parts suppliers in Palestine as generated by the AHP approach?
- What is an appropriate conceptual framework that includes the critical success factors? of TQM implementation and performance of automotive spare parts suppliers in Palestine?

1.7 Research Hypotheses

A set of the following hypotheses are tested in this research to identifying and prioritizing TQM critical success factors at the auto spare parts organizations in Palestine. Namely, we have the following hypotheses:

- There are no critical TQM success factors that can impact the automotive spare parts suppliers' performance in Palestine.
- There are no significant differences between the automotive spare parts suppliers' performance in Palestine with respect to their demographic profiles.
- There are no significant differences between the identified TQM critical success factors in terms of their impact on the automotive spare parts suppliers' performance in Palestine.

1.8 Thesis Structure

This research includes six chapters, chapter two reviews the existing literature review and its related concepts, it consists of Analytic Hierarchy Process (AHP) definition and applications, TQM history and definition, contribution of quality gurus to TQM, Business Excellence Models (BEMs), the TQM success factors, and ends with automotive spare parts business reviews. Chapter three represents the methodology used in conducting the study, including how the research was designed, sampling procedures, data collection methods, and techniques of data analysis used, and ends with a brief illustration of the computer softwares used in the analysis of data collected namely SPSS, Smart- PLS and Expert Choice Software package which was used to prioritize the TQM success factors. Chapter four summarizes the results of the data analysis, where the first section consists of the demographic profile of respondents and automotive spare parts companies, the main constructs of the study. Then, the second section contains the (PLS-SEM) analysis, then the AHP success factors comparison analyses were performed, it ends with calculating the weights and ranking of TQM success factors. The fifth chapter discusses the results of analyzed data and shows the conceptual framework of TQM success factors, and ends with answering the research questions and the hypotheses testing results. The final chapter provides the conclusions and recommendations of this study and finally addresses the limitations in which the possible future works may represent.

Chapter Two

Literature Review

2.1 Background

This chapter outlines the previous studies. The first section defines the TQM approach, its history, and contributions of quality gurus. The third section describes the most popular quality business excellence models. In the fourth section the TQM implementations success factors have been defined. The fifth section describes the automotive spare parts business and the automotive spare parts industry in Palestine. Then, the AHP approach, the concept, its benefits and applications were defined. While the last section represents the previous studies and the measurement development and factors analysis.

2.2 Total Quality Management (TQM)

2.2.1 History and Definition

Quality is the most effective driver in recent competitive environments in the business. Although there are many definitions for quality, but in the final, the definition of the quality is in the mind of the customer (Arumugan et al, 2011). Organizations which need to stay in the rapidly changing marketplace are encouraged to adopt the TQM as an approach to achieve customer satisfaction, maintain profitability and increase its market share. Over the last decades, TQM has been significantly described as a competitive tool by applying it as a management approach to managing people process and products (Ahire, and O'Shaughnessy,1998). The concept of quality and quality management has evolved over the past century to include a group of concepts and modern technologies that raise the performance of the organization in general, enhance competitiveness and increase profits in all types of businesses. There have been many remarkable development

steps toward the concept of quality management during the previous years from observation level to the machines and products to the managing all departments in business environment. Weckenmann et al., (2014) define the developing steps of quality management by the following steps:

- **Quality Inspection***:* Focusing on products quality and detects that deficient product.
- **Quality Control**: Focusing on process quality and eliminate causes and faults.
- **Quality Assurance**: System-oriented, ensure preventive quality of material and non-material products.
- **Quality Management***:* Standardizations, quality certificates, and documentation, ensuring preventive quality of the processes.
- **Total Quality Management***:* commitment of all employees, ensuring the quality of whole organization and its results.

The concept of TQM was developed in the 1980s thanks to experts from all over the world who contributed to the development of this concept such as Deming who proposed a 14-point plan to be applied to organizations in order to improve quality, Juran who developed the quality trilogy. Feigenbaum who first created the term Total Quality Control (TQC) and Crosby who known by his 'zero defects' philosophy based on 'doing things right the first time'. In addition, in recent years, some new business models and frameworks that intended to be defined as a tool for organizations to readdress their activities towards TQM have been created. The ISO 9001, and ISO 9004:2018 is the best-known standards, The Deming Prize, Malcolm Baldrige National Quality Award in the USA and the European Foundation for Quality Management (EFQM) Excellence Award are the most well-known international awards (Calvo-Mora et al., 2016; Gomez et al., 2017; Escrig et al., 2019; Asif, 2020; Nenandal, 2020).

TQM is defined as a management philosophy and wide culture that the organization will adopt for continuous improvement in order to produce or deliver high-quality products or services to increase customer satisfaction and profit and reduce cost (Kanji and Wallace, 2000). TQM is considered to be a holistic approach and competitive advantage tool that may depend on special managerial characteristics and can be unique in implementation process at any organization. TQM is an integrative management philosophy aiming to achieve customer satisfaction by continuous improving of products, tools, operations and employees within the organization (Abdul Raouf, et al., 2009). TQM is described as a comprehensive methodology that would be adopted by senior management in the organization at all levels of organization to improving the performance and gaining high customer satisfaction (Oakland, 2014). TQM is a management philosophy that influence the entire organization and empower the employees to participate in continuous organizational improvement (Alauddin, 2019). The early methodology of TQM has obtained through the principles and tools that have been determined and defined by many quality experts which providing a solid foundation for the TQM framework and have been implemented by many organizations to improve quality, increase employee participation, customer satisfaction, employee satisfaction, and increase productivity and profitability at any level of organization (Yang, 2014). TQM represents a whole system to follow customer satisfaction, and has created a huge number of advantages in many sectors such as manufacturing, service, government, and education in many countries around the world. TQM is a long-term commitment from all employees in all levels of organization to focus on a set of managerial practices that assure the consistency of meeting and exceeding the customer requirements (Talib, et al., 2011). Thus, the need for commitment of top management and all employees in an organization to high quality performance

leads to the approach of TQM along with recognizing the relationships between leadership, employee, processes, customer satisfaction and profitability (Weckenmann et al., 2014). To effectively implement TQM in any organization, literature classified TQM practices into two categories soft and hard practices. More specifically, soft TQM practices are related to people aspects and associated with top management strategy and may include leadership, customer focus, employee relations and suppliers' relations. On the other hand, hard TQM practices refer to quality tools and technologies and may contain quality measurement systems, inventory systems and process management. There is a significant and positive relationship between soft and hard TQM practices (Herzallah et al, 2014). TQM contains number of components that can be divided into hard management requirements, namely, planning, performance, processes, and people; while soft outcomes include culture, communications, and commitment (Oakland, 2014).

2.3 Contribution of Quality Gurus to TQM

Historically, there are four major pioneers in the quality management movement namely: Edward Deming, Joseph Juran, Philip Cosby and Kaoru Ishikawa who their contribution in the quality management is still applied as an improvement approach by many mangers and organizations around the world. In addition to other experts who introduced an important contribution to the quality management revolution includes Armand Feigenbaum, Bill Conway, Genichi Taguchi, Shingeo Shingo, and Ouchi (Zairi, 2013).

2.3.1 Deming's Contribution to TQM approach

Deming's ideas had a profound impact on Japanese industry, and many Japanese companies credit him with their success in quality and productivity. His ideas also had a

significant influence on the development of TQM worldwide. Deming's participation in quality management helped to shift the focus from inspection and quality control to a broader approach that emphasized continuous improvement and the involvement of all employees in the process. The focus must be on improving the quality of the products or services by eliminating uncertainty and variability in the all processes.

Some of Deming's key thoughts on TQM include (Alauddin, Yamad, 2019):

1. Focus on the customer: Deming believed that organizations should focus on understanding and meeting the needs of their customers. This involves gathering feedback from customers and using it to improve products and services.
2. Continuous improvement: Deming stressed the importance of continuous improvement in all areas of an organization. This requires a commitment to ongoing training and education, as well as a willingness to constantly reevaluate and improve processes.
3. Employee empowerment: Deming believed that employees should be empowered to make decisions and contribute to the improvement of the organization. This involves providing training and support, as well as creating a culture of trust and collaboration.
4. Leadership: Deming emphasized the importance of leadership in creating a culture of continuous improvement. Leaders should set a clear vision and provide direction, while also listening to feedback and involving employees in decision-making.

Deming believed that quality should be the driving force behind any organization and that it was the responsibility of management to create an environment that supports quality improvement. He developed a set of 14 principles for management that are still widely used today, including:

1. Create constancy of purpose for improvement of product and service.

2. Adopt the new philosophy.
3. Cease dependence on inspection to achieve quality.
4. End the practice of awarding business on the basis of price tag.
5. Improve constantly and forever the system of production and service.
6. Institute training on the job.
7. Institute leadership.
8. Drive out fear.
9. Break down barriers between departments.
10. Eliminate slogans, exhortations, and targets for the workforce.
11. Eliminate numerical quotas.
12. Remove barriers that rob people of pride of workmanship.
13. Institute a vigorous program of education and self-improvement.
14. Put everybody in the company to work to accomplish the transformation.

His Plan-Do-Check-Act, (PDCA) approach is considered to be a continuous improvement tool, therefore it is applicable method for quality management (Zairi, 2013).

2.3.2 Juran's Contribution to TQM Approach

Juran worked with Japanese organizations to improve quality in the 1950s. His lectures in Japan emphasized the managerial practices like planning, organizing, and controlling, in addition he focused on the management involvement to achieve quality and the need for setting quality goals (Neyestani, 2017). He concluded that the solution for the American organizations crisis in quality depends upon developing new managerial thinking that focuses on quality and includes all levels of organization (Zairi, 2013). He

presented procedure for quality improvement through his “Quality Trilogy” (Bisgaard, 2008) which includes:

- Quality Planning: which contains establishing the quality goals, identifying all types of customers and their requirements, developing the new products specifications and processes that meet customer needs.
- Quality Control: which contains what to control, and measurement tools for control, establishing dimensions and standards, performing the performance measurements, specifying the difference in performance and taking needed actions
- Quality Improvement: which contains Identifying the needs for improvement and outlined the improvement project organizing the project guidance and discovering and analyzing the causes of defects, providing solutions for defects, and control those solutions.

He defined the quality as “Fitness for Use” which dependent on five quality factors: technological, psychological, time-oriented, promised and ethical (Zairi, 2013).

Juran recommended ten steps to quality improvement as follows:

- Identify the needed improvement
- Set improvement objectives
- Plan to achieve the objectives
- Conduct trainings
- Perform the solving problem projects
- Report improvements
- Provide recognitions
- Share improvement results
- Measure improvements

- Preserve improvements

2.3.3 Crosby's Contribution to TQM Approach

Crosby was quality management consultant who developed practical practices to define and improve quality. The Crosby approach to TQM is centered around the concept of "zero defects," which means that the goal of an organization should be to produce products and services that meet or exceed customer expectations with no defects (Kruger, 2001). The major contribution made by Crosby to quality management is indicated by his introducing new terms and thoughts in the quality like: "Zero Defect", "Do it Right First Time", "and "Conformance to requirements". He recommends four absolutes for quality management (Kruger, 2001):

- The definition of quality is conformance to requirements
- The system of quality is prevention
- The performance standard is Zero-defat
- The measurement of quality is the price of non-conformance

In addition, Crosby set out four pillars of quality (Zairi, 2013):

1- Management involvement and attitude

2- Professional quality management

3- Original system

4- Recognition

Crosby introduced the concept of the cost of quality, which includes the cost of prevention, appraisal, and failure. He believed that organizations should measure the cost of quality and work to reduce the cost of poor quality. He believed that quality is free, meaning that the cost of improving quality is less than the cost of poor quality. He

emphasized the importance of prevention and continuous improvement in reducing the cost of poor quality.

2.3.4 Ishikawa's Contribution to TQM Approach

Kaoru Ishikawa was a Japanese engineer and quality control expert who made several significant contributions to the field of TQM, including:

1. Quality control tools: Ishikawa is best known for developing a set of quality control tools, known as the Seven Basic Tools of Quality Control, which include cause-and-effect diagrams, flowcharts, Pareto charts, histograms, check sheets, scatter diagrams, and control charts (Zairi, 2013).
2. Quality circles: Ishikawa introduced the concept of quality circles, which are small groups of employees who meet regularly to identify and solve quality problems. This approach emphasizes the importance of employee involvement and empowerment in quality improvement efforts (Neyestani, 2017).
3. Total quality control: Ishikawa believed in the importance of a holistic approach to quality management, which he referred to as "total quality control." This approach emphasizes the need to involve all aspects of an organization in quality improvement efforts, including suppliers, customers, and employees (Kruger, 2001).
4. Education and training: Ishikawa emphasized the importance of education and training in quality management. He believed that employees should be trained in quality control tools and techniques, as well as in the principles of quality management.

2.3.5 Taguchi's Contribution to TQM Approach

The Taguchi approach, also known as the Taguchi method, is quality management approach developed by Japanese engineer Genichi Taguchi. The approach is centered around the concept of robust design, which refers to designing products and processes that are less sensitive to variations in the environment or the inputs used in the process. Some key features of the Taguchi guideline in quality improvement include (Zairi, 2013):

1. Quality loss function: Taguchi introduced the concept of the quality loss function, which measures the cost to society of deviations from a target value. This function helps organizations to understand the cost of poor quality and to focus on minimizing variation.
2. Robust design: The Taguchi approach emphasizes the importance of robust design, which involves designing products and processes that are less sensitive to variations in the environment or the inputs used in the process. This approach helps to improve the reliability and performance of products and processes.
3. Parameter design: The Taguchi approach uses parameter design to optimize the performance of products and processes. Parameter design involves identifying the key variables that affect the performance of the product or process and optimizing their values to improve performance.
4. Quality control: The Taguchi approach also emphasizes the importance of quality control, which involves measuring and monitoring the performance of products and processes to identify and correct problems. The approach includes both on-line and off-line quality control techniques.
5. Cross-functional teams: The Taguchi approach emphasizes the importance of cross-functional teams in quality improvement efforts. This approach encourages

collaboration among different departments and functions to identify and solve quality problems.

2.3.6 Feigenbaum’ s Contribution to TQM approach

Feigenbaum is considered one of the pioneers of TQM and made significant contributions to the development and promotion of the TQM concept. Feigenbaum's most significant contribution to TQM is his book "Total Quality Control," which he published in 1951. In this book, he introduced the concept of Total Quality Control (TQC) which focuses on setting quality standards, appraising conformance to these standards, acting when standards are not met, and planning for improvement in these standards (Neyestani, 2017). he focused on cost of quality and made a major contribution to quality management identifying quality cost and indicated that quality and cost are a sum not a difference, and partners not enemies (Zairi, 2013) Feigenbaum also emphasized the importance of customer satisfaction and the need for continuous improvement in all areas of an organization .His emphasis on the importance of involving all employees in the quality control process and the need for continuous improvement is still relevant and widely practiced in organizations worldwide.

2.4 Business Excellence Models (BEMs)

2.4.1 Deming Prize

The Deming Prize is awarded in named after W. Edwards Deming; a quality management pioneer who helped Japan rebuild its manufacturing industry after World War II. The Deming Prize was established in 1951 by the Japanese Union of Scientists and Engineers (JUSE) and is awarded annually to companies that demonstrate exceptional performance

in quality management, it also awarded to individuals who made significant contribution on quality management. Deming prize is one of the top-quality awards in the world (Alauddin and Yamad, 2019).

To be eligible for the Deming Prize, companies must have a comprehensive quality management system in place that covers all aspects of their business operations. The award evaluation criteria are based on 3 main categories and every category includes many sub-criteria: Category A which includes leadership and organizational strategies and objectives, category B which includes TQM implementation practices, and category C that includes the results of implementation of TQM approach. Companies that are selected for the Deming Prize receive an extensive evaluation report outlining their strengths and weaknesses in quality management. The award is widely recognized as a mark of excellence in quality management and is highly regarded in Japan and around the world.

2.4.2 The Malcolm Baldrige National Quality Award (MBNQA)

The Malcolm Baldrige National Quality Award is a prestigious award given annually by the United States government to organizations that demonstrate excellence in quality management and performance. The award was established in 1987 in honor of Malcolm Baldrige, who served as Secretary of Commerce at that time. The award is administered by the National Institute of Standards and Technology (NIST) and is open to organizations of all sizes and types, including businesses, nonprofits, government agencies and healthcare organizations (Peng and Prybutok, 2015). The MBNQA is important tool to improve the quality in the US businesses which includes seven main criteria: leadership, strategic planning, customer focus, measurement, analysis, and

knowledge management, workforce focus, operations focus, and results (Salah and Salah, 2019). The award process involves a rigorous evaluation of the organization's performance in each of these criteria. Applicants are evaluated by a panel of judges who are experts in quality management and performance excellence. (Wilson and Collier, 2000) pointed out that many US organizations agreed that the MBNQA provides the best framework for TQM approach.

2.4.3 The European Quality Award (EQA)

European Quality Award (EQA) held on an annual basis and run by the European Foundation for Quality Management (EFQM) since 1991. The EFQM itself was created in 1988 by leading business organizations to alert European business organizations to the need to incorporate quality management in all operations and also to raise the level of knowledge and awareness of the benefits of TQM. EQA Award or (EFQM award) is dependent on EFQM Excellence Model or EFQM model. The EFQM model is a quality management framework aims to help organizations to achieve their long-term goals by improving their performance toward the excellence and focus on common goals of organization (Bou-Liusar, et al., 2009; Nenadal, 2020). EFQM model focuses on creating culture and practices of continuous improvement that in its very new version consists of 3 main sections: Direction (Why do it?), Execution (Who do it?), and Results (What is achieved?), 60% for the Direction and 40% for the Results. EFQM model consists of a total of 7 criteria (which includes: purpose, organizational culture, involving stakeholders, sustainable values, transformation, stakeholder perception, strategic performance), 23 sub-criteria, and 2 results criteria (Fonseca et al., 2021). To evaluate the overall organizational performance according to the EFQM criteria, EFQM developed

(RADAR) model which consists of the following stages: Results, Approach, Deploy, Assess, and Refine, which calculates the weights of each criterion in the model according to the development that the organization have achieved during the evaluation period. EFQM model was well recognized by many quality management executives around the world as the most innovative framework for achieving successfulness and excellency in the organizational performance (Nenadal, 2020).

2.5 TQM Success Factors

Organizations are choosing TQM as a strategy to improve competitiveness and stay in marketplace of business (Baidoun, 2003). To make the TQM an applicable methodology, the implementation of TQM strategy requires defining and implementing many factors which are defined as TQM critical Success Factors (CSFs), which are requirements or practices that determine organization performance through successful implementation of TQM (Aquilani et al., 2017). It is an essential step for the organizations to identify and classify those CSFs that the organization should give an excessive attention for ensuring successful implementation of TQM approach. Identifying and classifying of CSFs of TQM enhance the organization to deeply understand dynamic and active nature of TQM approach. Classification of TQM success factors determines characteristics of quality factors according to their degree of impact to successfully implement the TQM within the organization (Baidoun, 2003). Even though, the TQM success factors can be determined, defined and classified by the organization depending upon their size, type of business, culture, and number of employees, many researchers classified general success factors of TQM according to their degree of importance to all types of the organization performance. Factors like top management commitment, employee empowerment,

strategic planning, suppliers-partnership management, resources management, quality control systems, focus on customers, process management, continuous improvement and benchmarking considered to be critical factors of implementing TQM in any organization (Saraph et al., 1989; Ramirez and Loney, 1993; Flyn et al., 1994; Ahire and O'shaughessy, 1998; Zhang et al., 2000). TQM Success Factors are tools and crucial elements to accomplish the aims of the top management, so they have their great importance in TQM implementation operation (Kumar and Sharma, 2017). Based on the literature review (Sabella et al., 2014; Maitah et al., 2014Herzalla et al, 2013;Bidoun and Zairi, 2003; Baidoun, 2003) seventeen success factors have been classified as important factors for successful TQM implementation in Palestinian organizations: top management commitment, human resources management, employee empowerment and involvement, teamwork, supplier relationship management, process management, benchmarking, self-assessment, cost of quality, measuring customer satisfaction, strategic planning, continuous improvement, communications, using new technology, information analysis, employee training, and zero defect processes.

2.5.1 Top Management Commitment and Leadership

Top management commitment has been considered by many researchers and practitioners to be the most important success factor that impacting the implementation of TQM in any organization (Ahire and O'shaughessy, 1998; Baidoun, 2003). TQM requires a commitment from top management to establish a culture of continuous improvement, allocate resources, and lead by examples. Top management considered as the initiation point in which all quality improvement activities stem from, therefore it represents the main driving force behind implementation of TQM. TQM wouldn't be effectively

implemented without the full commitment of the top management that create the environment that encourage the employees at all levels of organization to applying the quality management strategies, performing quality standards, and focusing on customer's and employee's satisfaction (Ahire and O'shaughnessy, 1998). Many researchers in their literature have considered the top management commitment to be the source of TQM successful implementation, and it's also the corner stone criterion in many TQM prizes and frameworks. With the top management commitment many other TQM indicators could be easily implemented.

2.5.2 Human Resources Management (HRM)

Human Resources Management (HRM) is defined as the strategic approach to support and developing of the employees and ensuring a positive workplace environment to achieve the best organizational outcomes. HRM practices include recruiting and selection, employee's security and health, job satisfaction, job rotations, training and educations, incentive compensations, employees' development, performance appraisal, and employees' relationships (Yang, 2014).

TQM practices can highly be affected by HRM which can also has a huge impact on both employees and customer satisfaction (Obeidat et al, 2018). HRM practices such as employees training and development, recruiting and selections, and job satisfaction have the greatest influence on the implementation of TQM practices in the organization (Abu Doleh, 2012). Yang (2006) concluded that the effective HRM has a positive and significant effect on the implementation process of TQM.

2.5.3 Employee Empowerment and Involvement

Employee involvement is a key component of TQM implementation, as TQM practically emphasizes the importance of involving employees at all levels of the organization in the continuous improvement process. Many experts define the employee empowerment as a management philosophy that emphasizes the importance of providing the employees with a high level of confidence to participate in a decision making, setting performance objectives and control activities in the organization. The objective of employee empowerment is to create an environment that encourage the workforce to produce a service or products that meets the internal and external customer satisfaction (Ugboro and Obeng, 2000). There are many roles that employee empowerment can play to influence the TQM like idea generation, problem-Solving and continuous improvement. Employees are the ones who are closest to the processes and are most familiar with the issues and challenges. Therefore, they are in a unique position to provide valuable insights and suggestions for improvement. Empowered and satisfied employees are more likely to show cooperative behavior in addressing the customer requirements which has positive impact on organization's commitment to quality and customer satisfaction (Charni et al., 2019).

2.5.4 Teamwork

Effective teamwork can help organizations to achieve their quality objectives and improve performance. By working together, the organization can employ the employees' talents, skills and capabilities to identify and solve problems, develop improvements and implement changes. TQM as a general approach depends on both individuals and teams' performance in the organization to achieve TQM goals and change objectives (Sanjana

and Govender, 2013). Team work practices like quality cross-functional teams and quality circles could be effective tools to achieve the quality improvements objectives in organizations. Recent literature considered the teamwork to be critical success factor in implementing the TQM approach in organizations all over the world (Lewis et al., 2006).

2.5.5 Supplier Relationship Management

It is defined as the process of assessing supplier performance according to buyer's expectations for quality and terms of delivery and maintaining the relationships with customers. The goal of this process to ensure that supplier meets or exceeds the buyer's expectations in terms of quality, delivery and cost. In general, supplier relationship management philosophy was established to enhance organizations to find their suppliers that can offer better products and services with lower prices in order to optimize the organizations performance and to achieve satisfaction of customers in the marketplace (Fernandes et al., 2017). There are many objectives of supplier management like, reducing the inventory management, increase customer services and reduce the order cycle time. Supplier Relationship management focuses on coordination and configuration of the operations that are necessary to make qualified products with no delay), and low cost together with handling procurement of the material or service inputs, as a result, TQM applications help reduce process variance, which has a direct impact on cycle time and delivery conditions from the suppliers (Talib et al., 2011). The supplier relationship management considered to be amin factor in process of TQM implementation (Sriykul et al., 2012).

2.5.6 Process Management

Six Sigma and lean are tools for improving the processes within the organization. process management is a systematic approach to designing, managing, controlling and monitoring the business activities, operations and tasks inside and outside the organization. Process management which includes the set of behavioral and mythological practices that emphasizes on company activities and tasks rather than products and results (Kanji, 2012). Process management is a significant criterion in most excellence and standards models like ISO 2009, The Malcolm Baldridge National Award (MBNA) and the EFQM Excellence Model (Palmberg, 2010). The objective of process management is to make the process more effective, efficient and respond to meet changes in customer and business needs. According many researchers, process management becoming essential method to improve organizational effectiveness, meets the customer needs and improve business performance (Palmberg, 2009). Process management is defined as an integral part of TQM systems; therefore, organizations should focus on process management as a first step to effectively implement TQM approach (Stravinskiene and Sarafinas, 2020) .

2.5.7 Benchmarking

Benchmarking is defined as a process of comparing the performance of an organization's standards, activities or tools with those of other organizations that are leading the market. It's a continuous measurement tool for comparing the company's internal operations with those of the best in the business companies to improve competitiveness, and to review successful business techniques to implement in their organizations (Erdil and Erbiyk, 2019). It is considered an effective management tool used by many companies around the world to identify, pretoirs and apply best practices other organizations apply to close

existing gaps and achieve continuous improvement. Benchmarking is a very powerful tool to help organizations optimize deliverability by developing all internal processes to be zero-defect, consistent and very efficient and optimize delivery to the end customer to transition from just meeting basic requirements to assuring customer complete satisfaction (Zairi, 1995). It is necessary for companies to know where they stand compared to others, as well as to understand why others are ahead. Many studies have shown that there are four types of benchmarking: internal benchmarking, competitive benchmarking, functional benchmarking and generic benchmarking. In general, benchmarking accelerates TQM achievement by allowing companies to learn from other companies that have demonstrated quality improvement (Yaseen et al., 2017).

2.5.8 Self-Assessment

A systematic review, performed by stakeholders that focuses on organizations as a whole and its internal operations, work environment, and structure is referred to as self-assessment.

Self-assessment if applied effectively can provide the organization with comprehensive provision on the effect of TQM on the organization performance, so it leads the improvement in all operations inside the organization. Its objective is to evaluate the business processes and activities in financial and non-financial areas. Self-assessment as a continuous process enables the organization to perform the benchmarking and comparing the performance of organization to that in other organizations. Deming Prize, The Malcolm Baldridge National Quality Award (MBNQA), and European Quality Award (EAQ) considered to be self-assessment framework to implement TQM (Zairi and Yousef, 1995).

2.5.9 Cost of Quality (COQ)

Cost of Quality is defined as all associated costs that incurred as a result of a poor quality, representing the difference between the actual cost of qualified service or product and the cost of non-qualified service and product (Wood, 2013). These costs considered to be a true measure of the quality effort operations and improvements, and they are best determined from an analysis of the costs of quality. Such an analysis provides a method of assessing the effectiveness of the management and a means of determining problem areas, opportunities, savings, and action priorities in all processes and operations within the organization. There are four types of COQ: Prevention cost, which defined as a cost associated with all activities that prevent defects in products or service, Appraisal costs: the costs associated with measuring and evaluating the product or service quality to ensure conformance, Internal failure costs: costs incurred prior to the delivery of the product or service to the final customers, and External failure costs: the costs of discovered defects by end customers. COQ is considered to be a good tool to justify the implementation of quality improvement for the top management (Baidoun, 2003).

2.5.10 Measuring Customer Satisfaction

Listening to customers and trying to satisfy their needs and wants play important role in TQM implementation (Eklof and Westlund, 1998). Organizations who want to stay in the market place should monitor the customer satisfaction voice regarding product, service process and relations, so they can define the customer's requirements and expectations. Richards (2012) argued that the main factor of TQM implementation is focusing on customer, because the quality is defined by the customers and not by the organization or manufacturers. A TQM strategy should be designed to meet the needs and expectations

of customers. This can be done by gathering customer feedback, analyzing customer needs, and developing processes of services and products that meet or exceed customer expectations. Producing a product or a service that exceeds customer satisfaction making the organization meeting the customer's new needs and wants through applying new ideas and technologies and developing new measuring tools for all their operations within organization's levels (Flynn et al.,1994). Yang (2006) argued that customer satisfaction is a basic objective of organization if the organization cannot satisfy its customers, its competitiveness will be decreased. The adoption of TQM is therefore an effective means by which organization can increases competitiveness, implementation of TQM also benefited the organization's image, and improved the satisfaction and quality awareness of employees. With measuring customer satisfaction, the organization know about its customers, and competitors and know where to make quality improvements. Zairi (1994) considered measuring customer satisfaction as a cornerstone of TQM implementation process. We can therefore conclude that management and marketing theorists as well as practitioners agree on the importance of customer relations for a business's success. In order for that vision, it is important to put into operation the concept of customer relations so that it can be monitored and managed.

2.5.11 Strategic Planning

Organizations use strategic planning to communicate their mission and vision by creating and implementing stakeholder-focused strategies, policies, plans, objectives, and procedures. In addition, they consider the elements of the business environment as well as the organization's related internal strengths and weaknesses. strategic planning across the organization must dynamically adapt to environmental changes and instability

through proactive behavior resource allocation by buffering and shifting top management attention to dealing with uncertainty, Such an approach would have a positive impact in organizational performance, which results in long-term organizational indirect improvement performance (Oschman, 2017).The strategic planning criterion is seen as advice and is connected to the other important factors in TQM approach. With clear quality targets, continuous improvement, employee empowerment, and data-driven decision making, a well-defined strategy may offer direction and alignment to TQM implementation programs (Suarez et al., 2016). A TQM strategy should be based on data-driven decision-making, this can be achieved by collecting and analyzing data on process and product performance, identifying trends and patterns, and making decisions based on objective data (Yousef and Zairi, 1995).

2.5.12 Continuous Improvement

Continuous improvement is defined as the continuous process which aims to improving all processes, products and services and activities within the organization that could be achieved by the participation of all staff to increase the customer satisfaction and achieve the organizations objectives (Sanchez and Blanco, 2014). TQM is based on the principle of continuous improvement, and employees are encouraged to participate in improvement initiatives. The importance of continuous improvement in the business environment has been motivated by three major practices: business environment continuous changings, the new management systems and the importance of quality management itself. Employees can participate in improvement events, quality circles, and other improvement projects to identify opportunities for improvement and implement changes.

2.5.13 Communications

Employees must be kept informed of the quality goals and objectives, progress on improvement initiatives, and changes that affect their work. Communication is the exchange of ideas, applications, and information among employees through communication channels like, speech, signals and writings. Success of any organization is dependent into the quality of communication, accordingly when development of communication process is impeded, the entire organization will suffer (Kanji, 2021). Open communication channels can help to build trust, promote engagement, and foster a culture of continuous improvement. The organization should put the communication in its proper place that facilitate upward and downward flow of information within the all departments and employees inside the organization (Kasongo and Moono, 2012). Effective communication is essential for employee involvement in TQM implementation process. Powerful communication applications used by the organization enhance all types of stakeholders inside and outside the organization to have a depth understanding of TQM implementation (Sayyad, 2017).

2.5.14 Using New Technologies

Technology system is involved in all kind of business. Basic objective of technology systems is to enhance the production and service operations quality and delivery, reduce costs, and increasing the competitiveness position of the organization. The application of new technologies helps to improve the organization's activities, increasing the process control, enhances team activities, and easy communications among different departments. The Total Quality Management System Information System (TQMIS) is a combination between TQM and Information System that aim to manage the information of the

organization by acquiring, sorting and manipulating of information. Wang and Xiaoh (2008) explained that TQMIS increases customer satisfaction by exchanging the information with customers in time and in useful format, increase the productivity of employees by reducing the rework, and improving the quality of operations and products with less costs. It helps with the management of database, like customer database, inspection database, engineering database, production and scheduling. Significant progression of new technologies introduced Industry 4.0 which become a need to address in business organization. New innovations like Artificial Inelegance (AI), Virtual Reality (VR), Internet of Things (IoT) are used globally in production and operation in modern organizations. I 4.0 forming a portion of the modern manufacturing system which includes increasing interconnection among employees, machines and systems through real-time data sharing. I 4.0 enhances many development opportunities for many fields such as operation management and supply chain management (Kumar, 2022). The way in which I 4.0 technologies will be adopted incorporated with quality management is referred as Quality 4.0, which is a new TQM concept in this era. I 4.0 applications can positively affect the implementation of TQM principles. Asif (2020) argued that to have successfully TQM implementation, organizations have to focus on developing the integration of working with I 4.0 and using real-time control techniques.

2.5.15 Information Analysis

The TQM implementation needs information and data that must be accurate, available on time, and in useful format. The roles of information analysis in TQM contributed greatly to the enhancement of quality awareness, improving product quality, improving operational performance, faster delivery, improved flexibility, and reduced cycle time

(Siu Mane et al., 2011). Information analysis technology plays a vital role to implement TQM in any organization which can help to fulfill all factors of TQM and has a positive impact on organization growth and development (Ray and Tripathi, 2020).

2.5.16 Employee Training and Development

Developing the skills and capabilities of employees by trainings enhancing the organizations to raise its performance and achieve its objectives. Employees must be trained and educated in TQM principles and tools to ensure successful implementation (Zhang et al. 2000). TQM requires that employees who are trained and equipped with the knowledge and skills they need to contribute effectively to the improvement processes. Quality training defined as educating the employees at all level so as to broadening their knowledge, and skills on quality management objectives and tools and provide them with full information about TQM mission and strategy (Zakvan et al., 2012) It was argued by many experts that team members who received training in problem-solving methodologies, quality tools improvement projects and process management participate effectively in quality management. Increasing the productivity of employees through the training and education is fundamental to the success process of TQM implementation (Zaiari and Yousef, 1995).

2.5.17 Zero-Defect Process

In general, it is a popular management tool which goals to reduce the defects in processes, products or services by prevention method (Kumar and Sharma, 2017). The main idea of zero-defect approach is to do it right the first time and every time. The aim of zero defects approach is to eliminate the defects, waste and errors in all the operation aspects within

the organization like tools, employees and processes that do not add value to the whole system or final products or services (Fragapane et al., 2023). Zero-Defect approach is a goal for the automotive spare parts organizations because it reduces the cost of quality, and achieve the customer satisfaction by delivering the right parts in the right time and reasonable prices. It can be achieved by motivating employees to prevent the potential mistakes in all the parts business processes by developing a constant and continuous improvement of these processes.

2.6 TQM in Palestinian Context

Palestine still suffer from shortage of effective quality systems and practices at the organizational level (Herzalla et al, 2013). TQM is a well-established management approach that has been implemented in various countries around the world, including developing countries. In Palestine, the concept of TQM has been introduced and implemented in different sectors, including the private and public sectors, as well as in educational institutions.

The Palestinian Standards Institution (PSI) has played a significant role in promoting TQM practices in Palestine. The PSI has introduced various quality standards, including ISO 9001, and has provided training and consultancy services to organizations seeking to implement TQM practices. In addition, some Palestinian universities have incorporated TQM principles into their curricula, master programs and research programs. Despite these efforts, the implementation of TQM practices in Palestine faces some challenges, including limited resources, political instability, and lack of awareness among employees and managers about the benefits of TQM. However, with the growing emphasis on quality management and continuous improvement in global markets, TQM is likely to become

more prevalent in Palestine in the future. therefore, the promotion and implementation of TQM practices in Palestine is still possible with the appropriate support and resources. This can include investing in employee training and development, promoting a culture of continuous improvement, and providing resources to support TQM practices. Despite the fact that limited attention has been recognized to the TQM philosophy by Palestinian organizations, many Palestinian organizations have started the quality improvement trip, for example, many of them obtained ISO and international quality certificates. In response to the current challenges in Palestinian market, TQM could be a significant method to obtain improvements in today's business environment (Bidoun and Zairi, 2003). Baidoun (2003) defined and classified 31 TQM success factors that influence the performance of Palestinian organizations to be Critical, important and minor importance, accordingly, 19 success factors were found to be critical, 11 success factors were classified as important and one success factor considered to be minor importance.

2.7 Automotive Spare Parts

Automotive spare parts are any mechanical, electronical, or consumable items that can be replaced due to wear out or damage in the vehicle, to ensure the functionality and long life of the vehicle. The necessity of replacing any part in any type of vehicles could be wear or tear, vehicle accidents, or due to normal limited life duration. These parts are designed to fit specific makes and models of vehicles and are essential for maintaining the performance and safety of the vehicle.

Some common examples of automotive spare parts include Awar et al., 2021):

1. Engine components: These include items such as pistons, valves, camshafts, and crankshafts.

2. Electrical components: These include items such as batteries, alternators, starters, and spark plugs.
3. Brake system components: These include items such as brake pads, brake shoes, rotors, and calipers.
4. Suspension components: These include items such as shocks, struts, and control arms.
5. Transmission components: These include items such as clutch kits, torque converters, and transmission filters.
6. Cooling system components: These include items such as radiators, water pumps, and hoses.
7. Exhaust system components: These include items such as mufflers, catalytic converters, and exhaust pipes.
8. Body Parts: these include the outer components of the vehicle like pumpers, wings, headlights, and doors.
9. Lubricants: these include all the fluids needed for the vehicle to operates properly, like engine oil, transmission oil and brakes fluids.

Automotive spare parts supplier defined to be the commercial organizations that established for the purpose of producing, or wholesaling or retail selling of equipment and parts used to repair and service the motor vehicles, this does not include any installation work or repairs of the vehicles.

There are many different types of spare parts suppliers that offer a wide range of automotive parts for various makes and models of vehicles. Some common types of spare parts suppliers include (Ahire, and O'Shaughnessy,1998):

1. Authorized dealerships: These are typically affiliated with specific car manufacturers and offer Original Equipment Manufacturer (OEM) parts for their vehicles. These parts

are designed to meet the exact specifications of the car manufacturer and are often more expensive than aftermarket parts.

1. Independent auto spare parts stores: These are independent retailers that specialize in selling aftermarket parts. They may carry a variety of brands and offer parts that are designed to fit a wide range of vehicles.
2. Online retailers: These are e-commerce websites that offer a wide selection of aftermarket parts for a variety of vehicles. Online retailers can offer competitive prices and convenient shopping options, such as home delivery.
3. Salvage yards: Also known as junkyards, specialize in selling used auto parts that have been salvaged from vehicles that are no longer in use. Salvage yards can be a good source of hard-to-find parts or parts that are no longer in production.

The main task of automobile spare parts supplier in general, is to meet the needs of workshops, wholesales, and individual customers by providing the right parts, for the right price, at the right time, with the right quantity and right quality. This involves accurately forecasting demand for spare parts, optimizing inventory levels, and implementing efficient procurement and distribution processes. Effective spare parts management can help organizations to reduce costs, improve customer satisfaction, and increase the reliability and performance of their vehicles. The main objective of the spare parts department in a dealership is to manage and provide a comprehensive range of replacement parts and accessories for the vehicles sold by the dealership. This department is responsible for ensuring that customers have access to the right parts and accessories when they need them, whether for routine maintenance or repairs.

2.7.1 Palestinian Automotive Spare Parts Suppliers

The automotive industry is one of the major sectors that require spare parts in Palestine. The importation of vehicles and automotive spare parts is crucial for the transportation sector, which includes public transportation, commercial fleets, and private vehicles. The Palestinian automotive market is growing rapidly. There are 410 thousand registered vehicles in Palestine, around 30 thousand vehicles were licensed in year of 2022 (Palestinian Ministry of Transportation, 2023). In 2022, the share of vehicles market is 19% of the Gross Domestic Product (GDP) in Palestine (Palestinian Central Bureau of Statistics, 2022). Where the number of organizations for Sales of motor vehicles parts and accessories is 1974 organizations, 34 of them have 10 employees and above (Palestinian Central Bureau of Statics, 2017). There are several companies in Palestine that specialize in the supply and distribution of automotive spare parts. These companies provide a wide range of spare parts for various types of vehicles, including commercial fleets, public transportation, and private vehicles.

In Palestine, the availability of automotive spare parts can be challenging due to several factors, including political instability, limited resources, and restricted access to international markets. As a result, some businesses in the automotive sector may experience delays in repairs, leading to decreased productivity and increased downtime.

To address these challenges, several companies in Palestine specialize in the supply and distribution of automotive spare parts. These companies' source high-quality parts from international suppliers and distribute them to various businesses in the automotive sector, including workshops, mechanics, and dealerships. Furthermore, some organizations have invested in local production of automotive spare parts to address the challenges of importation. These companies work to produce spare parts that meet international

standards, reducing reliance on imports and creating local employment opportunities. In Palestine, there are two types of automotive spare parts suppliers who work in the Palestinian market, the first type is certified distributor for the branded and genuine spare parts, who represents the branded vehicles manufacturers in Palestine and perform the after sales services for the vehicles in their premises and provide the spare parts for wholesalers, retailers and vehicle owner customers. The second type is the independent commercial distributor who deliver the Original Equipment manufacturer (OEM) or after-market automotive spare parts to the retailers or end customers. The both types of suppliers strive to win the customer satisfaction and increase their market share in the competitive conditions of the Palestinian market through many capabilities like availability and quality of the spare parts, competitive pricing, certifications, delivery time, and spare parts after-sales services.

2.7.2 Automotive Spare Parts Management in Palestine

Effective automotive spare parts management is critical for the smooth functioning of the automotive industry in Palestine. Proper management of spare parts can help businesses reduce downtime, increase productivity, and minimize costs associated with repairs and maintenance. Here are some key aspects of automotive spare parts management that influence the performance of spare parts around the globe (Christian, 2022):

1. Inventory Management: Proper inventory management is essential to ensure that the right parts are available when needed. Businesses in the automotive industry should maintain accurate inventory records, including details such as part number, location, and quantity. Regular inventory checks should be conducted to identify any shortages or excess stock, and adjustments made accordingly.

2. Supplier Management: To ensure the timely availability of high-quality spare parts, businesses in Palestine should establish and maintain good relationships with suppliers. This includes identifying reliable suppliers, negotiating favorable terms, and maintaining clear communication channels.
3. Demand Forecasting: Accurate demand forecasting can help businesses plan and manage their inventory effectively. By analyzing historical data, businesses can predict future demand for specific spare parts, ensuring that they have the necessary inventory levels to meet customer needs.
4. Quality Control: It is important to ensure that spare parts are of high quality and meet international standards. Regular quality control checks should be conducted on incoming parts to ensure that they meet the required specifications. This will help reduce the risk of defective parts and minimize the need for costly rework.
5. Cost Management: Managing costs is critical for businesses in the automotive industry, particularly when it comes to spare parts. By negotiating favorable pricing with suppliers, managing inventory levels, and minimizing waste, businesses can reduce costs associated with spare parts management.

2.8 Analytic Hierarchy Process (AHP)

The Analytic Hierarchy Process (AHP), which developed by Thomas Saaty in the 1970s, is widely defined as one of the most popular and powerful tools for multiple criteria decision-making and testing theories in business management. It works by establishing priority weights for alternatives by constructing main objective, criteria, and sub-criteria in a hierarchical frame (Bernasconi, et al., 2010). AHP is a method of deriving a scale ratio from paired comparison, it is designed for a setting in which ideas, opinions theories

that can be qualified on subjective judgment to provide a scale ratio for prioritizing decision alternatives. The flexibility is one of the strength points of AHP method, that can be combined with different applications which making the extracted results from both applications to be easy and more solid (Vaidya and Kumar, 2006). The AHP method are carried out in two main phases, hierarchic design and evaluation by pairwise comparison (Vargas, 1990). AHP is based on the principle that judgement of expert people is very valuable in decision making (Vargas, 2011). The AHP is measurement approach that uses pairwise comparison that depends on actual measurements or expert feelings judgment to derive scales of priorities (Saaty, 1987). During the years, AHP has being employed to be used in many management applications such as selection, evaluation, allocation, planning and development, prioritization and forecasting (Vaidya and Kumar, 2006).

In order to generate a well-defined priority or alternatives in the AHP method, Saaty (2008) analyzed the prioritization or decision process into following sequential working steps:

1. Defining the main goal, or main objective of the problem or top priority of the case that will depend on all other factors or criteria in hierarchy.
2. Breaking down the objectives or main criteria and structuring them from a wide perspective into factors or elements that affect the main criteria and objectives.
3. Establishing the group of contribution weight into the main criteria or objective within each level of hierarchy though measurement and internal pairwise comparison.
4. For every element or factor in the lowest level, obtained weight by mathematical calculations us used to determine the priorities in this level. This process would be continually applied until the final priority of elements in the lowest level are obtained.

There are many benefits of AHP that can assist the researchers and business directors in their workplace, like decomposing the problems or the main objective into many other small decision hierarchies, information from experts could be collected by applying the pairwise comparison, it uses calculations to weigh the factors, and finally, consistency measure will be used to indicate the rating of expert's opinion in every factor (Amrine, and Yusof, 2013). One of the most important applications of AHP tool is priority and ranking (Talib et al, 2011). AHP technique can be applied to determine the percentage weights for contribution of all important performance categories of TQM success factors that were defined previously by experts and researchers in many sectors of business. AHP method can be applied to effectively determine the priorities or critical factors among all defined success factors that are essential to start the process of the TQM implementation in any organization (Chin, et al. 2002). More elaboration on the detailed methodology of AHP is presented in Chapter Three.

2.9 Previous Studies

There are Many studies that have applied the AHP method in prioritizing the TQM success factors. Table (2.1) represents some of the previous studies that using the AHP method in many managements' practices.

Table (2.1): Previous Studies that Using the AHP Method

Authers/ Date	Title of the study	Main findings
Alshaibi (2016)	Analytic Hierarchy Process (AHP) as criteria in business decision making and their implementation in practice	to demonstrate the potential of AHP as a tool that could easily rank 4 non-financial measures
AHMED (2015)	Ranking Critical success factors for sustaining Total Quality Management implementation in Sudan	To highlight some key barriers affecting the sustainability of TQM implementation and proposes conceptual model using AHP approach for sustaining TQM implementation in Sudan
Ahmad and Prizada, (2014)	Using Analytic Hierarchy Process for Exploring Prioritization of Functional Strategies in Auto Parts Manufacturing SMEs of Pakistan	This article uses AHP to find prioritization of functional strategies by (SMEs) operating in auto parts manufacturing sector of Pakistan
Talib, et al (2011)	Prioritizing the practices of total quality management: An analytic hierarchy process analysis for the service industries	17 TQM practices were identified and further divided into three categories. Then their prioritization was done using AHP approach to assign the relative importance of these 17 TQM practices in service industries

Wu and Tsai (2012)	Using AHP to evaluate the criteria of auto spare parts industry	This study identifies 7 main criteria and 30 sub-criteria for suppliers. Then the weights and priorities of main criteria were calculated by using AHP method and pairwise comparison matrix

2.10 Measurement Development and Factors Analysis

Based on comprehensive and deep researches of existing literature review, the questions that would measure the importance of TQM success factors in Palestinian spare parts organization were identified. Table (2.2) which is constructed based on the TQM critical success factors main criteria and Factors. The CSFs of TQM implementation can be classified into 6 main groups (criteria) each criterion consists of number of sub-criteria or (factors), more precisely, Planning criterion has been explained by 4 factors each factor consist of 3 statements (questions) in the questionnaire, Management has been explained by 6 factors, 4 factors explains the measurements criterion, 3 factors explain the employees criterion, one factor with 6 statements explain the external environment criteria, and one factor with 5 statements explains the internal criteria.

Table (2.2): Success Factors of Implementation TQM in the Spare Parts Organizations

Main Factors	Sub-Factors	References
Planning	Top Management Involvement (TM)	Ahire and O'shaughessy, 1998; Baidoun, 2003
	Strategic Planning (SP)	Oschman, 2017; Suarez et al., 2016
	Benchmarking (BM)	Yaseen et al., 2017; Zairi, 1995
	Quality Policy (QP)	Flynn et al.,1994
Management	Continuous Improvement (CI)	Sanchez and Blanco, 2014
	Communications (CM)	Kanji, 2021
	Process Management (PM)	Stravinskiene and Sarafinas, 2020
	Using New Technology (NT)	Asif, 2020
	Zero-Defect Process (ZD)	Palmberg, 2010
	Supplier Management (SM)	Sriykul et al., 2012; Talib et al., 2011
Measurements	Customer Satisfaction (CS)	Yang ,2006; Zairi, 1994
	Employee Satisfaction (ES)	Obeidat et al, 2018; Ugboro and Obeng,
	Self-Assessment (SA)	Zairi and Yousef, 1995; MBNQA
	Cost of Quality (CQ)	Wood, 2013
Employees	Employee Training (ET)	Zakvan et al., 2012
	Teamwork (TW)	Sanjana and Govender, 2013
	Employee Empowerment (EE)	Ugboro and Obeng, 2000
External Environment	External Factors (EF)	Baidoun, 2003
Internal Environment	Internal Factors (IF)	Baidoun, 2003

Chapter Three

Methodology

3.1 Overview

This chapter reveals the research methods used in performing this study. The first section focusses on the research design types, then the research approaches were defined, next the methodology flow chart is developed according to the research methodology, the next section determines the questionnaire design with the sampling technique. In the final section the AHP method is demonstrated and the data analysis techniques were viewed.

3.2 Research Design

Research design is the general plan and structure of the research its purpose is to achieve the objectives of the research and answering the research questions. It is essential for the researcher to create a powerful research design that draw a plan for answering the research questions (Saunders et al., 2007). Yin (1994) categorizes the academic research into explanatory (which clearly defined a research problem), descriptive (awareness of research problem), and exploratory (un-cleared research problem).

3.3 Research Approach

The selection of the appropriate research approach is dependent on many factors such as the objectives of the research, the problem that the research attempts to solve, and time available for the researcher to collect data and achieve the research objectives. Accordingly, there are two types of research approaches:

1. The Deductive Research Approach

Deductive research approach is useful in confirming, modifying or rejecting hypotheses of the research which were developed based on the pre-exist theories.

In the deductive research approach, hypotheses are deduced by researchers based on theories and known facts by analyzing them and testing them by using empirical ways and statistical methods (Bryaman,2000; sunders et al., 2007).

2. The Inductive Research Approach

It is used when there are no theories, and ends up by generating new theory. The inductive approach objective is to developing theory based on the analysis of collected data (Saunders et al., 2000).

3. Mix Research Method

Taking the previous discussions into account, the nature of this research is explanatory, and tries to answering the research questions and achieving its objectives by adopting deductive approach and adopts qualitative tool to analyze collected data.

3.4 Research Methodology

To achieve the desired objectives of this study in confident and consistent manner, the research methodology should include sequential and logical stages. Therefore, quantitative deductive methodology has been carried out through the following stages as illustrated in Figure (3.1).

- Stage One: Identifying the research objectives, research questions and hypotheses were setting dependent on reviewing the topic literature including the library resources, and academic journals.
- Stage Two: categorizing the success factors and designing the data collection tool (questionnaire), establishing the study population and sample, and collecting data method was determined by face-to-face meeting with managers of companies.
- Stage Three: conducting the processing and analyzing the collected data by AHP method in order to answering the research questions, and testing the hypotheses, then reporting the analysis results

based on research questions and hypotheses was performed, finally, the conclusions and recommendations were represented

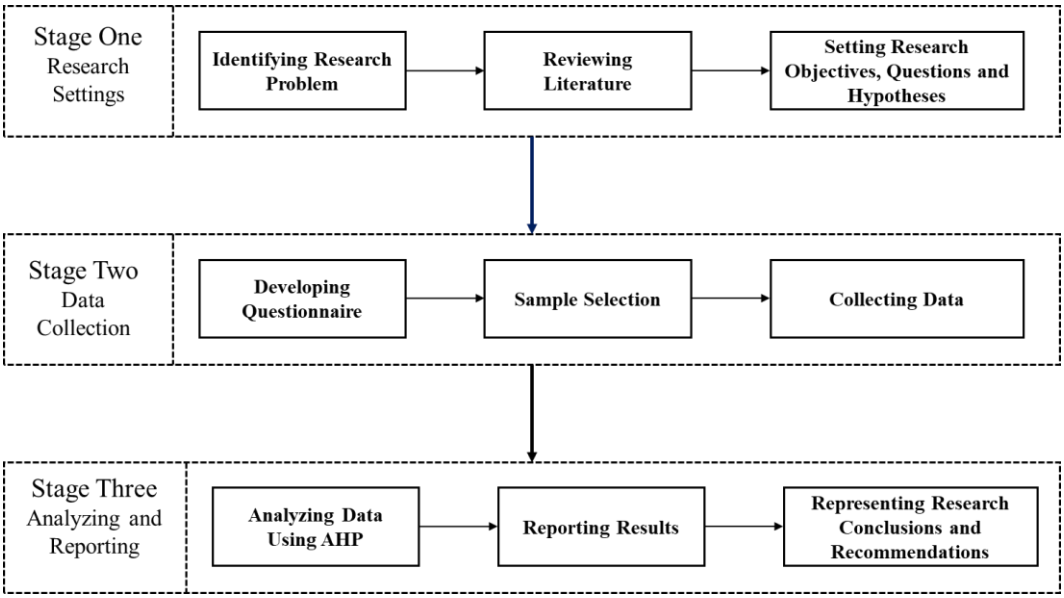

Figure (3.1): Flow Chart of Research Methodology

3.5 Questionnaire Design

The questionnaire is a set of questions asked to obtain useful information about specific and it considered as most popular survey tool used for collecting data (Roopa and Rani,

2012). In this research, the close-ended questions were pre-defined and adopted for respondents to answer. The research questions developed based on extensive literature review about TQM implementation success factors. Five-Point Likert scale was chosen as a scale where respondents choose the best answer to indicate their ideas about the TQM success factors. Five-point Likert scale, which defined as psychological scale that contains multiple options in which respondents can choose to indicate their opinions, attitudes, or feelings about a particular topic," (Nemoto & Beglar, 2014). Three experts were consulted to judge the questionnaire wording, simplicity, and ability of statements to represent each particular structure. The research questionnaire has been translated to Arabic language to make it clear for respondents as most of respondents prefer to answer the. The final version of questionnaire consists of four main parts. The cover page defines the title of the research, the objective of the research, the estimated time will be taken to fill out the research by respondents, and the researcher's contacting details for any further inquiries.

Part one aims to obtain a general background and demographical profile about respondents and the spare parts organizations, in this part, information about respondents like educational level and work experience are required. Furthermore, characteristics of organizations is required like business sector, number of employees, main customer of organization, establishment year, market share, and types of spare parts that the organization deals with.

Part two includes 47 statement to assess the factors that are important to implement the TQM: top management involvement, customer satisfaction, employees' satisfaction, continuous improvements, employees training, communications, suppliers' relationship, strategic planning, process management, self-assessment, cost of quality, benchmarking,

using new technology, teamwork, employees' empowerment, zero-defect processes, quality policy.

Part three includes five statements about the role in which external environment factors play to implementing effective TQM in the organization.

Part four includes six statements about internal factors that influence the implementation of TQM in the organization. The researcher contacted and visited 33 spare parts organizations to meet the mangers in these organizations and fill the questionnaire, all these organizations are listed in Appendix 3, furthermore, English and Arabic versions of the questionnaire are available in Appendix 1 and 2 in the end of this research. The data collection started in the beginning of February, 2023 and ended in the middle of April, 2023

3.6 Sampling Techniques and Data collection

According to Palestinian Central Bureau of Statistics (2022), there are 1974 organizations that work in the automotive spare parts in Palestine. To achieve the objective of this study, only the big companies among these companies have been considered as a population of the study, the number of employees was chosen to be the criteria which is 10 employees, this criterion has been chosen to select the big companies because with 10 employees the company has significant market share in the spare parts market, and it can apply managerial concepts like HR management, and we can find hierarchy of the staff in this company in addition to other managerial concepts and quality management approaches. 34 of them found to have more than 10 employees that work in these organizations. These organizations are the research population. As the population is relatively small (34

organizations) then, the total population sampling would be chosen to collect data from. This means that entire population included in the research have been conducted.

The 34 automotive spare parts organization that work in Palestine and distributing automotive spare parts and have more than 10 employees working have been defined and listed. Then managers of all these organizations have been contacted to fill the questionnaire. The response rate was 97%, as there is only one organization that did not fill the questionnaire. As a result, the filled questionnaires in the research were 33 questionnaires.

3.7 Analytic Hierarchy Process (AHP) Method

TQM success factors were measured based on multiple dimensions. AHP is a proper method to prioritizing and ranking the multiple criteria process. AHP can be applicable to prioritizing main criteria and factors that critically influence the decision of implementing the TQM (Chin et al., 2002). AHP is useful for decision makers to construct a complex problem in hieratical structure which consist of the main goal, Main criteria, Factors (Saaty, 1990). To achieve the objective of this research, the following steps were established as presented in Figure (3.2):

1. Based on the collected data, the AHP model was built, the main goal, main criteria and success factors were all structured in the hierarchal arrangement.
2. Developing the importance matrix for all success factors
3. Calculating the contingency and demining the acceptance of it according to the pairwise comparison performed.
4. Performing pair-wise comparison for each success factor in relative to their main criterion

5. Calculating the weights main criteria and success factors according to its contribution to the main goal
6. Determining priority weights of individual main criteria and factors that mostly influence main goal and ranking them.

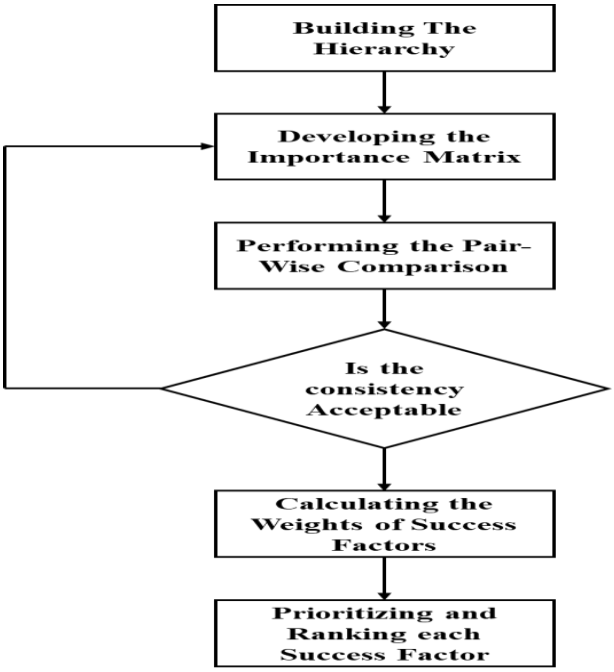

Figure (3.2): AHP Hierarchy Method – (Adopted from (Talib and Qureshi, 2011))

3.8 Data Analysis Techniques

Primary data were collected by questionnaire do not give indicators or meaningful information. Therefore, to transform these data into valuable information, they need to be processed and analyzed by computer software that are designed to analyses the data in the similar researches. Various tools and software packages were used in the research to analyze the data, and obtain the main objectives of this study. Statistical Package for Social Science (SPSS) software package was used to visualize and obtain the demographic analysis for the participated respondents and their organizations, Partial

Least Square Structural Equation Modeling (PLS-SEM) was used to assess the measurements of model and evaluation the structural model, the Smart-PLS software package was used for this purpose, Expert Choice software package was used in the AHP methodology to weight and prioritize the success factors based on their pairwise comparison and contribution weight to the main goal.

Chapter Four

Data Analysis and Results

4.1 Overview

This chapter includes the analysis of collected data from the spare parts managers work the Palestinian spare parts suppliers. The first section discusses the results of the descriptive statistics of demographic variables of the respondents, in addition to the demographic variables of the spare parts companies by using SPSS 26 software package. The second section in which discuss the assessment of measurement model by using Smart- PLS 4 software Package. The final section discusses the calculation of the weights and ranking of the TQM success Factors by using the AHP method and Expert Choice 11 software package.

4.2 Demographic Profiles

In this part of research descriptive analysis of a sample of 33 participants have been analyzed. Participants from 33 spare parts companies that are managers of spare parts departments have filled the questionnaire. The analysis of demographic profile has been performed by Statistical Package for the Social Sciences (SPSS 26). Demographic profile consists of two sections, the first one which related to the demographic information about the respondents such as education level and the years of experience for every manager. While the second part deals with the company's profile, and includes the company's business field, number of employees, establishment year, spare parts type, customer type, market share, key factors that limiting the company's development, and whether the company has quality control system or not.

4.2.1 Demographic Profile of Respondents

4.2.1.1 Education Level

The first demographic variable that is referred to the sample of the study is educational level of mangers who work as a head of spare parts department in the company. The result in Table (4.1) shows that 24 respondents which are 72.7% of the mangers hold Bachelor degree, 4 respondents 12.1% of them hold Master Degree, 4 respondents 12.1% of the them hold High

School Degree and one respondent that are 3% of them hold diploma degree.

Table (4.1): Education Level of Spare Parts Mangers

Educational Level	No of Managers	Percentage
High School	4	12.1%
Diploma	1	3%
Bachelor's Degree	24	72.7
High Education	4	12.1
Total	33	100 %

4.2.1.2 Years of Experience

Regarding the years of experience, Figure (4.1) shows that 60.6% of the respondents have more than 9 years of experience in the automotive spare parts, 24.2 % of them has an experience between 6 to 9 years, 9.1% of the them has from 3 to 6 years of experience, and about 6% of respondents has less than 3 years of experience.

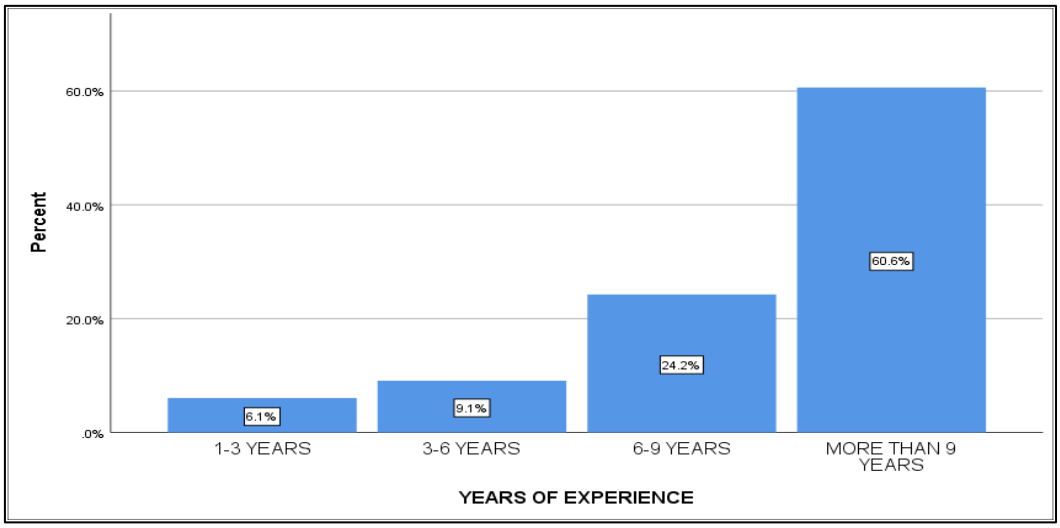

Figure (4.1): Years of Experience for Spare Parts companies Managers

4.2.2. Demographic Profile of Spare Parts Companies

4.2.2.1 Business Field of Spare Parts Companies

Table (4.2) shows the field of spare Parts business that the spare parts companies work at and it indicates that 15 companies (45.5% of companies) are spare parts companies, and 18 companies (54.5% of companies) are dealers for branded vehicles and spare parts.

Table (4.2): Business Field of Spare Parts Companies

Company Type	No of Companies	Percentage
Spare Parts Companies	15	45.5%
Vehicle and spare parts Dealers	18	54.5%
Total	33	100 %

4.2.2.2 Number of Employees

Number of employees that work in the spare parts companies or spare parts department in every spare parts company. Table (4.3) shows the number of employees works in the spare parts companies. The results show that 54.5% (18 companies) has from 10-20 employees, 39.4 has less than 10 employees and 6% has from 21 to 30 employees.

Table (4.3): Number of Employees who Work in the Spare Parts Companies

Number of Employees	No. of Companies	Percentage
10 Employees	13	39.5%
10- 20 Employees	18	54.5%
21-30 Employees	2	6%
Total	33	100 %

4.2.2.3 Year of Establishment

Date of establishment of each company has been analyzed and Figure (4.2) shows that one company (3%) has been established in 1929, 3 companies (9.1%) have been established in 1963, one company (3%) has been established in 1984, 3 companies (9.1%) have been established in 1995, 5 companies (15.2%) have been established in 1997, 3 companies have been established in 1998, 2 companies (6.1%) have been established in 1999, one company (3%) has been established in 2002, 3 companies (9.1) have been established in 2004, one company (3%) has been established in 2006, one company (3%) has been established in 2007, 2 companies (6.1%) have been established in 2008, one company (3%) has been established in 2009, one company (3%) has been established in 2010, 2 companies (6.1%) have been established in 2012, , one company (3%) has been established in 2016, , one company (3%) has been established in 2016, , one company (3%) has been established in 2018.

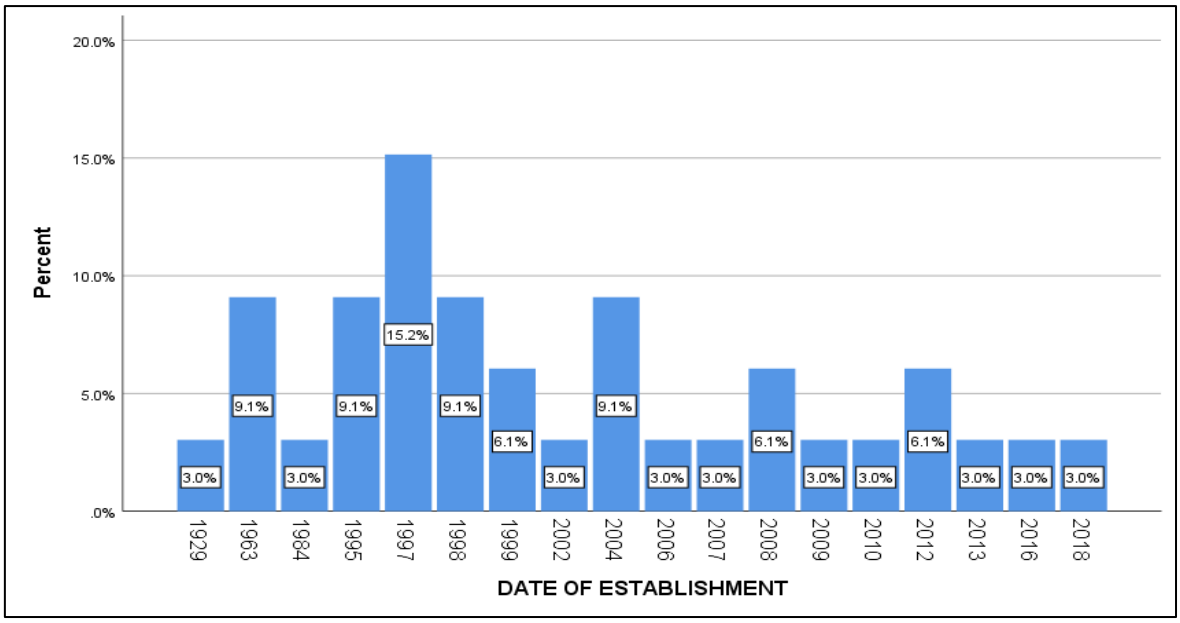

Figure (4.2): Year of Establishment of Spare Parts Companies

4.2.2.4 Spare Parts Type

Spare Parts type that the companies deal with is another important demographic analysis that Table (4.4) shows that 73% of them (24 companies) work in all types of spare parts, 15% (5 companies) work with mechanical parts, 6.45 (2 companies) work with electrical parts, 3.2% (one company) works in lubricants, 3.2% one company works with body parts.

Table (4.4): Spare Parts Type that the Spare Parts Companies Work in

Spare parts Type	No. of Companies	Percentage
All Types of Parts	24	73%
Mechanical Parts	5	15%
Electrical Parts	2	6%
Body Parts	1	3%
Lubricants	1	3%
Total	33	100 %

4.2.2.5 Customer Type

Customer types represents the customers that the company deals with and Table (4.5) indicates that 63.6% (21 companies) deals with all types of customers, 18.2% (6 companies) deals with retail customers, 12.1% (4 companies) deals with wholesales customers, 6% (2companies) deal with workshop owners

Table (4.5): Customer Types that the spare parts companies deal with

Market Share	No. of Companies	Percentage
Less Than 5%	16	48.5%
5% - 15%	14	42.4%
15% - 25%	3	9.1%
Total	33	100 %

4.2.2.6 Market Share

Market share of every spare parts company has been identified and Table (4.6) shows that 48.5 % of companies (16 companies) have less than 5% automotive spare parts market, 42.4 % of companies (14 companies) have market share between 5% and 15%, and 9.1 % of companies (3 companies) has market share between 15% and 25%.

Customer Type	No. of Companies	Percentage
All Types of Customers	21	63.6%
Retail Customers	6	18.2%
Wholesales	4	12.1%
Workshops	2	6%
Total	33	100 %

Table (4.6): Market Share of the Spare Parts Companies

Development of Spare Parts Companies

Figure (4.3) indicates the factors that limiting the development of automotive spare parts companies and indicates that 36.4% of companies (12 companies) indicates that the political factors limiting the development of the companies, 30.3% of companies (10companies) indicates that the governmental factors limiting the development of the companies, 12.1% of companies (4 companies) indicates that the technological factors limits the development of the companies, 12.1% of companies (4 companies) indicates that the technological factors limiting the development of the companies, 9.1% of companies (3 companies) indicates that the human factors limits the development of the companies

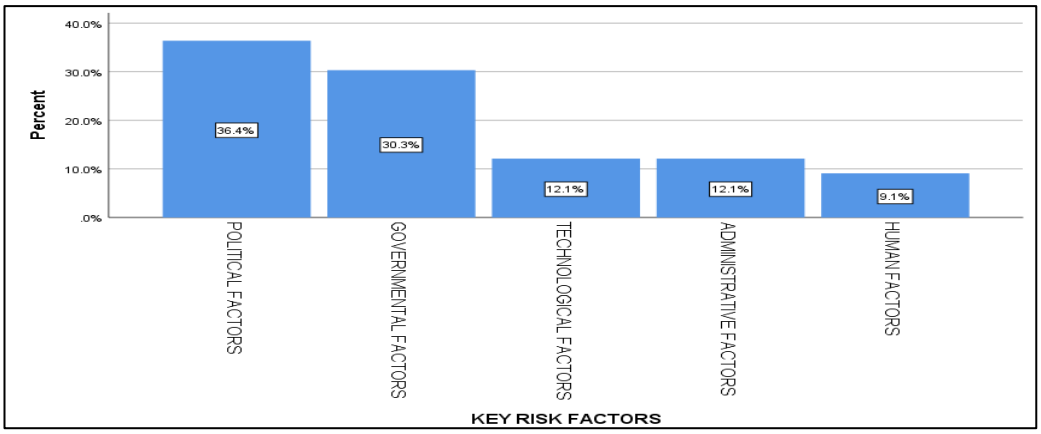

Figure (4.3) Key Factors Limiting the Development of Spare Parts Companies

4.2.2.7 Quality Control Systems

The last demographic analysis has been performed is whether the spare parts companies have their own quality control systems or not, Figure (4.4) shows that 63.6% of companies (21 companies) has no quality control system, and 36.4% (15 companies) on their way to build their own quality control system.

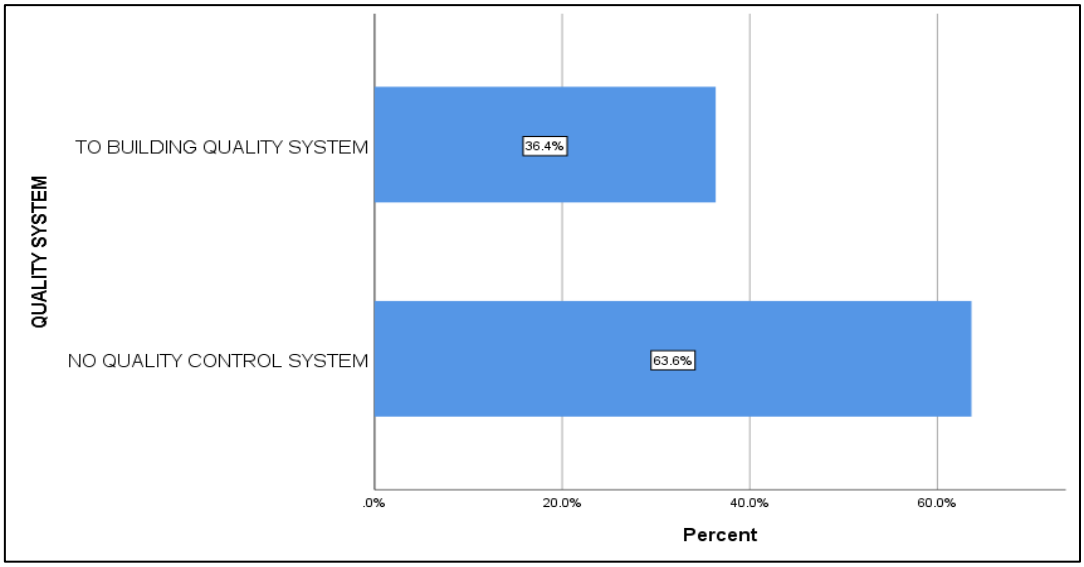

Figure (4.4): Quality Control Implementation Status in the Spare Parts Companies

4.3 Hierarchy Structure of TQM Success Factors

The first step in the analysis is to structure the TQM critical success factors into hierarchy by composing the TQM success factors into three levels. Figure (4.5) represents the hierarchy structure of the success factors which consist of three levels.

namely, level 1: the Main goal which is TQM implementation, level 2: consists of 6 main criteria, and level 3: the success factors that forms the main criteria.

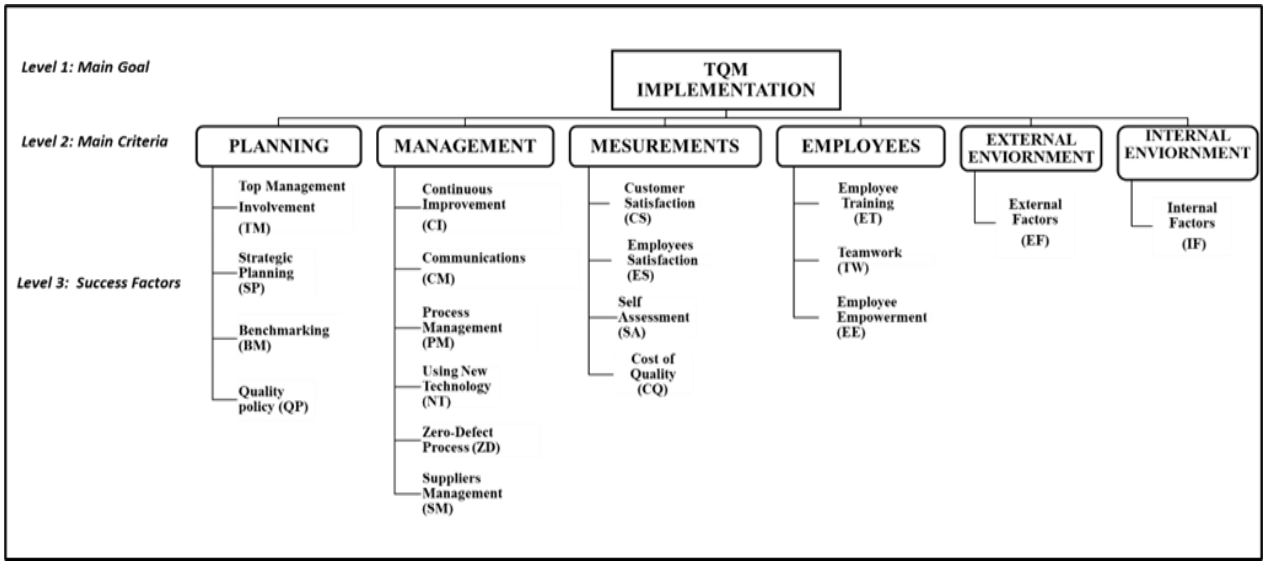

Figure (4.5): Hierarchy Structure of TQM Success Factors (Adopted from (Saaty, 2008))

4.4 Partial Least Square Structural Equation Modeling (PLS-SEM) Analysis

PLS-SEM is applied into many modern social science fields like, Organizing Management, Management Information Systems, Strategic Management, and Supply Chain Management (Hair, et al. 2018). Many researchers considered PLS-SEM analysis to giving significant results when applying to small sizes of samples. In this research, reflective hierarchical model was applied as measurement tool because the reflective scale offers the possibility of each TQM success Factors to influence and contribute in the main construct (TQM implementation) as shown in the Figure (4.5). In this study, the observed TQM success factors are represented as a source to implementing the TQM approach in the spare parts organization in the Palestinian market. Smart-PLS4 software package is used to evaluate the SEM analysis in this research. We have adapted reflective scale therefore, TQM implementation is the higher-level order reflective construct, as formed by main criteria (Planning, Management, Measurement, Employees, External Environment, and Internal

environment), then the success factors are the lowest level to form the main criteria. Figure (4.5) shows the model adapted for the PLS analysis. Figure (4.6) represents the measurement model adapted to the TQM implementation in the Palestinian spare parts organizations.

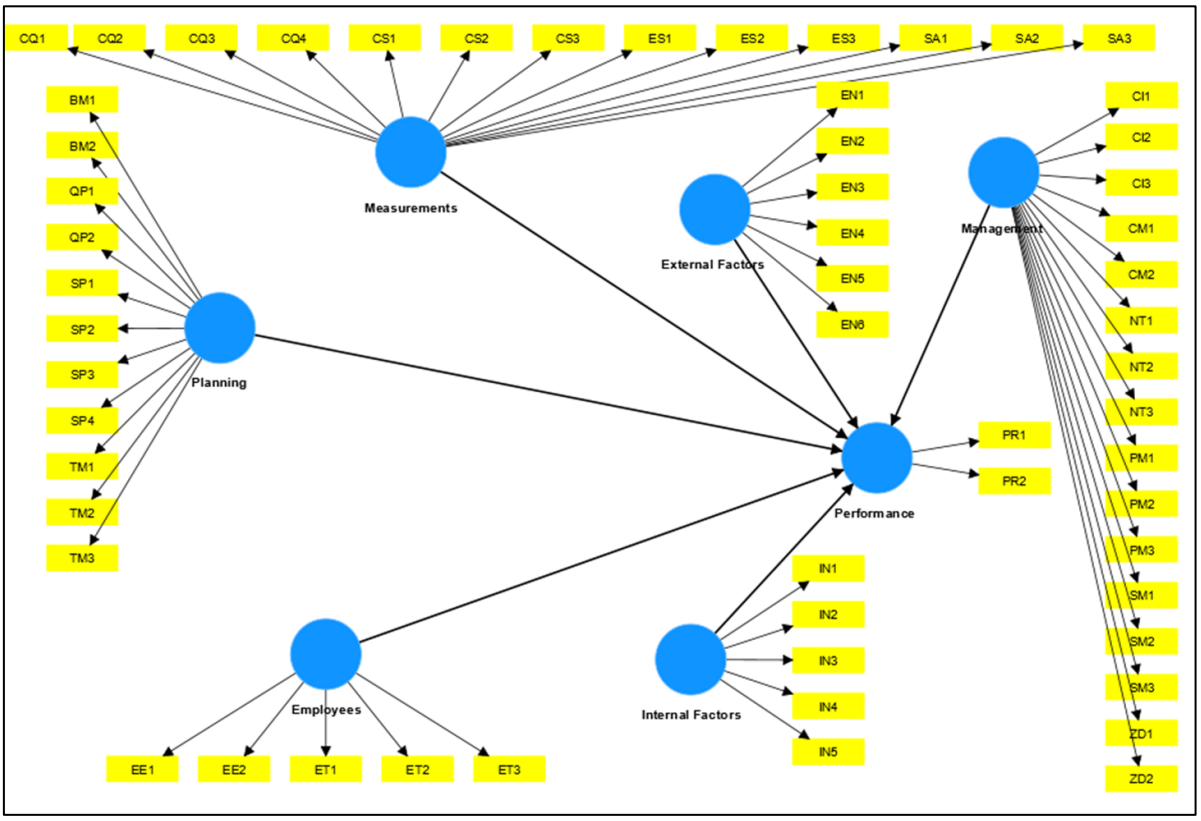

Figure (4.6): PLS Model Measurement

4.4.1 Assessment of Measurement Model (Outer Model)

The reflective measurement model is considered when the factors or indicators cause or contribute the forming of the construct or main criteria, the arrows are pointing from the main criteria to its factors. Therefore, when deleting one factor this will change the specification of the construct. Hair (2019) indicates the evaluation of the measurement

model by the following:

- **Statistical significance of factors weights**
- **Convergent validity**
- **Indicator collinearity**

4.4.1.1 Statistical Significance of Factors Weights

To evaluate the significance of structural model, the indicator's outer weight needs to be assessed, outer weight is an important criterion for evaluating the contribution and significance of each indicator to the construct. The values of outer weight can be obtained using the bootstrapping sample size of 5000. Outer weight and outer loading for each TQM success factor was calculated to evaluate the statistical significance, (outer weights which indicates the relative importance, and outer loadings which indicates the absolute importance). Then the *p* value of each weight was calculated. When TQM factor weight is significant, there is an empirical support that this factor is relevant or contribute to the forming the construct (TQM success factor), when the TQM factor weight is not significant but the corresponding outer loading is significant, the TQM success factor is significant, if both are not significant, there is no empirical support that the TQM success factors forming the construct and the factor needs to be eliminated (Afthanorhan, 2014). Larger weight is more relevant ($p<0.05$), outer loading of more than 0.5 is considered to be relevant (Hair, et al. 2019). Table (4.7) represents the values of outer weights and outer loadings for the TQM factors, (20 TQM success factors were found to be relevant by their outer weight value, and 38 TQM success factors were found to be relevant by their outer loading values.

Table (4.7): Values of Outer Weight and Outer Loading of TQM Success Factors

TQM Success Factor	Outer weight	T statistics (|O/STDEV|)	*p* values	Outer Loading	Result Weight	Result loading
BM1 -> Planning	0.16	0.288	0.17	0.583		Relevant
BM2 -> Planning	0.38	1.42	0.164	0.631		Relevant
QP1 -> Planning	0.697	2.014	0.044	0.807	Relevant	
QP2 -> Planning	0.381	0.969	0.365	0.608		Relevant
SP1 -> Planning	1.442	1.145	0.533	0.669		Relevant
SP2 -> Planning	0.258	2.434	0.013	0.432	Relevant	
SP3 -> Planning	1.21	2.698	0.007	0.492	Relevant	
SP4 -> Planning	1.503	2.042	0.041	0.32	Relevant	
TM1 -> Planning	0.302	2.261	0.024	0.122	Relevant	
TM2 -> Planning	0.334	2.183	0.029	0.383	Relevant	
TM3 -> Planning	1.043	2.184	0.034	0.245	Relevant	
CI1 -> Management	0.15	0.278	0.18	0.573		Relevant
CI2 -> Management	0.148	1.554	0.12	0.563		Relevant
CI3 -> Management	0.21	2.658	0.008	0.292	Relevant	
CM1 -> Management	0.352	1.514	0.13	0.686		Relevant
CM2 -> Management	0.191	1.476	0.234	0.581		Relevant
NT1 -> Management	0.11	0.147	0.662	0.516		Relevant
NT2 -> Management	0.28	1.3	0.194	0.67		Relevant
NT3 -> Management	0.397	1.032	0.302	0.577		Relevant
PM1 -> Management	0.232	2.241	0.025	0.019	Relevant	
PM2 -> Management	0.248	2.444	0.015	0.423	Relevant	
PM3 -> Management	0.29	2.521	0.012	0.528		Relevant
SM1 -> Management	0.271	3.186	0.001	0.003	Relevant	
SM2 -> Management	0.949	1.144	0.257	0.505		Relevant
SM3 -> Management	1.14	2.648	0.017	0.329	Relevant	
ZD1 -> Management	0.845	2.24	0.023	0.478	Relevant	
ZD2 -> Management	0.279	0.988	0.169	0.534		Relevant
CQ1 -> Measurement	0.274	1.982	0.048	0.337	Relevant	
CQ2 -> Measurement	0.405	2.61	0.039	0.427	Relevant	
CQ3 -> Measurement	1.58	1.245	0.071	0.697		Relevant
CQ4 -> Measurement	0.403	1.072	0.284	0.529		Relevant

CS1 -> Measurement	0.084	0.371	0.711	0.789		Relevant
CS2 -> Measurement	0.269	0.899	0.369	0.594		Relevant
CS3 -> Measurement	0.433	1.439	0.15	0.687		Relevant
ES1 -> Measurement	0.379	3.122	0.002	0.138	Relevant	
ES2 -> Measurement	1.201	1.12	0.31	0.61	Relevant	
ES3 -> Measurement	0.744	0.945	0.43	0.539		Relevant
SA1 -> Measurement	0.535	0.912	0.604	0.892		Relevant
SA2 -> Measurement	0.927	0.639	0.16	0.776		Relevant
SA3 -> Measurement	0.443	0.211	0.612	0.542		Relevant
EE1 -> Employees	0.151	0.669	0.212	0.742		Relevant
EE2 -> Employees	0.842	0.745	0.53	0.639		Relevant
ET1 -> Employees	0.23	2.026	0.043	0.321	Relevant	
ET2 -> Employees	0.342	2.58	0.01	0.599		Relevant
ET3 -> Employees	0.305	2.6	0.009	0.426	Relevant	
TW1 -> Employees	0.415	2.029	0.042	0.358	Relevant	
TW2 -> Employees	0.826	2.013	0.045	0.886		Relevant
EN1 -> External Environment	0.281	0.869	0.385	0.658		Relevant
EN2 -> External Environment	1.763	1.193	0.121	0.707		Relevant
EN3 -> External Environment	0.267	0.85	0.152	0.582		Relevant
EN4 -> External Environment	0.296	0.781	0.435	0.712		Relevant
EN5 -> External Environment	0.451	0.687	0.399	0.622		Relevant
EN6 -> External Environment	1.007	1.215	0.688	0.617		Relevant
IN1 -> Internal Environment	1.88	1.345	0.062	0.676		Relevant
IN2 -> Internal Environment	1.371	1.012	0.211	0.702		Relevant
IN3 -> Internal Environment	0.173	0.7	0.23	0.774		Relevant
IN4 -> Internal Environment	0.621	1.06	0.341	0.55		Relevant
IN5 -> Internal Environment	0.261	0.653	0.514	0.661		Relevant

4.4.1.2 Convergent Validity of Measurement Model

Assessment that measures the correlation level of multiple indicators within the same construct or main criteria is called convergent validity, in addition to the valuation of factors weight, there are two more indicators that measure the convergent validity in measurement model:

- **Composite Reliability (CR)**

It is internal tool consistency, that measures the reliability according to relationship between the factors and its construct. CR considered to be acceptable if it is 0.7 or more (Hair, et al., 2014)

- **Average Variance Extracted (AVE)**

It indicates the existence of construct validity and can be calculated by summation of squared loadings values of factors in the construct divided by the number of factors within the same construct, and it should be more than 0.5 to considered acceptable (Hair, et al., 20111). Table (4.8) represent the Composite Reliability with the Average Variance Extracted (AVE) for construct according to their loadings, where all CR values are greater than 0.7, and AVE values are greater than 0.5 which indicates acceptable convergent validity in the study.

Table (4.8): Composite Reliability and AVE of Constructs

Constructs	No. of Factors	Composite Reliability (CR)	AVE
Planning	11	0.711	0.502
Management	16	0.712	0.622
Measurements	13	0.856	0.575
Employees	7	0.822	0.533
External Environment	6	0.842	0.612
Internal Environment	5	0.835	0.623
Internal Environment	2	0.702	0.549

4.4.1.3 Indicators Collinearity

The indicators in measurement model are not correlated together, therefore, the correlation between TQM success factors is not expected to be exist, because the correlation between factors which referred as collinearity are problematic as it has an impact on the estimation of their weight of contribution to the construct and their statistical significance (Hair, et al. 2014). To determine the level of collinearity in PLS-SEM, Variance Inflation Factor (VIF) was assessed for each individual TQM success factors. There are two widely accepted rules of thumps to assess the VIF, if VIF is 5 or higher this indicates that there is an issue with collinearity (Hair, et al. 2011), the other is if VIF is more than 3.3, it indicates that there is a potential issue with collinearity problem (Diamantopoulos and Siguwa, 2006). Table (4.9) represent the VIF values for each TQM success factors which are all less than 5 or even 3.3 which indicates that there is no potential issue with collinearity.

Table (4.9): VIF Values for Each TQM Success Factor and its Main Criteria

Main Criteria	**VIF**	TQM S. Factor	**VIF**	Main Criteria	**VIF**	TQM S. Factor	**VIF**
Planning	1.297	BM1	1.397	Management	2.169	CI1	1.303
		BM2	1.523			CI2	1.849
		QP1	1.72			CI3	1.782
		QP2	1.621			CM1	2.347
		SP1	1.411			CM2	1.997
		SP2	2.324			NT1	1.394
		SP3	2.389			NT2	1.642
		SP4	2.155			NT3	1.579
		TM1	1.647			PM1	1.761
		TM2	1.651			PM2	1.811
		TM3	1.557			PM3	1.409
Measurements	1.523	CQ1	1.519	Employees	1.901	SM1	2.019
		CQ2	1.37			SM2	2.389
		CQ3	1.66			SM3	2.909
		CQ4	1.849			ZD1	1.268
		CS1	1.425			ZD2	1.196
		CS2	1.891			EE1	1.012
		CS3	2.367			EE2	1.065
		ES1	1.495			ET1	1.717
		ES2	1.303			ET2	1.478
		ES3	1.396			ET3	2.111
		SA1	1.485			TW1	1.14
		SA2	1.45			TW2	1.623
		SA3	1.646				
External Environment	1.268	EN1	1.223	Internal Environment	1.401	IN1	1.011
		EN2	2.931			IN2	1.168
		EN3	2.537			IN3	1.024
		EN4	1.753			IN4	1.073
		EN5	1.399			IN5	1.253
		EN6	1.512				

4.4.2 Evaluation of The Structural Model

After assessing the measurement model, the next step is to evaluate the structural model, which indicates the relationship between constructs. to assess the structural model three criteria will be evaluated (Hair, et al., 2019)

- **Coefficient of Determination ((R^2)**
- **The Effect Size (f^2)**
- **Blindfolding and Predictive Relevance (Q^2)**

4.4.2.1 Coefficient of Determination (R^2)

The primary evaluation criterion for measurement structural model is the coefficient of determination (R^2), which measures the value of the model's predictive relevance in the structural model. R^2 ranges from (0 – 1) and is considered to be high if it is more than 0.75, moderate when it is 0.5, weak when less than 0.25, and not acceptable if it is less than 0.19 (Hair, 2014).

Table (4.10) represents the R^2 value observed which achieved coefficient of determination (0.626) which is considered as moderate.

Table (4.10): Coefficient of Determination R^2 Value

Construct	R^2	R^2 Adjusted	Result
TQM Implementation	0.626	0.602	Moderate

4.4.2.2 Evaluation of the Effect Size (f^2) of Structural Model

The effect size is explained as the exogenous variable (constructs that explains other constructs in the model) contribution into the R^2 values of endogenous variable

(constructs that are being explained in the model). As a rule of thumb, if the of f^2 value less than 0.02 then it means that it has no effect size, between (0.02- 0.15) means having small effect size, between (0.15-0.35) means medium size effect, and values above 0.35 are considered to have a large effect size (Hair et al, 2014). Table (4.11) displays the value of f² for all exogenous variables.

Table (4.11): The Effect Size f^2 Values

Construct	TQM Success Factors	Result
Employees	0.142	Small
Management	0.082	Small
Measurement	0.187	Medium
Planning	0.233	Large
External Environment	0.105	Small
Internal Environment	0.703	Large

4.4.2.3 Blindfolding and Predictive Relevance (Q²)

Q² assesses the model's path predictive accuracy, and considered meaningful if it is greater than zero where it is considered medium when it is 0.25, and large when it is 0.5 or greater (Hair, et al., 2019). Table (4.12) represents the value s of Q² whereas all the values are greater than zero which considered meaningful.

Table (4.12): Blindfolding and Predictive Relevance (Q^2)

Construct	SSO	SSE	Q^2 (=1-SSE/SSO)	Range
Employees	312	214.23	0.31	Medium
Management	645	235.25	0.64	Large
Measurement	427	365.27	0.15	Small
Planning	368	246.88	0.33	Medium
External Environment	574	254.34	0.56	Large
Internal Environment	765	464.21	0.39	Medium
TQM Implementation	522	415.22	0.21	Small

Note: SSO is the sum of squares of observations, SSE is the sum of squares of prediction errors

4.5 AHP Rating Scale

To perform the AHP methods, the following steps were conducted in this study:

Step-1: Objective of the study

Step-2: Development of AHP hierarchical framework

Step-3 Compilation of observed information

Step-4: Perform pair wise comparison of attributes

Step-5: Development of pair-wise comparison matrix

Step-6: Normalization of matrix

Step-7: Consistency checking in pair wise matrix

Step-8 Ranking Hierarchy model of TQM Success Factors

In order to determine how much is the TQM success factor is important over the other factors, pair-wise comparisons among all factors were conducted by using AHP rating scale of 1 to 9 which was proposed by Saaty 2008. Table (4.13) represents the nine-point scale (1= equally, 3= moderate, 5= strong, 7= very strong, 9= extreme strong)

Table (4.13): AHP Pair-Wise Comparison Scale (Saaty, 2008)

Numeric	Description	Explanation
1	Equal Importance	Two factors contribute equally to the main goal
3	Moderate Importance	One factor slightly favors over another factor
5	Strong Importance	One factor strongly favors over another factor
7	Very Strong Importance	One factor very strongly favors over another factor
9	Extreme Importance	One factor is extreme strongly favor over another factor
2,4,6,8	Intermediate between Values	Intermediatory values between factors

4.5.1 AHP Rating Scale for Questionnaire

AHP rating scale has been applied to the questionnaire by converting the Five-Point Likert scale questionnaire answers of spare parts managers to AHP 9 scales. The weighted average of every success factor has been calculated according to the respondents' answers in the questionnaire, then the weighted average has been converted to AHP scale (Misra and Panda, 2017; Al Fozaie & Wahid, 2022). (Table 4.14) represents the results of transforming the weighted average of respondent's answers of the questionnaire to the AHP rating scale.

Table (4.14): Converting of Questionnaire Results to AHP Rating Scale

AHP value	Description	Questionnaire Value	Description
1	Equal Importance	**1**	Strongly Disagree
3	Moderate Importance	**2**	Disagree
5	Strong Importance	**3**	Neutral
7	Very Strong Importance	**4**	Agree
9	Extreme Importance	**5**	Strongly Agree

4.5.2 Results of the Mangers Review According to AHP Rating Scale

The results of the questionnaire have been calculated by weighted average of each TQM success factor, then the weighted average has been converted to the AHP values according to Table (4.12). Table (4.15) represent the findings and values of the TQM success factors according to the AHP rating scale.

Table (4.15): TQM Success Factors Values Obtained from the Questionnaire

TQM Success Factors	AHP Value	CSF	AHP
Top Management Involvement (TM)	9	Cost of Quality (CQ)	3
Customer Satisfaction (CS)	7	Benchmarking (BM)	5
Employee Satisfaction (ES)	3	Using New Technology (NT)	5
Continuous Improvement (CI)	5	Teamwork (TW)	5
Employee Training (ET)	5	Employee Empowerment (EE)	3
Communications (CM)	5	Zero-defect Process (ZD)	5
Supplier Management (SM)	7	Quality Policy (QP)	3
Strategic Planning (SP)	3	External Environment (EN)	3
Process Management (PM)	7	Internal Environment (IN)	5
Self-Assessment (SA)	5		

4.5.3 TQM Success Factors Comparison Matrix

To make the pairwise comparison for the TQM success factors values that obtained from the questionnaire in implementation of TQM , the scale in Table (4.4) used to identify each Success factor and compare the relative importance or contribution of each factor on TQM implementation in the Palestinian spare parts organizations, this comparison is conducted as a shape of matrix, which indicates how many times, or how strongly more is the left factor in the matrix attributes to the TQM implementation more than the factor in the top of the matrix (Saaty, 2008). The values from the questionnaire for each success factor have been entered according to the AHP scale, and pairwise comparison has been conducted for every factor to all other rest factors which was defined as follows: (9, 8, 7, 6, 5, 4, 3, 2, 1, 1/2, 1/3, 1/4, 1/5, 1/6, 1/7, 1/8, 1/9). Table (4.16) exhibits the importance of each success factor compared by other factors according to the AHP scale and according to the managers' judgment. For example, entering 2 (9-7) in the position of (TM, CS) in the matrix means that TM factor is 2 times more important than CS factor to implement the TQM in the Palestinian spare parts organizations, and vice versa, when enter ½ (7-9) this means that CS factor is half of importance of TM factor. Therefore, when we use the number to determine comparison between the importance of the factors (which is the result of subtracted the value success factor 1 – success factor 2), we should use the reciprocals to identify the value of opposite comparison (which is the result of success factor 2- success factor 1).

Table (4.16): Relative Pairwise Comparison of TQM Success Factors according to AHP Scale

	Results of pairwise comparison of TQM Success factors as obtained from the managers judgment (questionnaire)																		
Criterion	**TM**	**CS**	**SM**	**PM**	**CI**	**ET**	**CM**	**BM**	**NT**	**TW**	**ZD**	**IN**	**ES**	**SP**	**SA**	**CQ**	**EE**	**QP**	**EN**
TM	**1**	2	2	2	4	4	4	4	4	4	4	4	6	6	6	6	6	6	6
CS	1/2	**1**	1	1	2	2	2	2	2	2	2	2	4	4	4	4	4	4	4
SM	1/2	1	**1**	1	2	2	2	2	2	2	2	2	4	4	4	4	4	4	4
PM	1/2	1	1	**1**	2	2	2	2	2	2	2	2	4	4	4	4	4	4	4
CI	1/4	½	½	1/2	**1**	1	1	1	1	1	1	1	2	2	2	2	2	2	2
ET	1/4	½	½	1/2	1	**1**	1	1	1	1	1	1	2	2	2	2	2	2	2
CM	1/4	½	½	1/2	1	1	**1**	1	1	1	1	1	2	2	2	2	2	2	2
BM	1/4	½	½	1/2	1	1	1	**1**	1	1	1	1	2	2	2	2	2	2	2
NT	1/4	½	½	1/2	1	1	1	1	**1**	1	1	1	2	2	2	2	2	2	2
TW	1/4	½	½	1/2	1	1	1	1	1	**1**	1	1	2	2	2	2	2	2	2
ZD	1/4	½	½	1/2	1	1	1	1	1	1	**1**	1	2	2	2	2	2	2	2
IN	1/4	½	½	1/2	1	1	1	1	1	1	1	**1**	2	2	2	2	2	2	2
ES	1/6	¼	¼	1/4	1/2	1/2	1/2	1/2	1/2	1/2	1/2	½	**1**	1	1	1	1	1	1
SP	1/6	¼	¼	1/4	1/2	1/2	1/2	1/2	1/2	1/2	1/2	½	1	**1**	1	1	1	1	1
SA	1/6	¼	¼	1/4	1/2	1/2	1/2	1/2	1/2	1/2	1/2	½	1	1	**1**	1	1	1	1
CQ	1/6	¼	¼	1/4	1/2	1/2	1/2	1/2	1/2	1/2	1/2	½	1	1	1	**1**	1	1	1
EE	1/6	¼	¼	1/4	1/2	1/2	1/2	1/2	1/2	1/2	1/2	½	1	1	1	1	**1**	1	1
QP	1/6	¼	¼	1/4	1/2	1/2	1/2	1/2	1/2	1/2	1/2	½	1	1	1	1	1	**1**	1
EN	1/6	¼	¼	1/4	1/2	1/2	1/2	1/2	1/2	1/2	1/2	½	1	1	1	1	1	1	**1**

4.5.4 Normalization of Comparison Matrix

The normalization of Comparison matrix is made by dividing each value by the total column value in the comparison matrix in (Table 4.16) (Vafaei, et al., 2016). The values found in the Eigenvector have a direct physical meaning in AHP; they determine the participation or weight of that criterion relative to the total result of the main goal. The contribution of each criterion to the main goal is determined by calculating the average of every criterion value divided by the sum of the column in the matrix made using the priority vector (or Eigenvector). The Eigenvector shows the relative weights between each criterion to the main goal (Vargas, 2020). Table (4.17) represent that the sum of all values from the column in the matrix is always equal to one which means that the matrix is normal in its value and the contribution of each TQM criterion to the main goal.

Table (4.17): Normalization of Comparison Matrix

Results of Normalization of Comparison matrix of pairwise of TQM Success Factors																			
Criteria	**TM**	**CS**	**SM**	**PM**	**CI**	**ET**	**CM**	**BM**	**NT**	**TW**	**ZD**	**IN**	**ES**	**SP**	**SA**	**CQ**	**EE**	**QP**	**EN**
TM	0.176	0.186	0.186	0.186	0.186	0.186	0.186	0.186	0.186	0.186	0.186	0.186	0.146	0.146	0.146	0.146	0.146	0.146	0.146
CS	0.088	0.093	0.093	0.093	0.093	0.093	0.093	0.093	0.093	0.093	0.093	0.093	0.098	0.098	0.098	0.098	0.098	0.098	0.098
SM	0.088	0.093	0.093	0.093	0.093	0.093	0.093	0.093	0.093	0.093	0.093	0.093	0.098	0.098	0.098	0.098	0.098	0.098	0.098
PM	0.088	0.093	0.093	0.093	0.093	0.093	0.093	0.093	0.093	0.093	0.093	0.093	0.098	0.098	0.098	0.098	0.098	0.098	0.098
CI	0.044	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.049	0.049	0.049	0.049	0.049	0.049	0.049
ET	0.044	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.049	0.049	0.049	0.049	0.049	0.049	0.049
CM	0.044	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.049	0.049	0.049	0.049	0.049	0.049	0.049
BM	0.044	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.049	0.049	0.049	0.049	0.049	0.049	0.049
NT	0.044	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.049	0.049	0.049	0.049	0.049	0.049	0.049
TW	0.044	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.049	0.049	0.049	0.049	0.049	0.049	0.049
ZD	0.044	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.049	0.049	0.049	0.049	0.049	0.049	0.049
IN	0.044	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.049	0.049	0.049	0.049	0.049	0.049	0.049
ES	0.029	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.024	0.024	0.024	0.024	0.024	0.024	0.024
SP	0.029	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.024	0.024	0.024	0.024	0.024	0.024	0.024
SA	0.029	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.024	0.024	0.024	0.024	0.024	0.024	0.024
CQ	0.029	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.024	0.024	0.024	0.024	0.024	0.024	0.024
EE	0.029	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.024	0.024	0.024	0.024	0.024	0.024	0.024
QP	0.029	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.024	0.024	0.024	0.024	0.024	0.024	0.024
EN	0.029	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.024	0.024	0.024	0.024	0.024	0.024	0.024
Total	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
Average	**5.3%**	**5.3%**	**5.3%**	**5.3%**	**5.3%**	**5.3%**	**5.3%**	**5.3%**	**5.3%**	**5.3%**	**5.3%**	**5.3%**	**5.3%**	**5.3%**	**5.3%**	**5.3%**	**5.3%**	**5.3%**	**5.3%**

4.5.5 Calculating the Consistency Ratio (CR)

Before we performing the comparison analysis, the consistency of the matrix should be calculated because in the practical judgment, human opinion does not lead to a matrix with transitive entries, therefore inconsistency in the managers' opinion sometimes exists. Saaty (1994) suggests consistency ratio to verify the consistency of the AHP matrix, in this regard he suggests the inconsistency to be less than 0.1 to acceptable. In each comparison, the inconsistency has been calculated and represented in the following sections.

4.5.6 TQM Success Factors Comparison Analysis

4.5.6.1 Comparison Hierarchy Structure of TQM Success Factors

Comparison hierarchy structure of TQM success factors have been implemented depends on the categorization in Figure (4.5), where groups of TQM success factors form a main criterion; Figure (4.7) shows the comparison hierarchy structure of TQM success factors. The main goal is (TQM implementation), the main criteria are Planning, Management, Measurements, Employees, External Environment, and Internal Environment.

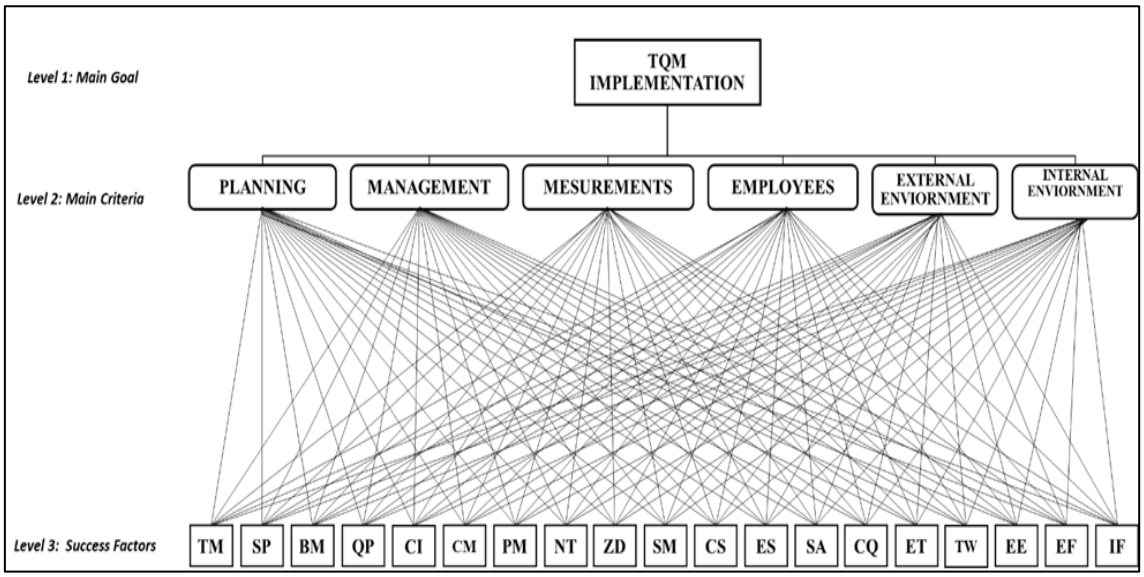

Figure (4.7): TQM Comparison Hierarchy Structure

4.5.6.2 Relative Importance of the Main Criteria

Relative importance of main criteria was performed with respect to the main Goal (TQM Implementation). Table (4.17) shows the relative importance of the main criteria of the TQM success Factors with respect to the main goal (TQM critical success factors)

Table (4.17): Relative Importance of Main Criteria of the TQM Success Factors with Respect to the Main Goal

Criteria	Planning	Management	Measurements	Employees	External Environment	Internal Environment
Planning	**1**	1/2	2	1	2	1
Management	2	**1**	4	2	4	2
Measurements	1/2	1/4	**1**	1/2	1	1
Employees	1	1/2	2	**1**	2	1
External Environment	1/2	1/4	1	1/2	**1**	1/2
Internal Environment	1	1/2	2	1	2	**1**

4.5.6.3 Pairwise Comparison Between Main Criteria

Pairwise comparison between main criteria of the TQM success factors with respect to the main goal (TQM Implantation) was performed, figure (4.8) shows the result of priority of pairwise comparison between the main criteria of the TQM critical success factors with respect to the main goal (TQM Critical Success Factors). The results in Figure (4.12) shows that the Management criteria has 0.334 priority, the Planning and employees have 0.167, Internal Environment has 0.151 priority, measurement 0.096 priority, and external environment has 0.084 priority, and the inconsistency ratio is 0.0 (less than 0.1, accepted)

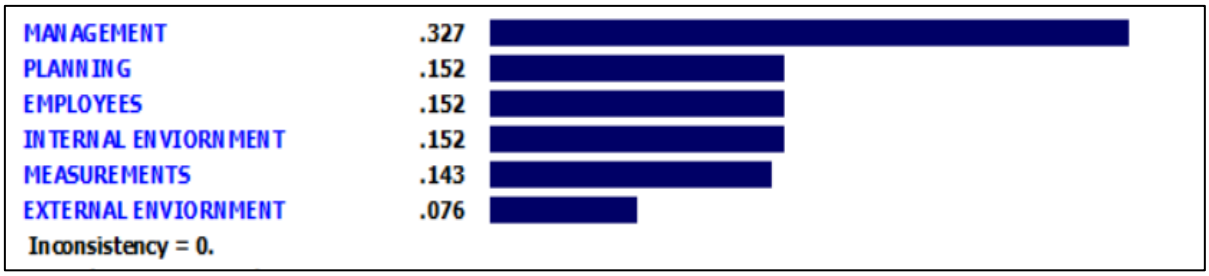

Figure (4.8): Pairwise Comparison Results Between Main Criteria of TQM Success Factors

4.5.6.2 Relative Importance of TQM Success Factors of Planning Criterion

Relative importance of TQM success factors with respect to the planning criterion was performed. Table (4.18) shows the relative importance of the TQM success Factors with respect to the planning main criterion.

Table (4.18): Relative Importance Between the TQM Success Factors of the Planning

Main Criterion: Planning	TM	SP	BM	QP
TM: Top Management Involvement	**1**	6	4	6
SP: Strategic Planning	1/6	**1**	1/2	1
BM: Benchmarking	¼	1/4	**1**	2
QP: Quality Policy	1/6	1	1/2	**1**

4.5.6.3 Pairwise comparison between TQM Success Factors of Planning criterion

Pairwise comparison between the TQM success factors of Planning was performed. Figure (4.9) shows the result of comparison: Top management 0.626 of priority, benchmarking 0.181 of priority, and both the strategic planning and quality policy 0.097 of priority, and the inconsistence ratio is 0.0039, less than 0.1 (accepted)

Figure (4.9): Result of Pairwise Comparison Between TQM Success Factors in the Planning

4.5.6.4 Relative Importance of TQM Success Factors in Management Criterion

Relative importance of TQM success factors with respect to the Management criterion was performed. Table (4.19) shows the relative importance of the TQM success Factors with respect to the Management main criteria.

Table (4.19): Relative Importance Between the TQM Success Factors of the Management

Main Criterion: Management	CI	CM	PM	NT	ZD	SP
CI: Continuous Improvement	**1**	1	½	1	1	1/2
CM: Communications	1	**1**	½	1	1	1/2
PM: Process Management	2	2	**1**	2	2	1
NT: Using New Technologies	1	1	½	**1**	1	1/2
ZD: Zero-Defect Process	1	1	½	1	**1**	1/2
SP: Supplier Management	2	2	1	2	2	**1**

4.5.6.5 Pairwise Comparison between TQM Success Factors of Management Criterion

Pairwise comparison between the TQM success factors of Management was performed. Figure (4.10) shows the result of comparison: Process management and Supplier Management have priority of 0.25, Continuous Improvement, Communications, using new technologies, and Zero-Defect Process have 0.125 of priority, and the inconsistency ratio is 0.0 (less than 0.1, accepted)

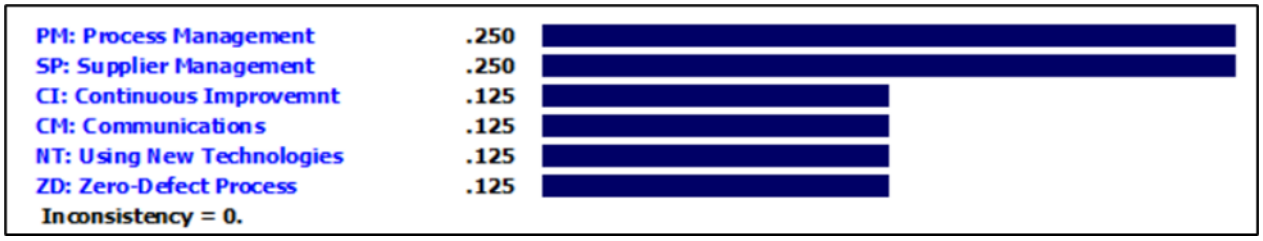

Figure (4.10): Results of pairwise comparison between TQM success Factors in the Management

4.5.6.6 Relative Importance of TQM Success Factors in Measurements Criterion

Relative importance of TQM success factors with respect to the Measurements criterion was performed. Table (4.20) shows the relative importance of the TQM success Factors with respect to the Measurements main criterion.

Table (4.20): Relative Importance Between the TQM Success Factors of the Measurement

Main Criterion: Measurements	CS	ES	SA	CQ
CS: Customer Satisfaction	**1**	4	4	4
ES: Employee Satisfaction	¼	**1**	1	1
SA: Self-Assessment	¼	1	**1**	1/4
CQ: Cost of Quality	¼	1	1	**1**

4.5.6.7 Pairwise comparison between TQM Success Factors of Measurements

Pairwise comparison between the TQM success factors of measurements was performed. Figure (4.11) shows the result of comparison: customer satisfaction has 0.571 of priority, Employee satisfaction, self-assessment, and cost of quality have 0.143, and inconsistency ratio of 0.0 (less than 0.1, accepted)

Figure (4.11): Results of pairwise comparison between TQM success Factors in the Measurements

4.5.6.8 Relative importance of TQM success factors in Employees criterion

Relative importance of TQM success factors with respect to the Employees criterion was performed. Table (4.21) shows the relative importance of the TQM success Factors with respect to the Employees main criterion.

Table (4.21): Relative Importance Between the TQM Success Factors of Employees

Main criterion: Employees	ET	TW	EE
ET: Employee Training	**1**	1	2
TW: Teamwork	1	**1**	2
EE: Employee Empowerment	1/2	1/2	**1**

4.5.6.9 Pairwise comparison between TQM Success Factors of Employees

Pairwise comparison between the TQM success factors of Employees was performed. Figure (4.12) shows the result of comparison: Employee training has 0.4 of priority,

Teamwork 0.4 of priority, Employee Empowerment 0.2 of priority, and inconsistency ratio of 0.0 (less than 0.1, accepted)

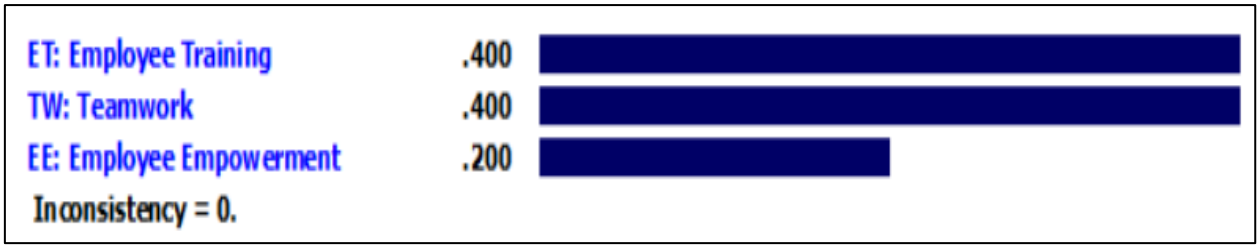

Figure (4.12): Results of Pairwise Comparison Between TQM Success Factors in the Employees

4.6 Calculating the Weights and Rankings of TQM Success Factors

To calculate each TQM success factor's weight and contribution level to the implementation of TQM approach in the spare parts supplier in the Palestinian market, Expert Choice 11 software package was used depending on the figure (4.11) and table (4.9). in order to calculate the final weight value of each success factor, weight of each main factor (which indicates the weight of main factor to the TQM implementation) was multiplied by the local weight (which indicates the weight of success factor inside the main factor). After final weight of each factor was determined, the factor's weight was ranked from highest level to the lowest level. Table (4.22) represents the weights of the main factors and the weights of TQM success, in addition, the ranking value of each TQM success factor.

Table (4.22): Values of local Weights, Global Weight Ranking of TQM Success Factors

Main criteria	Weight	TQM Success Factor	Local Weight	Global Weight	Calculated Ranking
Planning	0.167	Top Management Involvement	0.626	0.105	2
		Strategic Planning	0.097	0.016	9
		Benchmarking	0.181	0.03	8
		Quality Policy	0.097	0.016	9
Management	0.334	Continuous Improvement	0.125	0.042	6
		Communications	0.125	0.042	6
		Process Management	0.25	0.084	3
		Using New technologies	0.125	0.042	6
		Zero-Defect process	0.125	0.042	6
		Supplier Management	0.25	0.084	3
Measurements	0.096	Customer Satisfaction	0.571	0.055	5
		Employee Satisfaction	0.143	0.014	10
		Self-assessment	0.143	0.014	10
		Cost of Quality	0.143	0.014	10
Employees	0.167	Employee Training	0.4	0.067	4
		Teamwork	0.4	0.067	4
		Employee Empowerment	0.2	0.033	7
External Environment	0.084	External factors	1	0.084	3
Internal Environment	0.151	Internal Factors	1	0.151	1

4.6.1 Categorizing the Importance of Each TQM Success Factor

To categorize the TQM success factors importance in the Palestinian spare parts organizations, the ranking of each success factor was determined from highest values to

the lowest values. Then the weights of success factor were categorized according to its values. Table (4.23) represent the ranking of each TQM success factor and the category of importance for each success factor, it was found that there are 5 success factors were categorized as critical to implementing the TQM in the spare parts organizations, 9 factors were categorized as important to implementing the TQM in the spare parts organizations, and the last 5 factors were categorized as minor important when implementing the TQM in the spare parts organizations.

Table (4.23): Ranking of TQM Success Factors in Palestinian Spare Parts Suppliers

TQM success factors	Weight	Ranking	Amended Ranking	Importance category
Internal Factors	0.151	1	1	**Critical**
Top Management Involvement	0.105	2	2	
Process Management	0.084	3	3	
Supplier Management	0.084	3	4	
External factors	0.084	3	5	
Employee Training	0.067	4	6	**Important**
Teamwork	0.067	4	7	
Customer Satisfaction	0.055	5	8	
Continuous Improvement	0.042	6	9	
Communications	0.042	6	10	
Using New technologies	0.042	6	11	
Zero-Defect process	0.042	6	12	
Employee Empowerment	0.033	7	13	
Benchmarking	0.030	8	14	
Strategic Planning	0.016	9	15	**Minor Importance**
Quality Policy	0.016	9	16	
Employee Satisfaction	0.014	10	17	
Self-assessment	0.014	10	18	
Cost of Quality	0.014	10	19	

Chapter Five

Discussion

5.1 Overview

This chapter discusses the results of data analysis. The results of main criteria and the success factors were discussed in the first section, then the research questions were discussed and answered, in the final section, the hypotheses were testing according to the findings.

5.2 Discussion of Results

Despite the successful TQM implementation in many organizations in many countries around the world, this study came to reveal the implementation of TQM approach as a management philosophy in automotive spare parts organizations in Palestine through the assessment of spare parts suppliers' performance. Based on the results obtained, the following theoretical implications of TQM practices are presented as follows.

5.2.1 Discussion of the Results of Main Criteria of TQM

Based on what was obtained from AHP analysis of main criteria that influence the implementation of TQM in spare parts organization in Palestine as shown in Table (4.22), it was found that the management as a main criterion lies in the first position with 33% weight of the contribution to the TQM implementation, Employees and Planning in the second position with weight of 17% of contribution, internal environment in the third position with 15% of contribution, measurement in the fourth position with 10% of contribution, and the external environment in the last position with 8% of contribution.

This leads to the fact that the management is the corner stone in implementing the TQM in Palestinian spare parts organizations, then the employees and the planning come in the second position of importance, after that the internal environment, measurement and external environment.

5.2.2 Discussion of the Results of Success Factors of TQM

TQM success factors that the spare parts suppliers in Palestinian market should take care mostly when implementing the TQM approach in their organizations were ranked as shown in Table (4.23). the findings highlighted the 5 critical success factors of TQM implementation and their total weight is 51% of the contribution of TQM Implementation that are internal environment, top management involvement, process management, supplier management, and external environment. These findings supported by some of previous studies such as (Saraph et al., 1989; Ramirez and Loney, 1993; Flyn et al., 1994; Ahire and O'shaughessy, 1998; Zhang et al., 2000: Baidoun, 2003; Herzallah et al., 2014; Kumar and Sharma, 2017).

In the second level, 9 success factors were ranked to be important and their weight in contribution of TQM implementation is 42% were highlighted as follows: Employee training, teamwork, customer satisfaction, continuous improvement, communications, using new technologies, Zero-defect processes, Employee empowerment, and Benchmarking. As a result, the spare parts organization should pay more attention to the employee commitment which starts by employee training on the TQM philosophy and important skills, and empowerment them and apply teamwork philosophy in the workplace, which leads to the customer satisfaction and play active roles in continuous improvements which are important to any automotive spare parts organizations to be in

the market place. Benchmarking and explore the success experiences in the field of spare parts considered to be essential tool in using the new technologies of organizing, reporting, and applying modern ways of working to measure and evaluate the primary processes within the spare parts organizations.

In the third level, 5 minor importance TQM success factors were ranked to contribute 7% of the TQM implementation and are defined as: Strategic planning, quality policy, employee satisfaction, self-assessment, and cost of quality. These factors stand in the bottom level as the spare parts suppliers depends in their management approach on the operation rather than planning, the results show that these organizations pay less attention to planning of applying the quality management approaches and the employee satisfaction which related to the human resources management to keep the good employees in the work place and reduce the employee turnover.

5.3.3 Discussion of Research Questions

5.3.1 RQ1: What is the Current State of TQM Implementation and Performance of Automotive Spare Parts in Palestine?

The performance of automotive spare parts organizations found to be in their early stages in implementing the TQM approach as they face many challenges in the implementation of TQM practices in Palestine, some of these challenges are:

1. Limited Resources: Many automotive spare parts organizations in Palestine may lack the necessary resources to implement TQM practices effectively. For example, some organizations may not have enough financial resources to hire qualified TQM experts or invest in modern technology and equipment that can support TQM practices.

2. Political Instability: The political situation in Palestine can also hinder the implementation of TQM practices in the spare parts organizations. Frequent conflicts, instability, and occupation may disrupt organizational operations, making it difficult for organizations to focus on quality improvement initiatives.
3. Lack of Awareness: There may be a lack of awareness among employees and managers about the benefits of TQM practices in the automotive spare parts organizations. This lack of understanding can lead to resistance to change and reluctance to embrace new quality management techniques.
4. Cultural Factors: The cultural factors in Palestine can also pose challenges to the implementation of TQM practices. For example, there may be a hierarchical culture in spare parts organizations, which may hinder effective participation and involvement of employees in quality improvement initiatives.
6. Limited Access to Training and Development: Some spare parts organizations in Palestine may not have access to quality TQM trainings and development programs, making it difficult for them to implement and sustain TQM practices effectively.

5.3.2 RQ2: What are the Critical Success Factors of TQM that Can be Implemented in Automotive Spare Parts Suppliers in Palestine as Generated by AHP Approach?

Internal environment, Top management involvement, Process management, Supplier management, and External environment were ranked as critical success factors by applying the AHP approach to start implementing the TQM approach in the Palestinian spare parts organizations. These factors are known in the literature as fundamental

component the organizations should considered when implementing the TQM approach in their organizations

- Internal environment in the spare parts organization is the first critical factor which specifies the current situation of the organization in terms of the relationship between the employees, relationship between employees and the top management, staff readiness to accept changes, working to achieve the objectives of the organizations, how do the staff treat the customers. Working to improve these criteria may enhance the effectiveness of the internal environment inside the spare parts organizations.
- Top Management Involvement is the essential element in any improvement and the driver of TQM implementation in the spare parts organization, without the noticeable involvement of the top management there will be no dynamic actions to implement the TQM or any improvements in the organization.
- Process Management in the spare parts organization is considered to be very important to monitor the workflow an reduce the faults in the work place and achieve customer satisfaction, because the processes are the element that the organization is based on, when the organization improve the processes of the work, it can improve the whole situation of the organization.
- Supplier Management is the element that all spare parts suppliers work based on, monitor and evaluated the supplier performance according to capabilities and commitment of quality in providing the spare parts are the secret of spare parts organization successful.
- External Environment that has a direct impact on the performance of the automotive spare parts companies like governmental regulations, competitors, customer attitudes, and new technologies in vehicles are essential components that improve the external

environment and to accelerate the implementation the TQM in Palestinian spare parts organizations.

5.3.3 RQ3: What is an Appropriate Conceptual Framework that Includes the Critical Success Factors of TQM Implementation and Performance of Automotive Spare Parts Suppliers in Palestine?

Many researchers and quality experts came to the fact that the organizations' managers who are attempting to implement TQM approach are being confused where to start this implementation in their organization, even though they were familiar of many concepts, principles and models. The results of this research (Table 4.23) shows that there are 5 CSFs that are found to be essential to be addressed in the first step in implementing the TQM in spare parts organizations, there are 9 important success factors and 5 minor importance. Based on these findings, a conceptual frame work of TQM success factors were constructed for implementing the TQM in the spare parts organizations. Figure (5.1) represent the conceptual framework that can be a guide for any spare parts organization who want to start implementing the TQM approach.

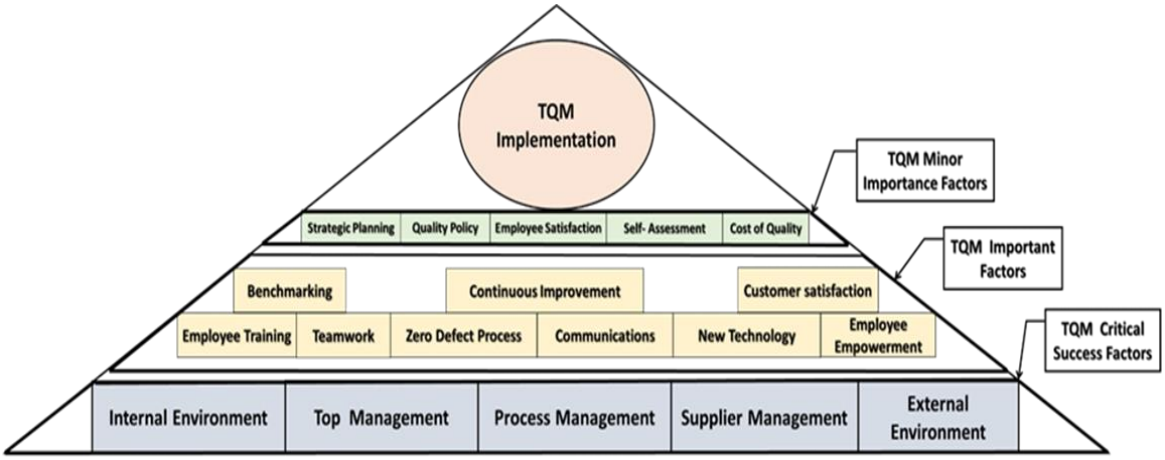

Figure (5.1): Conceptual Framework for TQM Implementation of Spare Parts Suppliers in Palestine

Most of the TQM success factors that the conceptual framework consists of had been identified and used by many other quality management consultants like (Bidoun and Zairi, 2003; Sabella et al., 2014; Herzallah et al., 2014). And business Excellence models such as EFQM and MBNQA.

5.4 Hypothesis Testing Results

5.4.1 H.1: There are no Critical TQM Success Factors that Can Impact the Automotive Spare Parts Suppliers' Performance in Palestine

Based on the findings of the ranking of TQM Success Factors in Palestinian spare parts suppliers in Table (4.23), the hypothesis No.1 can be rejected, that's means that there are critical success factors for implementing the TQM approach in Palestinian spare parts suppliers.

5.4.2 H.2: There are no Significant Differences Between the Automotive Spare Parts Suppliers' Performance in Palestine with Respect to Their Demographic Profiles.

Depending on results of research descriptive analysis section (4.2.2), the hypothesis No.2 can be rejected, this means that there are significant differences between the automotive spare parts suppliers' performance in Palestine with respect to their demographic profiles according to their business field, number of employees, year of establishment, spare parts type, customer type, and market share.

5.4.3 H3: There are no Significant Differences Between the Identified TQM Critical Success Factors in Terms of their Impact on the Automotive Spare Parts Suppliers' Performance in Palestine.

Based on the findings of the analysis of weights of TQM success factors in Table (4.23), the hypothesis No.3 can be rejected, that's mean that every TQM success factors has its own weight of contribution to the TQM implementation in the spare parts organization in Palestine, therefore we can find significant difference between identified TQM success factors in terms of their impact on the automotive spare parts suppliers in Palestine.

Chapter Six

Conclusions and Recommendations

Theoretical and Managerial Implications

6.1 Overview

In this chapter, the results of the research are completed and summarized. Moreover, the recommendations for Spare parts organizations to implementing TQM approach in future days are highlighted. This chapter also presents the research limitations and offers suggestions for future researches.

6.2 Conclusion

This study has supported the outcomes from many previous literatures and defined the TQM critical success factors in developing economies, namely the automotive spare parts suppliers in Palestine. Based on the wide revision of related literature reviews, a set of related hypotheses have been formulated and new conceptual framework was constructed to be a guide for implementing the TQM approach in automotive spare parts companies in Palestine. According to the analysis of collected data from the managers and experts of Palestinian automotive spare parts suppliers, this study makes several key conclusions:

- This study is the first of its kind in Palestine in this field and was limited to the automotive spare parts sector in Palestine due to its importance to Palestinian market.
- This study categorized the critical, important and minor importance success factors which have positive impact on implementing the TQM approach in the spare parts companies.

- The study defined the critical success factors that considered as a first step and requires the spare parts companies to focus on and pay serious attention to them when deciding implementing the TQM approach.
- Based on AHP theory, a conceptual framework of TQM success factors was constructed to be a practical guide for the spare parts organizations senior managers who are willing to implement the TQM approach in their companies.

6.3 Recommendations

According to the obtained results, several recommendations are presented to Palestinian automotive spare parts companies.

- Palestinian automotive spare parts companies are advised to pay more attention to the TQM approach by studying its concepts, practices and theory to move forward quality management and achieve excellence performance and employees and customer satisfaction.
- Internal environment in the workplace of spare parts organizations is critical component to implement TQM practices, therefore spare parts organizations are strongly encouraged to promote an environment that highlights company's objective and goals, company structure, company culture, self- assessment and human resources management for contributing towards quality improvements and extends employees' participation and involvement in the decision-making.
- External environment in Palestine like unstable economy, legal regulations, competitive forces, customer behaviors, new technologies and occupation are major issues that the spare parts companies experienced; therefore, these companies are strongly advised to

employ the benchmarking, trainings and continuous improvement to overcoming the external factors consequences.

- Appointing a TQM consultant in the spare parts companies is a good idea to increase the awareness of TQM benefits and starting the quality improvement trip.
- The spare parts companies are strongly encouraged to conduct trainings of TQM factors and practices like customer satisfaction, supplier management, process management, effective communication, and continuous improvements to integrate the TQM approach into all aspects of spare parts organizations as a second step.

6.4 Research Limitations and Future Researches

This study examined several limitations that would create an opportunity for those who want to conduct further researches on the same topic. Firstly, the study revealed that some of spare parts managers showed some limited knowledge about some TQM practices and factors that mentioned in the questionnaire, due to their nature of their practical experience in the spare parts engineering and specifications. Firstly, most of the respondents didn't have full knowledge about TQM practices and its advantages to their companies, therefore, talking about this kind of concepts carries some mystery to them, because some managers have pure engineering practical experiences and may find some difficulties to deal with management concepts. Secondly, the study targeted automotive spare parts sector in Palestine with predetermined factors which limiting the results overviews, thus, future researches may be conducted to extend the research to other sectors and industry. Thirdly, the study targeted the companies that work in the West Bank only, where the Gaza were excluded from the study due to the geographic separation and limited reaching of Gaza's companies, thus, more researches on the spare parts sector

can be conducted in the future to include Gaza strip companies, or neighbor countries like Jordan and Egypt for enlarging the findings. Fourthly, the study results depending on data collected from the mangers opinions, it may be more appropriate for accurate findings to gather more information regarding this topic from different stakeholders' viewpoints like suppliers, manufacturers customers and competitors.

References

Aamer, A. M., Al-Awlaqi, M. A., & Alkibsi, S. M. (2017). TQM implementation in a least developed country: An exploratory study of Yemen. *TQM Journal*, *29*(3), 467–487. https://doi.org/10.1108/TQM-11-2015-0141

Abu-Doleh, J. D. (2012). Human resource management and total quality management linkage - rhetoric and reality: Evidence from an empirical study. *International Journal of Commerce and Management*, *22*(3), 219–234. https://doi.org/10.1108/10569211211260300

Achetoui, Z., Mabrouki, C., & Mousrij, A. (2019). A review of spare parts supply chain management. *Jurnal Sistem Dan Manajemen Industri*, *3*(2), 67. https://doi.org/10.30656/jsmi.v3i2.1524

Ahire, S. L., & O'Shaughnessy, K. C. (1998). The role of top management commitment in quality management: an empirical analysis of the auto parts industry. *International Journal of Quality Science*, *3*(1), 5–37. https://doi.org/10.1108/13598539810196868

Ahmad, Y., & Pirzada, D. S. (2014). Using analytic hierarchy process for exploring prioritization of functional strategies in auto parts manufacturing SMEs of Pakistan. *SAGE Open*, *4*(4). https://doi.org/10.1177/2158244014553560

Alauddin, N., & Yamad. S (2019). Overview of Deming Criteria for Total Quality Management Conceptual Framework Design in Education Services. *Journal of Engineering and Science Research*, *3*(5), 12–20. https://doi.org/10.26666/rmp.jesr.2019.5.3

Al Fozaie, M. T., & Wahid, H. (2022). A Guide to Integrating Expert Opinion and Fuzzy AHP When Generating Weights for Composite Indices. *Advances in Fuzzy Systems*, *2022*, 1–12. https://doi.org/10.1155/2022/3396862

Aliyev, R., Temizkan, H., & Aliyev, R. (2020). Fuzzy analytic hierarchy process-based multi-criteria decision making for universities ranking. *Symmetry*, *12*(8), 1–15. https://doi.org/10.3390/sym12081351

al-Karim Alshaibi, A., Kahraman, G. D., & al-Ilah Qasim, A. (2016). Analytic Hierarchy Process (AHP) as criteria in business decision making and their implementation in practice. In *International Journal of Management and Business Studies* (Vol. 6, Issue 2). www.internationalscholarsjournals.org

Aquilani, B., Silvestri, C., Ruggieri, A., & Gatti, C. (2017). A systematic literature review on total quality management critical success factors and the identification of new avenues of research. In *TQM Journal* (Vol. 29, Issue 1, pp. 184–213). Emerald Group Publishing Ltd. https://doi.org/10.1108/TQM-01-2016-0003

Asif, M. (2020). Are QM models aligned with Industry 4.0? A perspective on current practices. In *Journal of Cleaner Production* (Vol. 258). Elsevier Ltd. https://doi.org/10.1016/j.jclepro.2020.120820

Awan, M. U., Raouf, A., Ahmad, N., & Sparks, L. (2009). Total quality management in developing countries: A case of pharmaceutical wholesale distribution in Pakistan. *International Journal of Pharmaceutical and Healthcare Marketing*, *3*(4), 363–380. https://doi.org/10.1108/17506120911006056

Awari, G. K., Kumbhar, V. S., & Tirpude, R. B. (2021). *Automotive systems: principles and practice*. CRC Press.

Baidoun, S. (2003). An empirical study of critical factors of TQM in Palestinian organizations. *Logistics Information Management*, *16*(2), 156–171.https://doi.org/10.1108/09576050310467296

Bernasconi, M., Choirat, C., & Seri, R. (2010). The Analytic Hierarchy Process and the Theory of Measurement. *Source: Management Science*, *56*(4), 699–711. https://doi.org/10.1287/mnsc.l090.1123

Bisgaard, S. (2008). Quality management and Juran's legacy. *Quality Engineering*, *20*(4), 390–401. https://doi.org/10.1080/08982110802317398

Bou-Liusar, J. C., Escrig-Tena, A. B., Roca-Puig, V., & Beltrán-Martín, I. (2009). An empirical assessment of the EFQM Excellence Model: Evaluation as a TQM framework relative to the MBNQA Model. *Journal of Operations Management*, *27*(1), 1–22. https://doi.org/10.1016/j.jom.2008.04.001

Brah, S. A., & Lim, H. Y. (2006). The effects of technology and TQM on the performance of logistics companies. *International Journal of Physical Distribution and Logistics Management*, *36*(3), 192–209. https://doi.org/10.1108/09600030610661796

Calvo-Mora, A., Navarro-García, A., Rey-Moreno, M., & Periañez-Cristobal, R. (2016). Excellence management practices, knowledge management and key business results in large organisations and SMEs: A multi-group analysis. *European Management Journal*, *34*(6), 661–673. https://doi.org/10.1016/j.emj.2016.06.005

Charni, H., Brun, I., & Ricard, L. (2020). Impact of employee job satisfaction and commitment on customer perceived value: An original perspective. *International Journal of Bank Marketing*, *38*(3), 737–755. https://doi.org/10.1108/IJBM-03-2019-0097

Cheng, E. W. l., li, H., & ho, D. C. k. (2002). Analytic hierarchy process (AHP):A defective tool when used improperly. *Measuring Business Excellence*, *6*(4), 33–37. https://doi.org/10.1108/13683040210451697

Chin, K.-S., Pun, K.-F., Xu, Y., & Chan, J. S. F. (2002). An AHP based study of critical factors for TQM implementation in Shanghai manufacturing industries. In *Technovation* (Vol. 22). www.elsevier.com/locate/technovation

Christian, B (2022, July, 12). A simple Guide to Spare Parts Management. Retrieved July, 02, 2023 from https://limblecmms.com/blog/spare-parts-management/

Dağdeviren, M., & Yüksel, I. (2008). Developing a fuzzy analytic hierarchy process (AHP) model for behavior-based safety management. *Information Sciences*, *178*(6), 1717–1733. https://doi.org/10.1016/j.ins.2007.10.016

Daniel, C. O., & Musa, M. R. (2020). Role of Total Quality Management on Entrepreneurial Orientation and SMEs Export Execution. *Asian Journal of Business and Management*, *8*(2). https://doi.org/10.24203/ajbm.v8i2.6160

Diamantopoulos, A., & Siguaw, J. A. (2006a). Formative versus reflective indicators in organizational measure development: A comparison and empirical illustration. *British Journal of Management*, *17*(4), 263–282. https://doi.org/10.1111/j.1467-8551.2006.00500.x

Eklöf, J. A., & Westlund, A. (1998). Customer satisfaction index and its role in quality management. *Total Quality Management*, *9*(4–5), 80–85. https://doi.org/10.1080/0954412988613

Erdil, A., & Erbiyik, H. (2019). The Importance of Benchmarking for the Management of the Firm: Evaluating the Relation between Total Quality Management and Benchmarking. *Procedia Computer Science*, *158*, 705–714. https://doi.org/10.1016/j.procs.2019.09.106

Escrig-Tena, A. B., Garcia-Juan, B., & Segarra-Ciprés, M. (2019). Drivers and internalization of the EFQM excellence model. *International Journal of Quality and Reliability Management*, *36*(3), 398–419. https://doi.org/10.1108/IJQRM-08-2017-0161

Feigenbaum, A. V. (1999, November 6). *The new quality for the twenty-first century*. http://www.emerald-library.com

Fernandes, A. C., Sampaio, P., Sameiro, M., & Truong, H. Q. (2017). Supply chain management and quality management integration: A conceptual model proposal. *International Journal of Quality and Reliability Management*, *34*(1), 53–67. https://doi.org/10.1108/IJQRM-03-2015-0041

Fonseca, L., Amaral, A., & Oliveira, J. (2021). Quality 4.0: The EFQM 2020 model and industry 4.0 relationships and implications. *Sustainability (Switzerland)*, *13*(6). https://doi.org/10.3390/su13063107

Fragapane, G., Eleftheriadis, R., Powell, D., & Antony, J. (2023). A global survey on the current state of practice in Zero Defect Manufacturing and its impact on production performance. *Computers in Industry*, *148*. https://doi.org/10.1016/j.compind.2023.103879

Gnanavelbabu, A., & Arunagiri, P. (2018). Ranking of MUDA using AHP and Fuzzy AHP algorithm. In *Materials Today: Proceedings* (Vol. 5). www.sciencedirect.comwww.materialstoday.com/proceedings

Gómez, J. G., Martínez Costa, M., & Martínez Lorente, Á. R. (2017). EFQM Excellence Model and TQM: an empirical comparison. *Total Quality Management and Business Excellence*, *28*(1–2), 88–103. https://doi.org/10.1080/14783363.2015.1050167

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice*, *19*(2), 139–152. https://doi.org/10.2753/MTP1069-6679190202

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019a). When to use and how to report the results of PLS-SEM. In *European Business Review* (Vol. 31, Issue 1, pp. 2–24). Emerald Group Publishing Ltd. https://doi.org/10.1108/EBR-11-2018-0203

Herzallah, A. M., Gutiérrez-Gutiérrez, L., & Munoz Rosas, J. F. (2014a). Total quality management practices, competitive strategies and financial performance: The case of the Palestinian industrial SMEs. *Total Quality Management and Business Excellence*, *25*(5–6), 635–649. https://doi.org/10.1080/14783363.2013.824714

Howell, R. D., Breivik, E., & Wilcox, J. B. (2007a). Reconsidering Formative Measurement. *Psychological Methods*, *12*(2), 205–218. https://doi.org/10.1037/1082-989X.12.2.205

Imran, M., Abdul Hamid, S. N. B., & Aziz, A. B. (2018a). The influence of TQM on export performance of SMEs: Empirical evidence from manufacturing sector in Pakistan using PLS-SEM. *Management Science Letters*, *8*(5), 483–496. https://doi.org/10.5267/j.msl.2018.3.003

Johnston, R., Jones, K., & Manley, D. (2018). Confounding and collinearity in regression analysis: a cautionary tale and an alternative procedure, illustrated by studies of British voting behaviour. *Quality and Quantity*, *52*(4), 1957–1976. https://doi.org/10.1007/s11135-017-0584-6

Kallio, H., Pietilä, A. M., Johnson, M., & Kangasniemi, M. (2016). Systematic methodological review: developing a framework for a qualitative semi-structured interview guide. In *Journal of Advanced Nursing* (Vol. 72, Issue 12, pp. 2954–2965). Blackwell Publishing Ltd. https://doi.org/10.1111/jan.13031

Koilakuntla, M., Patyal, V. S., Modgil, S., & Ekkuluri, P. (2012a). A Research Study on Estimation of TQM 'Factors Ratings' Through Analytical Hierarchy Process. *Procedia Economics and Finance*, *3*, 55–61. https://doi.org/10.1016/s2212-5671(12)00120-7

Kruger, V. (2001). Main schools of TQM: "The big five." In *TQM Magazine* (Vol. 13, Issue 3, pp. 146–155). Emerald Group Publishing Ltd. https://doi.org/10.1108/09544780110366042

Kujala, J., & Ullrank, P. (2004). Total Quality Management as a Cultural Phenomenon. *Quality Management Journal*, *11*(4), 43–55. https://doi.org/10.1080/10686967.2004.11919132

Kumar, V., & Sharma, R. R. K. (2017). An empirical investigation of critical success factors influencing the successful TQM implementation for firms with different strategic orientation. *International Journal of Quality and Reliability Management*, *34*(9), 1530–1550. https://doi.org/10.1108/IJQRM-09-2016-0157

Kwon, H. K., & Seo, K. K. (2014). A fuzzy AHP based multi-criteria decision-making model to select a cloud service. *International Journal of Smart Home*, *8*(3), 175–180. https://doi.org/10.14257/ijsh.2014.8.3.16

Lee, M.-C. (2010). The Analytic Hierarchy and the Network Process in Multicriteria Decision Making: Performance Evaluation and Selecting Key Performance Indicators Based on ANP Model. In *Convergence and Hybrid Information Technologies*. InTech. https://doi.org/10.5772/9643

Lewis, W. G., Pun, K. F., & Lalla, T. R. M. (2006). Exploring soft versus hard factors for TQM implementation in small and medium-sized enterprises. In *International Journal of Productivity and Performance Management* (Vol. 55, Issue 7, pp. 539–554). https://doi.org/10.1108/17410400610702142

Ligus, M., & Peternek, P. (2018). Determination of most suitable low-emission energy technologies development in Poland using integrated fuzzy AHP-TOPSIS method. *Energy Procedia*, *153*, 101–106. https://doi.org/10.1016/j.egypro.2018.10.046

Liu, Y., Eckert, C. M., & Earl, C. (2020). A review of fuzzy AHP methods for decision-making with subjective judgements. In *Expert Systems with Applications* (Vol. 161). Elsevier Ltd. https://doi.org/10.1016/j.eswa.2020.113738

Magno, F., Cassia, F., & Ringle, C. M. M. (2022). A brief review of partial least squares structural equation modeling (PLS-SEM) use in quality management studies. *TQM Journal*. https://doi.org/10.1108/TQM-06-2022-0197

Maitah, M., Hodrab, R., & Melad, A. (2014). The impact of quality management practices on firm's performance an empirical investigation of associated constructs in Palestinian information and communication technology firms. *International Business Management*.

Martínez-Lorente, A. R., Dewhurst, F., & Dale, B. G. (1998). Total quality management: Origins and evolution of the term. *TQM Magazine*, *10*(5), 378–386. https://doi.org/10.1108/09544789810231261

Maysoon Hesham Syaj Supervisor Riyad Abdel-Karim Awad, B. (2015). *Challenges in the Implementation of Quality Management in the Construction Sector in Palestine* [Master Thesis]. An-Najah National University.

Misra, S., & Kumar Panda, R. (2017). Scale transformation of analytical hierarchy process to Likert weighted measurement method: an analysis on environmental consciousness and brand equity. In *Int. J. Society Systems Science* (Vol. 9, Issue 3).

Mohamad, W., Bin, A., & Afthanorhan, W. (2014). Hierarchical Component Using Reflective-Formative Measurement Model In Partial Least Square Structural Equation Modeling (Pls-Sem). In *International Journal of Mathematics and Statistics Invention (IJMSI)* || (Vol. 2). www.ijmsi.org

Morgeson, F. V., Hult, G. T. M., Sharma, U., & Fornell, C. (2023). The American Customer Satisfaction Index (ACSI): A sample dataset and description. *Data in Brief*, *48*. https://doi.org/10.1016/j.dib.2023.109123

Mumtaz, A. (2022). Prioritizing and Overcoming Barriers to e-Health Use among Elderly People: Implementation of the Analytical Hierarchical Process (AHP). *Journal of Healthcare Engineering*, *2022*. https://doi.org/10.1155/2022/7852806

Najeh, R. I., & Kara-Zaitri, C. (2007). A comparative study of critical quality factors in Malaysia, Palestine, Saudi Arabia, Kuwait and Libya. In *Total Quality Management and Business Excellence* (Vol. 18, Issues 1–2, pp. 189–200). https://doi.org/10.1080/14783360601053400

Nenadal, J. (2020). The new EFQM model: What is really new and could be considered as a suitable tool with respect to quality 4.0 concept? *Quality Innovation Prosperity*, *24*(1), 17–28. https://doi.org/10.12776/QIP.V24I1.1415

Neyestani, B. (2017). Principles and Contributions of Total Quality Management (TQM) Gurus on Business Quality Improvement. *Selected Works*. https://doi.org/10.5281/zenodo.345428

Nkechi Eugenia, I. (2009). Quality Improvement in a Global Competitive Marketplace- Success Story from Nigeria. *International Journal of Business and Management*, *5*(1). https://doi.org/10.5539/ijbm.v5n1p211

Oakland, & John S. (2014). *Total Quality Management and Operational Excellence* (4th ed.). Routledge. www.routledge.com/cw/oakland

Obeidat, B., Tawalbeh, H. F., & Masa'deh, R. (2018). The Relationship between Human Resource Management (HRM) Practices, Total Quality Management (TQM) Practices and Competitive Advantages. *Modern Applied Science*, *12*(11), 17. https://doi.org/10.5539/mas.v12n11p17

Oschman, J. J. (2017). The role of strategic planning in implementing a total quality management framework: An empirical view. *Quality Management Journal*, *24*(2), 41–53. https://doi.org/10.1080/10686967.2017.11918508

Palestinian Central Bureau of Statistics. (2021). *State of Palestine Palestinian Central Bureau of Statistics*. http://www.pcbs.gov.ps

Palestinian Ministry of Transportation, 2020. *Annual Statistical Report*, Available at: http://www.mot.gov.ps/wpcontent/uploads/Portals/_Rainbow/Documents/Stats/Annual_1_Report2020_01.pdf

Palmberg, K. (2009). Exploring process management: Are there any widespread models and definitions? *TQM Journal*, *21*(2), 203–215. https://doi.org/10.1108/17542730910938182

Palmberg, K. (2010). Experiences of implementing process management: A multiple-case study. *Business Process Management Journal*, *16*(1), 93–113. https://doi.org/10.1108/14637151011017967

Patli, D. and R. N. (2023). Customer experience and satisfaction: Importance of customer reviews and customer value on buying preference. *International Research Journal of Modernization in Engineering Technology and Science*. https://doi.org/10.56726/IRJMETS36460

Peng, X., & Prybutok, V. (2015). Relative effectiveness of the Malcolm Baldrige National Quality Award categories. In *International Journal of Production Research* (Vol. 53, Issue 2, pp. 629–647). Taylor and Francis Ltd. https://doi.org/10.1080/00207543.2014.961207

Psarommatis, F., Prouvost, S., May, G., & Kiritsis, D. (2020). Product Quality Improvement Policies in Industry 4.0: Characteristics, Enabling Factors, Barriers, and Evolution Toward Zero Defect Manufacturing. In *Frontiers in Computer Science* (Vol. 2). Frontiers Media S.A. https://doi.org/10.3389/fcomp.2020.00026

Rane, N., & Choudhary, S. P. (2023). Fuzzy AHP and Fuzzy TOPSIS as an effective and powerful Multi-Criteria Decision-Making (MCDM) method for subjective judgements in selection process. *International Research Journal of Modernization in Engineering Technology and Science*. https://doi.org/10.56726/IRJMETS36629

Ray, S. S., & Tripathi, D. S. (2020). Role of Information Technology and Information System as an Antecedent to Successful Implementation of TQM. *International Journal of Recent Technology and Engineering (IJRTE)*, *8*(5), 1010–1016. https://doi.org/10.35940/ijrte.E6070.018520

Rezazadeh, A., Najafi, S., Hatami-Shirkouhi, L., & Miri-Nargesi, S. (2012a). Evaluating and prioritising critical success factors of TQM implementation based on fuzzy AHP. In *Quarterly Journal Modares Human Sciences-Management Research in Iran and Journal of Public Administration Perspective* (Vol. 9, Issue 1).

Ringle, C. M., & Sarstedt, M. (2016). Gain more insight from your PLS-SEM results. *Industrial Management & Data Systems*, *116*(9), 1865–1886. https://doi.org/10.1108/IMDS-10-2015-0449

Roopa, S., & Rani, M. (2012a). Questionnaire Designing for a Survey. *The Journal of Indian Orthodontic Society*, *46*, 273–277. https://doi.org/10.5005/jp-journals-10021-1104

Saaty, T. L. (1977). A Scaling Method for Priorities in Hierarchical Structures. In *JOURNAL 01: MATHEMATICAL PSYCHOLOGY* (Vol. 15).

Saaty, T. L. (1990). The analytic hierarchy process in conflict management. In *International Journal of Conflict Management* (Vol. 1, Issue 1, pp. 47–68). https://doi.org/10.1108/eb022672

Saaty, T. L. (2002a). Decision making with the Analytic Hierarchy Process. *Scientia Iranica*, *9*(3), 215–229. https://doi.org/10.1504/ijssci.2008.017590

Saaty, T. L. (2016). The analytic hierarchy and analytic network processes for the measurement of intangible criteria and for decision-making. *International Series in Operations Research and Management Science*, *233*, 363–419. https://doi.org/10.1007/978-1-4939-3094-4_10

Saaty, T. L., & Vargas, L. G. (2012). *The possibility of group choice: pairwise comparisons and merging functions*. *38*(3), 481–496. https://doi.org/10.1007/S00355-01

Sabella, A., Kashou, R., & Omran, O. (2014). Quality management practices and their relationship to organizational performance. *International Journal of Operations and Production Management*, *34*(12), 1487–1505. https://doi.org/10.1108/IJOPM-04-2013-0210

Sageer, A., Rafat, S., & Agarwal, P. (2012). Identification of Variables Affecting Employee Satisfaction and Their Impact on the Organization. *IOSR Journal of Business and Management (IOSR-JBM*, *5*(1), 32–39. www.iosrjournals.org

Saha, P., Talapatra, S., Belal, H. M., & Jackson, V. (2022). Unleashing the Potential of the TQM and Industry 4.0 to Achieve Sustainability Performance in the Context of a Developing Country. *Global Journal of Flexible Systems Management*, *23*(4), 495–513. https://doi.org/10.1007/s40171-022-00316-x

Salah, S., & Salah, D. (2019). Comparison between the UAE Government Excellence System, Malcolm Baldrige National Quality Award and European Foundation for Quality Management model: implications for excellence models. *International Journal of Quality and Innovation*, *4*(3/4), 121. https://doi.org/10.1504/ijqi.2019.105751

Saleh, Y. (2015). Developing an Inventory Management System for an Automobile-Spare Parts Local Distributor, International Journal of Engineering and Management Research (IJERM) ISSN: 2349-2058,Volume-02 Issue-09, September 2015

Sanchez, L., & Blanco, B. (2014). Three decades of continuous improvement. *Total Quality Management and Business Excellence*, *25*(9–10), 986–1001. https://doi.org/10.1080/14783363.2013.856547

Sanjana, *, Parumasur, B., & Govender, P. (2013). The Importance of Teamwork, Continuous Top Management Support and Training in Bringing About TQM. In *Journal of Economics and Behavioral Studies* (Vol. 5, Issue 9).

Saraph, J. V., Benson, P. G., & Schroeder, R. G. (1989). An Instrument for Measuring the Critical Factors of Quality Management. *Decision Sciences*, *20*(4), 810–829. https://doi.org/10.1111/j.1540-5915.1989.tb01421.x

Sayyad, N. (2017). The Relationship between Total Quality Management Practices and Their Effects on Firms Performance in Palestine. In *Business & Entrepreneurship Journal* (Vol. 6, Issue 2). online) Scienpress Ltd.

Sila, I., & Ebrahimpour, M. (2003). Examination and comparison of the critical factors of total quality management (TQM) across countries. *International Journal of Production Research*, *41*(2), 235–268. https://doi.org/10.1080/0020754021000022212

Stravinskiene, I., & Serafinas, D. (2020). The Link between Business Process Management and Quality Management. *Journal of Risk and Financial Management*, *13*(10), 225. https://doi.org/10.3390/jrfm13100225

Sun, C. C. (2010). A performance evaluation model by integrating fuzzy AHP and fuzzy TOPSIS methods. *Expert Systems with Applications*, *37*(12), 7745–7754. https://doi.org/10.1016/j.eswa.2010.04.066

Sun, M., Ng, C. T., Wu, F., & Cheng, T. C. E. (2022). Optimization of after-sales services with spare parts consumption and repairman travel. *International Journal of Production Economics*, *244*, 108382.

Taguchi, G. (1985). Quality engineering in Japan. *Communications in Statistics - Theory and Methods*, *14*(11), 2785–2801. https://doi.org/10.1080/03610928508829076

Talib, F., Rahman, Z., & Qureshi, M. N. (2011). A study of total quality management and supply chain management practices. In *International Journal of Productivity and Performance Management* (Vol. 60, Issue 3, pp. 268–288). https://doi.org/10.1108/17410401111111998

Talib, F., Rahman, Z., & Qureshi, M. N. (2011). Prioritizing the practices of total quality management: An analytic hierarchy process analysis for the service industries. *Total Quality Management & Business Excellence*, 22(12), 1331–1351. doi:10.1080/14783363.2011.625192

Triantaphyllou, E., & Mann, S. H. (1995a). USING THE ANALYTIC HIERARCHY PROCESS FOR DECISION MAKING IN ENGINEERING APPLICATIONS: SOME CHALLENGES. *Journal of Industrial Engineering: Applications and Practice*, *2*(1), 35–44.

Twaissi, N. M. M. (2008). *AN EVALUATION OF THE IMPLEMENTATION OF TOTAL QUALITY MANAGEMENT (TQM) WITHIN THE INFORMATION AND COMMUNICATIONS TECHNOLOGY (ICT) SECTOR IN JORDAN*. University of Jordan.

Ugboro, I. O., & Obeng, K. (2000). Top management leadership, employee empowerment, job satisfaction, and customer satisfaction in TQM organizations: an empirical study. In *www.journalofqualitymanagement.com Journal of Quality Management* (Vol. 5). www.journalofqualitymanagement.com

Umam, R., & Jermsittiparsert, K. (2019). *Supplier Relationship Management, TQM Implementation, Leadership and Environmental Performance: Does Institutional Pressure Matter Entrepreneurship View project Empirical Discourse Analysis Project View project*.

Vafaei, N., Ribeiro, R. A., & Camarinha-Matos, L. M. (2016). Normalization techniques for multi-criteria decision making: analytical hierarchy process case study. In *Technological innovation for cyber-physical systems: 7th IFIP WG 5.5/SOCOLNET advanced doctoral conference on computing, electrical and industrial systems, DoCEIS 2016, Costa de Caparica, Portugal, April 11–13, 2016, Proceedings 7* (pp. 261-269). Springer International Publishing.

Vaidya, O. S., & Kumar, S. (2006a). Analytic hierarchy process: An overview of applications. *European Journal of Operational Research*, *169*(1), 1–29. https://doi.org/10.1016/j.ejor.2004.04.028

van Kemenade, E., & Hardjono, T. W. (2019). Twenty-first century Total Quality Management: the Emergence Paradigm. In *TQM Journal* (Vol. 31, Issue 2, pp. 150–166). Emerald Group Holdings Ltd. https://doi.org/10.1108/TQM-04-2018-0045

van Schoten, S., de Blok, C., Spreeuwenberg, P., Groenewegen, P., & Wagner, C. (2016). The EFQM Model as a framework for total quality management in healthcare: Results of a longitudinal quantitative study. *International Journal of Operations and Production Management*, *36*(8), 901–922. https://doi.org/10.1108/IJOPM-03-2015-0139

Van Trang, T., & Do, Q. H. (2020). Critical success factors of TQM implementation in Vietnamese supporting industries. *Journal of Asian Finance, Economics and Business*, *7*(7), 391–401. https://doi.org/10.13106/jafeb.2020.vol7.no7.391

Vargas, R. V. (2010). Using the analytic hierarchy process (AHP) to select and prioritize projects in a portfolio. *Paper presented at PMI® Global Congress 2010—North America, Washington, DC. Newtown Square*, PA: Project Management Institute.

Wilson, D. D., & Collier, D. A. (2000). *An Empirical Investigation of the Malcolm Baldrige National Quality Award Causal Model Subject Areas: Performance Measurement, Quality Management, and Struc-tural Equation Modeling* (Vol. 31).

Wai, L. S. M. D. L., Seebaluck, A. K., & Teeroovengadum, V. (2011). Impact of information technology on quality management dimensions and its implications. *European Business Review*, *23*(6), 592–608. https://doi.org/10.1108/09555341111175426

Weckenmann, A., Akkasoglu, G., & Werner, T. (2015). Quality management - History and trends. *TQM Journal*, *27*(3), 281–293. https://doi.org/10.1108/TQM-11-2013-0125

Wood, D.C. (2013). Principles of quality costs: financial measures for strategic implementation of quality management. American Society for Quality, Quality Press, Milwaukee, WI 53203

Wu, H. H., & Tsai, Y. N. (2012). Using AHP to evaluate the criteria of auto spare parts industry. *Quality and Quantity*, *46*(1), 359–364. https://doi.org/10.1007/s11135-010-9367-z

Yang, C. C. (2006a). The impact of human resource management practices on the implementation of total quality management: An empirical study on high-tech firms. *TQM Magazine*, *18*(2), 162–173. https://doi.org/10.1108/09544780610647874

Yaseen, M. M., Sweis, R. J., Abdallah, A. B., Obeidat, B. Y., & Sweis, N. J. (2018). Benchmarking of TQM practices in the Jordanian pharmaceutical industry (a comparative study). *Benchmarking*, *25*(9), 4058–4083. https://doi.org/10.1108/BIJ-04-2017-0076

Youssef, M. A., & Zairi, M. (1995). Benchmarking critical factors for TQM. *Benchmarking for Quality Management & Technology*, *2*(2), 3–19. https://doi.org/10.1108/14635779510090517

Zairi, M. (1994a). Benchmarking: The Best Tool for Measuring Competitiveness. *Benchmarking for Quality Management & Technology*, *1*(1), 11–24. https://doi.org/10.1108/14635779410056859

Zairi, M. (1994b). Benchmarking: The Best Tool for Measuring Competitiveness. *Benchmarking for Quality Management & Technology*, *1*(1), 11–24. https://doi.org/10.1108/14635779410056859

Zairi, M. (2013). The TQM legacy - Gurus' contributions and theoretical impact. *TQM Journal*, *25*(6), 659–676. https://doi.org/10.1108/TQM-06-2013-0069

Zairi, M., & Youssef, M. A. (1995). Benchmarking critical factors for TQM. *Benchmarking for Quality Management & Technology*, *2*(1), 5–20. https://doi.org/10.1108/14635779510081616

Zimmermann, H.-J. (2001). Fuzzy Set Theory—and Its Applications. In *Fuzzy Set Theory—and Its Applications*. Springer Netherlands. https://doi.org/10.1007/978-94-010-0646-0

Appendices

Appendix (1): Questionnaire in English Language

Dear Manager,

This study comes within the preparation of a master's thesis in the Master of Quality Management program at the Faculty of Graduate Studies at the Arab American University.

This questionnaire aims to define the "Critical Success Factors of Total Quality Management" for Automotive spare parts companies in Palestine. In order to achieve the desired goal of this questionnaire, your assistance in providing accurate, honest and objective answers according to your experience in the field of automotive spare parts to the questions in this questionnaire is highly appreciated. Kindly notice that answering all questions will take approximately 15 minutes. The results of this questionnaire will be used for scientific research purposes only, while maintaining the strict confidentiality of this information and its source.

If you have any inquiries or questions about the questionnaire or its results, don't hesitate to contact me through the following contact details.

a.tomeh1@student.aaup.edu

Mobile No.: 0597-497506

Thank you very much for your kind cooperation.

Note: This questionnaire targets managers of automotive spare parts in automotive importers companies or managers of automotive spare parts companies in Palestine

Researcher: Alaa Tomeh

Section one: Demographic information

Please choose the answer that reflects your situation and the current situation of the company

1.1- Information about the manager who fills out the questionnaire

1.1.1- What is you education level

( ) High School or less

( ) Diploma

( ) Bachelor's

( ) Postgraduate

1.1.2- How many years of experience do you have in the auto spare parts business?

( ) From one year to less than 3 years

( ) From 3 years to less than 6 years

( ) From 6 years to less than 9 years

( ) More than 9 years

1.2- Information about the company

1.2.1- What is the specific scope of your company's work in spare parts?

( ) Automotive spare parts company only

( ) vehicles and spare parts dealership

( ) Other (please specify):_____

1.2.2- What is the number of employees in your company / or spare parts department in your company?

( ) 10 employees

( ) From 10 to 20 employees

( ) From 21 to 30 employees

( ) more than 30 employees

1.2.3- Company establishment year? _____

1.2.4- What type of spare parts do you deal with in your company?

( ) lubricants

( ) Body parts

( ) Electric parts

( ) mechanical parts

( ) All types of Spar Parts and lubricants

1.2.5- Who are the customers of your company or the spare parts department in your company?

( ) External maintenance workshops

( ) Customers who have vehicles from your dealership

( ) Retail customers

( ) wholesale customers

( ) all kinds of customers

1.2.6- What is your market share (approximately) in spare parts Palestinian market?

( ) less than 5%

( ) 5% to less than 15%

( ) 15% to less than 25%

( ) more than 25%

1.2.7- What are the factors that prevent the economic growth of your company or the spare parts department in your company? (You can choose more than one answer)

( ) Political factors (occupation)

( ) Government factors (procedures and laws)

( ) Technological factors for new vehicles

( ) Administrative factors (not keeping up with the administrative development in business)

( ) Human Resources factors (related to staff competencies)

1.2.8- Do you have a quality control system or a quality management system? If the answer is yes, please specify the system.

( ) No, we don’t have

( ) In the process of preparation and construction

( ) Yes, please specify the name of the system:_____

Section Two: Evaluation of the company's performance in terms of applying "Total Quality Management" factors and criteria

Please specify the degree of your agreement by placing an (X) on the following questions and sentences so that the answers are 5: Strongly agree, 4: Agree, 3: Neutral, 2: Disagree, 1: Strongly disagree

2.1 Involvement of Top management and its commitment to applying the factors of "Total Quality Management"

Question	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
2.1.1 Top management of the company pays attention to quality and is keen to apply its standards to the progress of operations and activities in the company or its spare parts department					
2.1.2 Top management is aware of all that is new in order to improve the quality in the company or its spare parts department					
2.1.3 Top management makes all necessary efforts to raise the level of quality in the company or its spare parts department					

2.2 Customer satisfaction and dealing with customer complaints

Question	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
2.2.1 The company or the spare parts department is keen to meet the requirements and needs of existing customers and periodically measures the extent of customer satisfaction					
2.2.2 The company studies and tries to meet the requirements and needs of the company's future customers					
2.2.3 All customer complaints are received through a specific procedure and are resolved in ways that are satisfactory to customers					

2.3 Employees Satisfaction

Question	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
2.3.1 To what extent does the company consider employees as partners in important decisions in the company or its spare parts department?					
2.3.2 Employees express their opinions honestly and their suggestions are taken seriously by the top management					
2.3.3 To what extent do you think that employee satisfaction is one of the most important factors for the success of the company and the achievement of its strategic objectives?					

2.4 Continuous Improvement and Adopting the Successful References in the Company					
Question	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
2.4.1 Procedural errors in operations are circulated to the concerned employees in order to avoid their occurrence in the future					
2.4.2 The company uses workshops, analysis and decision-making tools such as brainstorming in order to raise the level of performance of the company or spare parts department					
2.4.3 The company applying international quality standards such as ISO to evaluate the performance of departments or to evaluate the performance of operations within the company or the spare parts department					
2.5 Employees Development and Training					
Question	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
2.5.1 Trainings are held for employees inside and outside the company on a regular basis					
2.5.2 Positions are rotated for employees in the company or the spare parts department					
2.5.3 The company monitors the development of employee performance through modern evaluation tools based on trainings					
2.6 Communication within the company					
Question	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
2.6.1 An evaluation of the company's communication tools is carried out					
2.6.2 The company is keen to improve communication tools inside and outside the company					
2.7 Relationship with Manufacturers and Suppliers					
Question	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
2.7.1 An evaluation is made for the communication processes between your company or your spare parts department and manufacturers and suppliers					
2.7.2 Mutual work visits are performed between suppliers or manufacturers and the company's management to explore the latest developments					
2.7.3 Quality instructions from manufacturers and suppliers are implemented and applied to operations inside and outside the company					

2.8 Defining Business Plans and Objectives of the Company					
Question	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
2.8.1 There is always a strategic plan and an annual target for the company in general and the spare parts department in particular					
2.8.2 Objectives related to quality standards are defined in the company or the spare parts department and there are efforts to achieve them					
2.8.3 The spare parts department manager or field managers are involved in setting objectives related to the company's quality standards					
2.8.4 The achievements of the strategic goals and plans of the company or its spare parts department are evaluated					
2.9 Managing operations and activities in the company					
Question	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
2.9.1 I believe that effective operations management is one of the success factors of the company					
2.9.2 There are written instructions on how perform all operations and activities within the company					
2.9.3 Operations and activities are evaluated periodically based on the quality of these activities and the purpose of each activity or process is determined					
2.10 Internal Evaluation of the Performance of the Spare Parts Department					
Question	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
2.10.1 An evaluation of the performance of the spare parts department in the company is carried out according to KPI's, which are prepared and designed according to "Total Quality Management"					
2.10.2 Suggestions related to developing the quality level in the company are taken seriously and implemented					
2.10.3 Employees of the company deal with their colleagues as they deal with customers, considering their colleagues as internal customers, each according to the requirements of his job					
2.11 Cost of Quality					
Question	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
2.11.1 The company calculates the costs of poor quality (internal and external failures to deliver the service) on a regular basis					

2.11.2 The costs of poor quality (internal and external failures to provide the service) are greater than the costs of a company's quality standards					
2.11.3 The company works to spread the culture of reducing the costs of bad quality among its employees in order to reduce them					
2.11.4 The company allocates part of its budget to enhance the serious quality costs by prevention, examination and inspection procedures for its products and services					
2.12 Benefit from successful companies' experiences through Benchmarking					
Question	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
2.12.1 The company constantly reviews the successful experiences and tries to benefit from its experiences to improving the level of its services quality					
2.12.2 The company follows the example of successful companies and tries to find the reason for their success by “Benchmarking”					
2.13 Using New Technologies					
Question	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
2.13.1 The company uses special programs for financial management, inventory management, human resources management and reports, and they are updated according to business needs					
2.13.2 New technologies, such as computer programs, is used to prepare quality reports and evaluate processes within the company					
2.13.3 The latest software computer and new technologies are used to check, and calibrate spare parts in the company					
2.14 Teamwork					
Question	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
2.14.1 The company is keen on teamwork and considers this one of the quality standards within the company					
2.14.2 The teamwork of employees is valued in the company					
2.15 Employees Empowerment					
Question	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
2.15.1 The management takes employee suggestions related to improving work performance very seriously and tries to implement their suggestions related to quality					

2.15.2 The company encourages employees to submit their suggestions to improve the level of performance and quality in the company					
2.16 Reaching the Zero-Defect Processes					
Question	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
216.1 The activities and processes within the company are reviewed to ensure that they are free of any defects or failures					
2.16.3 Using of analysis and evaluation tools to perform operations and processes within the company or within the spare parts department is evaluated					
2.17 Adoption of the Quality Policy by the Company					
Question	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
217.1 The company generally adopts a policy of high quality for its products and services					
2.17.2 The company relies in evaluating employee performance on the quality policy					
Section Three: The Role that the External Environmental Factors Play in Encouraging the Implementation of "Total Quality Management"					
Please specify the degree of your agreement by placing an (X) on the following questions and sentences so that the answers are 5: Strongly agree, 4: Agree, 3: Neutral, 2: Disagree, 1: Strongly disagree					
Question	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
3.1 I believe that government policies and laws help the company in implementing "Total Quality Management" factors.					
3.2 I believe that the culture of customers in the spare parts market contributes to raising the level of performance in "Total Quality Management" in the company or the spare parts department					
3.3 I believe that the use of new technology contributes to the company's application of "total quality management" concepts					
3.4 I believe that the auto spare parts market helps the company to apply the concepts and factors of "Total Quality Management"					
3.5 The competitive nature of auto spare parts plays a role in improving the performance of companies and raising the level of quality in their processes					

Section Four: Internal Factors that Limit the Adoption of "Total Quality Management" factors in the Company					
Please specify the degree of your agreement by placing an (X) on the following questions and sentences so that the answers are 5: Strongly agree, 4: Agree, 3: Neutral, 2: Disagree, 1: Strongly disagree					
Question	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
4.1 The lack of interest of top management in the importance of "total quality management" limits the company's adoption of that strategy					
4.2 Information, data and programs about "Total Quality Management" are not available in the company or in the spare parts department					
4.3 Training employees on the "total quality management" methodology is not available in the company or in the spare parts department					
4.4 There is no clear plan for the company or the spare parts department to implement the concept of "Total Quality Management					
4.5 The nature of customers and the market does not allow the adoption of "Total Quality Management" factors in the company or the spare parts department					
4.6 The size of the company does not need such concepts in management					

Thank you for your cooperation

Appendix (2): Questionnaire in Arabic language

حضرة المدير المحترم،

تحية طيبة وبعد،

تأتي هذه الدراسة ضمن اعداد رسالة الماجستير في برنامج ماجستير ادارة الجودة في كلية الدراسات العليا في الجامعة العربية الأمريكية.

تهدف هذه الاستبانة الى تعريف " عوامل إدارة الجودة الشاملة" لدى مزودي قطع غيار المركبات في فلسطين.

من أجل تحقيق الغاية المرجوة من هذه الاستبانة، أرجو مساعدتكم في توفير إجابات دقيقة و صادقة و موضوعية حسب خبراتكم في مجال قطع غيار المركبات على الاسئلة الواردة في هذا الاستبيان علما أن الاجابة على جميع الاسئلة تستغرق 8 دقائق تقريبا. سيتم استخدام نتائج هذا الاستبيان لأغراض البحث العلمي فقط مع الحفاظ على السرية التامة لهذه المعلومات و مصدرها.

اذا كان لديكم اي استفسار عن الاستبانة او نتائجها يمكنكم مراسلتي عبر البريد الالكتروني ادناه

مع الشكر و الاحترام،

علاء طعمه

ايميل : a.tomeh1@Student.aaup.edu

جوال: 0597-497506

ملاحظة: هذا الاستبيان يستهدف مدراء قطع غيار المركبات في شركات استيراد المركبات أو مدراء شركات قطع غيار المركبات في فلسطين

القسم الأول: البيانات الديمغرافية

أرجو إختيار الإجابة التي تعبر عن وضع حضرتكم و وضع الشركة الحالي

1.1- بيانات المدير الذي يعبئ الاستبيان

1.1.1- ما هو مستوى حضرتك التعليمي؟

( ) ثانوية عامة فما دون

( ) دبلوم

( ) بكالوريوس

( ) دراسات عليا

1.1.2- ما هي عدد سنوات الخبرة لديك في مجال قطع غيار المركبات؟

( ) من سنة الى اقل من 3 سنوات

( ) من 3 سنوات الى اقل من6 سنوات

( ) من ست سنوات الى اقل من 9 سنوات

( ) اكثر من 9 سنوات

1.2- معلومات عن الشركة

1.2.1- ما هو مجال عمل شركتكم في قطع الغيار بالتحديد؟

( ) شركة قطع غيار مركبات فقط

( ) وكالة مركبات وقطع غيار

( ) غير ذلك (يرجى التحديد):_____

1.2.2- ما هو عدد الموظفين في شركتكم/ أو قسم قطع الغيار في شركتكم؟

( ) 10 موظفين

( ) من 10 الى 20 موظف

( ) من 21 الى 30 موظف

( ) اكثر من 30 موظف

1.2.3- تاريخ تأسيس الشركة؟_____

1.2.4- ما نوع قطع الغيار التي تتعاملون بها في شركتكم؟

( ) زيوت

( ) قطع بودي

( ) قطع كهرباء

( ) قطع ميكانيك

( ) جميع قطع انواع المركبات والزيوت

1.2.5- من هم زبائن شركتكم او قسم قطع الغيار في شركتكم؟

( ) ورشات الصيانة الخارجية

( ) زبائن لهم مركبات من وكالتكم

( ) زبائن المفرق

( ) زبائن الجملة

( ) جميع انواع الزبائن

1.2.6- ما هو حجم حصتكم السوقية (تقريبا) في مبيعات قطع الغيار في السوق الفلسطيني؟

( ) اقل من 5%

( ) 5% الى اقل من 15%

( )15% الى اقل من 25%

( ) اكثر من 25%

1.2.7- ما هي العوامل التي تحول دون النمو الاقتصادي لشركتكم أو قسم قطع الغيار في شركتكم؟ (بامكانكم اختيار اكثر من اجابة)

( ) عوامل سياسية (الاحتلال)

( ) عوامل حكومية (الاجراءات والقوانين)

( ) عومل تكنولجية خاصة بالمركبات الجديدة

( ) عوامل إدارية (عدم مواكبة التطور الاداري في الاعمال)

( ) عوامل بشرية (لها علاقة بكفاءات الموظفين)

( ) غير ذلك (حددها رجاء):_____

1.2.8- هل لديكم نظام مراقبة على الجودة او نظام ادارة الجودة اذا كان الجواب نعم أرجو تحديد النظام.

( ) لا يوجد

( ) في طور الإعداد والبناء

( ) نعم، يرجى تحديد اسم النظام:_____

القسم الثاني: تقييم أداء الشركة من حيث تطبيق عوامل و معايير"إدارة الجودة الشاملة"

أرجو من حضرتكم تحديد درجة موافقتك بوضع اشارة X على الاسئلة والجمل التالية بحيث تكون الاجابات 5: أوافق بشدة، 4: أوافق، 3: محايد، 2:اعارض ، 1: اعارض بشدة

2.1 - مشاركة الإدارة العليا و التزامها بتطبيق عوامل " إدارة الجودة الشاملة"

السؤال	أوافق بشدة	اوافق	محايد	اعارض	اعارض بشدة
2.1.1- تولي الإدارة العليا للشركة اهتماما بالجودة و تحرص على تطبيق معاييرها على سير العمليات و النشاطات في الشركة او قسم قطع الغيار فيها					
2.1.2- تَطِّلع الإدارة العليا على كل ما هو جديد من اجل تحسين الجودة في الشركة او قسم قطع الغيار فيها					
2.1.3- تبذل الإدارة العليا كل الجهود اللازمة من أجل رفع مستوى الجودة في الشركة أو قسم قطع الغيار فيها					

2.2 - رضا الزبائن و التعامل مع شكاوى الزبائن

السؤال	أوافق بشدة	اوافق	محايد	اعارض	اعارض بشدة
2.2.1- تحرص الشركة أو قسم قطع الغيار على تلبية متطلبات و إحتياجات الزبائن الحاليين في الشركة و تقوم بقياس مدى رضى الزبائن بشكل دوري					
2.2.2- تدرس الشركة و تحاول تلبية متطلبات و إحتياجات زبائن المستقبل للشركة					
2.2.3- يتم إستلام جميع شكاوي الزبائن عبر إجراء محدد و يتم حلها بطرق مرضية للزبائن					

2.3 – الاهتمام بالموظفين و مدى رضاهم

السؤال	أوافق بشدة	اوافق	محايد	اعارض	اعارض بشدة
2.3.1- إلى أي مدى تعتبر الشركة الموظفين شركاء في القرارات المهمة في الشركة أو قسم قطع الغيار فيها					
2.3.2- يُعبّر الموظفون عن أرائهم بكل صدق و تؤخذ إقتراحاتهم على محمل الجد من قبل الإدارة					

2.3.3- الى اي مدى تعتبر الشركة أن رضى الموظفين من أهم عوامل نجاح الشركة و تحقيق أهدافها الإستراتيجية					
2.4 - حرص الشركة على التحسين المستمر و استخدام المرجعيات الناجحة					
السؤال	**أوافق بشدة**	**اوافق**	**محايد**	**اعارض**	**اعارض بشدة**
2.4.1- يتم تعميم الاخطاء الاجرائية في العمليات على الموظفين المعنيين من أجل تفادي حدوثها في المستقبل					
2.4.2- تستخدم الشركة ورشات العمل وأدوات التحليل و اتخاذ القرار كالعصف الذهني من اجل رفع مستوى أداء الشركة او القسم					
2.4.3- تستخدم الشركة معايير الجودة المعروفة عالميا مثل ISO لتقييم أداء الاقسام أو تقييم أداء العمليات داخل الشركة أو قسم قطع الغيار					
2.5 - تطوير الموظفين و تدريبهم					
السؤال	**أوافق بشدة**	**اوافق**	**محايد**	**اعارض**	**اعارض بشدة**
2.5.1- يتم عمل دورات للموظفين داخل الشركة و خارجها بشكل دوري					
2.5.2 - يتم تدوير المناصب للموظفين في الشركة أو قسم قطع الغيار					
2.5.3 - تتابع الشركة تطور أداء الموظفين عن طريق ادوات تقييم حديثة بناء على التدريبات					
2.6 - الإتصال و التواصل داخل الشركة					
السؤال	**أوافق بشدة**	**اوافق**	**محايد**	**اعارض**	**اعارض بشدة**
2.6.1 - يتم عمل تقييم لأدوات الإتصال و التواصل في الشركة					
2.6.2 - تحرص الشركة على تحسين أدوات الإتصال و التواصل داخل الشركة و خارجها					
2.7 - العلاقة مع المصنعين و الموردين					
السؤال	**أوافق بشدة**	**اوافق**	**محايد**	**اعارض**	**اعارض بشدة**
2.7.1 - يتم عمل تقييم عمليات التواصل بين شركتكم او قسم قطع الغيار لديكم و بين المصنعين و الموردين					

2.7.2 - يتم تبادل زيارات العمل بين الموردين و المصنعيين بشكل دوري من جهة و بين ادارة الشركة للاطلاع على اخر المستجدات					
2.7.3 - يتم تنفيذ التعليمات من المصنعين و الموردين الخاصة بالجودة و تطبيقها على العمليات داخل الشركة و خارجها					
2.8 - تحديد خطط العمل و الأهداف للشركة					
السؤال	**أوافق بشدة**	**اوافق**	**محايد**	**اعارض**	**اعارض بشدة**
2.8.1 - يوجد دائما خطة استراتيجية و هدف سنوي للشركة بشكل عام و قسم قطع الغيار بشكل خاص					
2.8.2 - يتم تحديد الاهداف المتعلقة بمعايير الجودة في الشركة او قسم قطع الغيار و العمل على تحقيقها					
2.8.3 - تتم مشاركة مدير قسم قطع الغيار أو المدراء الميدانيين في تحديد الأهداف المتعلقة بمعايير الجودة في الشركة					
2.8.4 - يتم تقييم تحقيق الاهداف و الخطط الاستراتيجية للشركة أو لقسم قطع الغيار فيها					
2.9 – إدارة العمليات و الأنشطة في الشركة					
السؤال	**أوافق بشدة**	**اوافق**	**محايد**	**اعارض**	**اعارض بشدة**
2.9.1 - أعتقد أن إدارة العمليات الناجحة هي من عوامل نجاح الشركة					
2.9.2 - يوجد تعليمات مكتوبة لكيفية القيام بكافة العمليات والأنشطة داخل الشركة					
2.9.3- يتم تقييم العمليات و الأنشطة بشكل دوري بناء على جودة تلك الأنشطة و تحديد الهدف من كل نشاط أو عملية					
2.10 – التقييم الداخلي لأداء قسم قطع الغيار					
السؤال	**أوافق بشدة**	**اوافق**	**محايد**	**اعارض**	**اعارض بشدة**
2.10.1- يتم عمل تقييم لأداء قسم قطع الغيار في الشركة حسب مؤشرات اداء رئيسية KPI's معدة و مصممة حسب " ادراة الجودة الشاملة"					
2.10.2- يتم اخذ المقترحات المتعلقة برفع مستوى الجودة في الشركة على محمل الجد و يتم تطبيقها					
1.10.3- يتعامل الموظفون بالشركة مع زملاءهم كما يتعاملون مع الزبائن باعتبار زملائهم زبائن داخليين كل حسب متطلبات عمله وظيفته					

2.11 – تكاليف الجودة					
السؤال	أوافق بشدة	اوافق	محايد	اعارض	اعارض بشدة
2.11.1- تقوم الشركة بحساب تكاليف الجودة السيئة (الاخفاقات الداخلية والخارجية في تقديم الخدمة) بشكل منتظم					
2.11.2- تعتبر تكاليف الجودة السيئة (الاخفاقات الداخلية والخارجية في تقديم الخدمة) هي أكبر من تكاليف معايير الجودة في الشركة					
2.11.3- تعمل الشركة على نشر ثقافة تقليل تكاليف الجودة السيئة بين موظفيها بهدف تقليلها					
2.11.4- تخصص الشركة جزء من ميزنيتها لتعزيز تكاليف الجودة الجدية الخاصة باجراءات الوقاية والفحص والتفتيش لمنتجاتها وخدماتها					
2.12 – الإستفادة من تجارب الشركات الناجحة من خلال الاقتباس المعياري Benchmarking					
السؤال	أوافق بشدة	اوافق	محايد	اعارض	اعارض بشدة
2.12.1- تَطّلع الشركة بشكل مستمر على التجارب الناجحة و تحاول الإستفادة من تجاربها في مجال رفع مستوى الجودة					
2.12.2 - تحتذي الشركة بحذو الشركات الناجحة و تحاول البحث عن سبب نجاحهم Benchmarking					
2.13 – إستخدام التكنولوجيا الحديثة					
السؤال	أوافق بشدة	اوافق	محايد	اعارض	اعارض بشدة
2.13.1 - تستخدم الشركة برامج خاصة للإدارة المالية و إدارة المخزون و إدارة الموارد البشرية و التقارير و يتم تحديثها حسب حاجة العمل					
1.13.2- يتم إستخدام التكنولوجيا كبرامج الكمبيوتر باعداد التقارير الخاصة بالجودة و تقييم العمليات فيها					
1.13.3- يتم إستخدام أحدث البرامج والتقنيات في الشركة واللازمة لفحص قطع الغياروصايرتاه وتصليحها					
2.14 – العمل الجماعي					
السؤال	أوافق بشدة	اوافق	محايد	اعارض	اعارض بشدة
2.14.1- تحرص الشركة على العمل الجماعي و تعتبر ذلك من معايير الجودة داخل الشركة					

2.14.2- يتم تقييم العمل الجماعي لدى الموظفين في الشركة					
2.15 – تمكين الموظفين					
السؤال	**أوافق بشدة**	**اوافق**	**محايد**	**اعارض**	**اعارض بشدة**
2.15.1- تأخذ الادارة اقتراحات الموظفين المتعلقة بتحسين اداء العمل بكل جدية و تحاول تطبيق مقترحاتهم المتعلقة بالجودة					
2.15.2- تشجع الشركة الموظفين على تقديم إقتراحات لتحسين مستوى الأداء و الجودة في الشركة					
2.16 – الوصول الى عمليات خالية من أي خلل					
السؤال	**أوافق بشدة**	**اوافق**	**محايد**	**اعارض**	**اعارض بشدة**
2.16.1- يتم مراجعة العمليات في الشركة للتّأكد من خلوها من أي عيوب أو خلل					
2.16.2- يتم تقييم إستخدام الشركة لأدوات التحليل و التقييم للقيام بالعمليات داخل الشركة أو داخل قسم قطع الغيار					
2.17 – تبني سياسة الجودة من قبل الشركة					
السؤال	**أوافق بشدة**	**اوافق**	**محايد**	**اعارض**	**اعارض بشدة**
2.17.1- تتبنّى الشركة بشكل عام سياسة الجودة العالية لمنتجاتها وخدماتها					
2.17.2- تعتمد الشركة في تقييمها لأداء الموظفين على سياسة الجودة					

القسم الثالث : الدور الذي تلعبه عوامل البيئة الخارجية في تشجيع تطبيق "إدارة الجودة الشاملة"					
ارجو من حضرتكم تحديد درجة موافقتك على الاسئلة والجمل التالية بحيث تكون الاجابات 5: أوافق بشدة، 4: أوافق، 3: محايد، 2:اعارض ، 1: اعارض بشدة					
السؤال	**أوافق بشدة**	**اوافق**	**محايد**	**اعارض**	**اعارض بشد**
3.1- أعتقد أن السياسات و القوانين الحكومية تساعد الشركة في تطبيق عوامل "إدارة الجودة الشاملة"					
3.2- أعتقد أن ثقافة الزبائن السائدة في سوق قطع الغيار تساهم في رفع مستوى الاداء في "إدارة الجودة الشاملة" في الشركة أو قسم قطع الغيار					
3.3- أعتقد أن استخدام التكنولوجيا الجديدة تساهم في تطبيق الشركة لمفاهيم "إدارة الجودة الشاملة"					
3.4- أعتقد ان سوق قطع غيار المركبات يساعد الشركة على تطبيق مفاهيم و عوامل " إدارة الجودة الشاملة"					
3.5 - تلعب الطبيعة التنافسية لقطع غيار المركبات دوراً في تحسين أداء الشركات و رفع مستوى الجودة في عملياتها					
القسم الرابع : العوامل الداخلية التي تحد من إعتماد عوامل " إدارة الجودة الشاملة" في الشركة					
ارجو من حضرتكم تحديد درجة موافقتك على الاسئلة والجمل التالية بحيث تكون الاجابات 5: أوافق بشدة، 4: أوافق، 3: محايد، 2:اعارض ، 1: اعارض بشدة					
السؤال	**أوافق بشدة**	**اوافق**	**محايد**	**اعارض**	**اعارض بشدة**
4.1- عدم إهتمام الادارة العليا باهمية "إدراة الجودة الشاملة" تحد من اعتماد الشركة لتلك الاستراتيجية					
4.2- المعلومات و البيانات و البرامج عن "إدارة الجودة الشاملة" غير متوفرة في الشركة أو في قسم قطع الغيار					
4.3- تدريب الموظفين على منهجية " إدارة الجودة الشاملة" غير متاح في الشركة او في قسم قطع الغيار					
4.4- لا يوجد خطة واضحة لدى الشركة او قسم قطع الغيار لتطبيق مفاهيم "ادارة الجودة الشاملة"					
4.5- طبيعة الزبائن و السوق لا تسمح باعتماد عوامل "إدارة الجودة الشاملة" في الشركة او قسم قطع الغيار					
4.6- حجم الشركة لا يحتاج الى مثل هذه المفاهيم في الإدارة					

شكراً لحسن تعاونكم

Appendix (3): Companies participating in the survey

#	Company Name	Brand	City
1	**Abu Khader Group**	BMW	Ramallah
2	**Al Hudhud General Trade Company**		Nablus
3	**Al-Asbah Group**	VOLVO	Ramallah
4	**Al-Rami Motors Company**	FORD, MAZDA	Ramallah
5	**Alsabbah Company**		Nablus
6	**Al-Salam Investment Group**		Hebron
7	**Alsinjlawi Company For Import**		Ramallah
8	**Arab Motor Trade Company**	KIA, SSANGYONG	Ramallah
9	**Asia Star for Marketing & Import Co**		Nablus
10	**Auto Line for Cars Spare Parts**		Ramallah
11	**Auto Sign Trading Company**		Ramallah
12	**Autozone Automobiles Trading Co**	PEUGEOT	Ramallah
13	**Gargour Trading Company**	Mercedes-Benz	Bethlehem
14	**Group Plus for investment and contracting**	CITROEN	Ramallah
15	**IMI for Trading and Industry (Al-Tahhan)**		Ramallah
16	**Jamal AlDana Auto Parts**		Toulkarem
17	**Jamal Shalash and Sons General Trading Company**		Ramallah
18	**Kerish Motors Company**	GMC, ISSUZU	Ramallah
19	**Korean Palestinian Company for Spare parts**		Ramallah
20	**Mena Investment Company**	NISSAN	Ramallah
21	**Palestine Automobile Company (PAC)**	HYUNDAI, FIAT CRYSLER	Ramallah
22	**Palestine Motors Company**	MITSUBISHI	Ramallah
23	**Qawasmi for Auto Parts**		Hebron
24	**Red Car Company**		Hebron
25	**Rifat yaish & sons Trading company**		Nablus
26	**Ritz Motors Compny**	JAGUAR, LANDROVER	Ramallah
27	**Sara Investment Group**		Jenin
28	**Shakaa co for trade and import**		Nablus
29	**Signature Motors Group**	RENAULT	Ramallah
30	**Tower Mechanical Equipment Co. (TOMECO)**	IVECO	Ramallah
31	**United Motor Trade Company**	AUDI, VW, SKODA	Nablus
32	**Wasef Haj Ahmad Amer Company**		Nablus
33	**Yaish Distribution Company**		Nablus

الملخص

يحتل العمل في المركبات مكانة مرموقة في الاقتصاد الفلسطيني وتسعى شركات المركبات العاملة في فلسطين لزيادة حصتها السوقية و الحصول على رضا الزبائن عن طريق تطبيق أعلى معايير إدارة الجودة لمنتجاتها و خدماتها و عملياتها. من أهم معايير ادارة الجودة هو إدارة الجودة الشاملة. في هذه الدراسة تم توثيق فوائد تطبيق ممارسات إدارة الجودة الشاملة في شركات قطع غيار المركبات وعوامل نجاح إدارة الجودة الشاملة فيها بشكل جيد في الأدبيات ، ومع ذلك لا يُعرف سوى القليل من الأبحاث حول تنفيذ عوامل النجاح الحاسمة لإدارة الجودة الشاملة في شركات قطع غيار المركبات الفلسطينية. تقيّم هذه الدراسة تطبيق ممارسات إدارة الجودة الشاملة في شركات قطع غيار المركبات الفلسطينية وتأثيرها على أداء هذه الشركات. ولهذه الغاية ، تم جمع البيانات ذات الصلة بشأن عوامل النجاح الحاسمة في ممارسات ادارة الجودة الشاملة من عينة من 33 شركة محلية لقطع غيار السيارات. تم تطبيق طريقة عملية التسلسل الهرمي التحليلي لتصنيف عوامل نجاح إدارة الجودة الشاملة التي حددتها الأدبيات وخبراء إدارة الجودة الشاملة. تم استخدام برنامج Expert Choice لتحليل البيانات التي تم جمعها.من خلال نتائج التحليل، أبرزت الدراسة العديد من النتائج الأساسية من ضمنها ان البيئة الداخلية ، و مشاركة الإدارة العليا ، و إدارة العمليات ، و إدارة العلاقة مع الموردين ، والبيئة الخارجية ، هي عوامل تم تحديدها لتكون حاسمة لتنفيذ نهج إدارة الجودة الشاملة ، و 9 عوامل مرتبة على أنها مهمة و 5 عوامل أخرى تم تصنيفها على أنها ثانوية الاهمية. وفقًا للنتائج ، تم تطوير الإطار المفاهيمي لعوامل نجاح إدارة الجودة الشاملة ، علاوة على ذلك ، تم تعريف التحديات التي تواجه شركات قطع غيار السيارات في فلسطين مثل محدودية الوصول الى موارد ممارسات إدارة الجودة الشاملة ، وعدم الاستقرار السياسي والاقتصادي. تم التوصل إلى العديد من التوصيات بما في ذلك تشجيع موردي قطع غيار السيارات على إيلاء المزيد من الاهتمام لبيئتهم الداخلية والخارجية ، وتعيين مستشار إدارة الجودة الشاملة ، وإجراء المزيد من التدريبات للموظفين على ممارسات إدارة الجودة الشاملة وعوامل نجاحها وتأثيرها على إنجازات المؤسسة وأدائها. أخيرًا ، أوضحت الدراسة قيود العمل البحثي مثل الوعي المحدود بنهج إدارة الجودة الشاملة من قبل المستجيبين للدراسة، وكذلك محدودية البيانات التي تم جمعها من آراء مديري موردي قطع غيار المركبات، حيث يمكن أن يكون جمعها أكثر كفاءة لو تضمن البحث اراء آخرين ذو صلة، مثل مصنعي قطع غيار المركبات الرئيسين و الزبائن .