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EXPLORING THE APPLICATION OF TOTAL QUALITY MANAGEMENT IN THE LIBYAN OIL AND GAS COMPANIES: POTENTIAL, OBSTACLES AND SOLUTIONS

MUSBAH SALEM MUFTAH SALEH

A thesis submitted to Durham University
in accordance with the requirements of the degree of
Doctor of Philosophy
in the School of Government and International Affairs

March 2013

Exploring the Application of Total Quality Management in Libyan Oil and Gas Companies: Potential, Obstacles and Solutions

Musbah Saleh

Abstract:

Currently, there is worldwide interest in and focus on the implementation and effectiveness of quality management initiatives in industrial organisations with the objective of enhancing effectiveness and efficiency. Total Quality Management (TQM) is a quality management model, which, as the literature over the years has shown, can have a transforming impact on an industry that is in a state of substantial structural change and facing increased competition by raising performance. Therefore, there is no doubt that TQM has received a great deal of attention from practitioners, academics and researchers over the last two decades across the world especially in developing countries, including Libya.

The petro-chemical companies constitute the main industrial structure in Libya as oil and gas is the main source of income in the country. However, they are facing a number of challenges including increasing competition and quality level. In order to remain competitive, Libyan petro-chemical companies need to successfully and effectively employ quality management initiatives such as TQM, which can enable and empower the entire workforce, improve competitive position and raise performance.

This study, hence, aims to explore and analyse the implementation level of TQM within Libyan oil and gas organisations by exploring the causes of failure in the effective implementation of TQM in order to identify the barriers that exist and act to hinder the effective adoption and implementation of TQM. In addition, this study aims to highlight factors that will assist the Libyan petro-chemical organisations to continue to effectively implement TQM successfully and to explain the proper method of TQM application.

To achieve these aims, quantitative and qualitative methods in triangulation form were adopted: an extensive questionnaire was utilized to elicit the opinions, attitudes and perceptions of 120 participants (managerial categories) from fully-owned Libyan petroleum companies regarding TQM-related issues. In addition, 20 one-to-one semi-structured interviews within the participating Libyan petroleum organisations were used to identify top managers' opinions and perceptions concerning the issues related to quality initiatives with particular attention being paid to TQM.

The findings of this study suggest that the actual implementation levels of TQM practices were found to be in the early stages in the Libyan petro-chemical organisations. In addition, the analysis identified 15 pertinent factors, which act as barriers that are most frequently faced by the surveyed companies including Arabian Gulf Oil Company (AGOCO), Ras Lanuf Oil and Gas Processing Company (RASCO) and Sirte Oil Company (SOC). These identified obstacles through empirical analysis of the primary data are: 'lack of awareness and understanding of TQM', 'lack of information and communication', 'the problem of employee resistance to change', 'insufficient management style', 'the absence of real teamwork', 'lack of internal and external customer satisfaction, unsatisfactory measurement and evaluation', 'insufficient organisational culture', 'the absence of continuous improvement and innovation culture', 'lack of resources and requirements of TQM', 'inadequacy of top management and leadership commitment', 'insufficient employee training, development and education', 'the absence of quality strategic planning, lack of employee involvement and empowerment, and lastly lack of government support.

As the findings indicate, this study concludes that the implementation of TQM is still an underdeveloped area in Libya

Declaration

I declare that the work in this thesis was carried out in accordance with the regulations of the Durham University and is original except were indicated by specific reference in the text. No part of the thesis has been submitted as part of any other academic award. The thesis has not been presented to any other education institution in the United Kingdom or overseas.

Any views expressed in the thesis are those of the authors and in no way represent those of the University.

Signed……

Date……

Dedication

To the memory of my beloved father, much-loved mother, brothers and sisters whom I really missed their company during the course of my sojourn towards Ph.D.

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I sincerely thank Almighty Allah for his guidance and blessing on all aspects of life, including this work, which could have not been accomplished without his will.

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My deepest appreciation and thanks to the Libyan Government who sponsored my PhD research in one of the best educational institutions in the UK and provided great financial support, for which I am also truly grateful.

Further, much gratitude is directed to the participants in this study from RASCO, AGOCO and SOC for their valuable time and effort in taking part in survey aimed at collecting the primary data for this study.

I express my sincere thanks to all staff in the Durham University especially the staff at the School of Government and International Affairs. My appreciation is also extended to all my colleagues at the SGIA for their help and encouragement.

I owe my sincerest thanks and gratitude to my wife, who in addition to her continued encouragement, support and understanding took the responsibility and the load of the children (Masa and Salem) and home in addition to 'me' and provided a wonderful environment that allowed me to carry on my work with minimal disruption which have made this project achievable.

Lastly, but most importantly, I would like to emphasise the heartfelt debt I owe to my mother and father for their love, prayer, patience and support. The greatest thanks go to all my sisters and brothers for the encouragement, understanding and belief in me that made this research possible.

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Chapter1

INTRODUCTION

1.1. BACKGROUND

In today's world, organisations face continuous changes on economic, technological and political levels, and are challenged by rapid development, particularly in relation to information technology, globalization, international trade and global management, and due to the introduction of modern management methods. In addition, the introduction of new strategic concepts such as focus on the customer needs and quality initiatives has led to ever-increasing competition between organisations (Porter, 1985, 1999; Go and Govers, 2000).

These challenges have emerged due to the multiplicity of organisations, diversity of tasks, working methods and procedures and a communications revolution, as well as the emergence of economic blocs such as the General Agreement for Trade and Tariffs (GATT) and standard compliancy requirements such as the ones by the International Organisation for Standardization (ISO). Therefore, with globalisation, more interaction and interdependence between countries and organisations, regardless of business areas and nationality, is the reality of the new business environment. While such developments create a challenge for an organisation to sustain its position, they also require urgent and decisive action from organisations to adopt a proper management philosophy and system of measurement to address these changes and to achieve their primary objectives, which are 'customer satisfaction', 'cost efficiency', 'increased performance', 'sustaining and maintaining the workforce' and 'ensuring a high quality management system'. This means that organisations need to consider a radical change to the traditional management style by disposing of a bureaucratic management style and poor resource planning. In addition, organisations need to improve their performance by providing good quality products and services, adopting modern management methods, and ensuring continuous developments in every aspects of their operations. Among a number of methods, introducing the philosophy of Total Quality Management (TQM) may help to achieve such objectives. Indeed, all organisations (private or public) seek to achieve quality performance; however,

quality is no longer a luxury or a choice which can be ignored, but an indispensable factor for survival. Therefore, organisations, which fail to apply TQM philosophy, may find themselves unable to sustain their existence and continuity of their management.

In fact, the concept of quality has been a source of research and debate for some time now as well as being an important part of organisational existence in service and product delivery. For example, in the last decade of the 20th century, the debate on the various concepts of quality developed through several stages. The first stage, 'examination', ensures that the product specifications match its design specifications. The second stage, 'quality control', aims to minimize the errors and reduce the rate of defective products by using quantitative methods (statistical techniques). The third stage, 'quality assurance' (QA), has received more attention than the preceding stages, with the focus on the prevention of errors, which means exercising control of the design process of products to the end users. The final stage is 'Total Quality Management' or TQM).

Recognition of the importance of TQM has increased over the last twenty years as the importance of using TQM activities has increased. TQM has become a priority for service and manufacturing organisations. It should be noted that the culture of quality with its philosophy has been associated with the Japanese approach towards continuous quality improvement since the Second World War through the efforts of cooperation from a particular group including decision-makers, policy-makers, engineers and Japanese scientists (Deming, 1986). Indeed, the Japanese developed the so-called management philosophy, which later became known to as TQM (Walton, 1986 and Powel, 1995). Achieving quality means 'achieving presence' and the 'continuation of quality' means 'continued presence', and 'strengthening quality' means to 'strengthen the presence' and the 'decline in quality' means 'non-existence or failure.

TQM originally emerged from the manufacturing and basic industries sectors and some other activities and assisted in developing the ideas formulated by quality scientists with the contribution of scholars such as Deming, Crosby, Juran, Feigenbaum and Ishikawa, whose primary focus was on continuous improvement and customer satisfaction. The contemporary management scientists in the field of quality

have paid more attention to the concept of TQM and recommended its adoption and application, which, as a quality assurance method, is based mainly on the quality of goods and services produced and delivered with the objective of achieving customer satisfaction. Indeed, it is reported that many organisations have benefited from the adoption of TQM through significant improvement processes in quality and reduction of costs of manufacturing products in many industries (Porter, 1985).

There is no doubt that TQM is a way of thinking and management philosophy, which has helped and supported many organisations in developing and developed countries to become international organisations (Crosby, 1979; Deming, 1982; Zairi, 2002; Dahlgaard *et al*., 2002; Hansson, 2003). It is obvious that the philosophy of TQM decreases contrast and reduces waste, which means reducing costs and also assisting in providing high quality products and services resulting in customer satisfaction and sustaining resources, as well as maintaining personnel (Deming, 1986; George, 2002; and Van Horn, 1997). It should be noted that the emergence and development of TQM philosophy has contributed for the firms to achieve competitive edge. Thus, considering the benefits it may generate, all types of organisations should focus closely on the philosophy and implementation of TQM, as a method and process in order to be survive, remain in the market and keep up with the competition. Blackstone (1996) states that organisations should achieve a high level of quality in all their activities to meet the requirements of globalization and market competition and also to achieve in success; this can come about by adopting one or more quality initiatives such as TQM.

Indeed, TQM has been commonly used and developed in many organisations across the world. In particular, during the 1990s, awards were established to be given to organisations with outstanding performance such as the Deming Award, MBNQA and EFQM). The aim of these awards is to encourage organisations to put greater effort into achieving excellent performance in relation to customers and their finished product.

It is worthwhile mentioning that although advantages and benefits can be gained by adopting and effectively applying TQM, the actual impact will be seen in the long term. Therefore, companies that implement this philosophy need to be patient to achieve the desired results (Hendeicks and Singhal, 2001). In other words, the process

of applying TQM as a development programme and improvement processes perhaps will take a number of years for the changes to take place.

It should be noted that, despite the fact that a significant number of organisations are now using and applying different types of TQM frameworks, only a minority of them will be able to ensure its success and continue the process of its application effectively and efficiently (Taylor and Wright, 2003). In addition, the benefits of the implementation of such programmes in some companies have been less than expected. For example, TQM was seen as a resource, which would provide competitive advantage for many sectors and types of organisations, but this has been undermined by the failure of some organisations to implement better application of this particular philosophy (Proposing Framework for Your TQM Program, 2002). Therefore, several factors can be considered to leading to failure. For example, Sebastianelli and Tamimi (2003) conclude that there are five factors which are considered to be the biggest obstacles to continuous improvement programmes: inadequate human resources and development management; lack of quality planning; lack of quality leadership; lack of customer focusing and inadequate resources for improvement programmes. In this context, each company faces many unique obstacles, which may prevent them from putting into place a successful and effective form of TQM.

In order to achieve satisfactory results and gain the desired results from TQM implementation it is essential to identify and explore the constraints. In addition, knowing these barriers and obstacles may enable organisations to successfully apply and use quality initiative to reach their objectives. This means that a transition from a bureaucratic style, traditional approach together with embracing effective strategies and adopting a culture of TQM is a critical step for all organisations and countries, whether developed or developing, to take in order to survive.

Being a developing economy, Libyan business world has been developing their organisations, operations, production and delivery. As known, the Libyan economy relies on the export of petroleum and is dependent on the world's economy. In other words, Libya's economy is still underdeveloped in terms of improved quality, product quality, and operation methods compared with other developing and developed countries. Thus, there are many internal and external difficulties facing Libyan oil and

gas companies in the local and international market. These problems include cost, speed of response, and high levels of product quality, which are key to challenging the global competition and selling their products in the future. In addition, there are other related factors, which could have negative influences upon the progress of these companies. In addition to neglecting the importance of human resources as one of the most important instruments of change in an organisation; poor leadership, lack of clarity of the overall vision and the absence of a scientific approach to managing the organisation are considered to be the most important barriers facing most Libyan organisations. It should be noted that these obstacles are deemed to be the biggest hindrances for the development and progress of the industry. In addition, some Libyan companies also suffer from the absence of inspection of products whether in the early or final stages, absence of management system review, poor organisation, and poor production quality. It is perhaps obvious that these problems and difficulties, among others, may lead to the deterioration and collapse of some organisations in the near future.

Therefore, exploring and determining possible obstacles facing the efficient and effective implementation of quality or TQM is an urgent and crucial matter in the Libyan oil and gas industry. In practical terms, Libyan oil and gas companies need to fully develop their quality standards, improve production, raise levels of productivity and comply with international requirements. Considering that only a few Libyan organisations apply TQM philosophy, its study is essential in the case of Libyan oil and gas companies. It should, however, be noted that attempts to apply this philosophy successfully and effectively have been undertaken recently and have become the goal of most Libyan oil and gas organisations.

1.2. AIM AND OBJECTIVES

This research aims to explore and analyse the application of TQM in Libyan oil and gas organisations by examining the reasons for the failure of effective application of TQM according to the perceptions of various levels of staff in those organisations. In addition, this study aims to identify factors, which are considered preventing the effective implementation of TQM in Libyan oil and gas organisations.

In order to achieve these aims the following objectives are developed:

(i) to develop an advanced understanding of TQM as a concept and mechanism;

(ii) to identify the potential barriers and obstacles that could have an adverse impact on the continuity of effective application;

(iii) to explore the importance and benefits of TQM in Libyan oil and gas organisations by conducting a questionnaire and interview surveys with the managerial staff at these organisations;

(iv) to explore the related issues on the implementation of TQM in Libyan oil and gas organisations in particular determining the barriers and obstacles preventing efficient implementation;

(v) to develop some recommendations based on the findings of the study with the objective of enabling oil and gas organisations in Libya to continue successful TQM implementations.

1.3. RESEARCH QUESTIONS

The main research question posed by this research related to the application of TQM in Libya is as follows:

What is the state of the application of TQM in Libyan oil and gas organisations and what factors are considered to be preventing efficient implementation of TQM?

In order to investigate this main research question, the following specific research questions will be investigated:

(i) How have quality initiatives developed generally throughout managerial history? How does TQM generally work? What are the benefits that TQM can offer?

(ii) What are the possible barriers that restrict the continued effective application of TQM in Libyan petroleum organisations?

(iii) What are the reasons for the barriers in relation to the effective and efficient implementation of TQM and how did they emerge in Libyan oil and gas organisations?

(iv) Could any methods lead to the continued successful application of TQM from the perspective of staff at the petro-chemical organisations?

1.4. RATIONALE AND MOTIVATION FOR THE RESEARCH

Due not to having any other viable sector and capital accumulation in Libya, historically Libya has heavily relied on the proceeds of the oil and gas industry for its development. In an attempt to increase the return though increasing efficiency, quality initiatives have been adopted as a way to increase production leading to an improvement in quality of the level of goods and services in industrialised and producing countries (Al-Khalifa and Aspinwall, 2000).

It should be noted that oil and gas exports are considered to be the main source of income and wealth in Libya, constituting about 95% of export revenues, implying that the Libyan economy still depends significantly on such exports (World Report, 2004). Furthermore, before the sanctions upon Libya were lifted at the beginning of September 2003, having lasted for a period of more than 10 years, they caused significant damage to all Libyan organisations, and incurred high costs to maintain them. Therefore, adopting a management initiative such as TQM might assist in the continuing progress and development of the Libyan oil and gas industry so that it can compete on the global market and sustain its valuable resources.

As identified, due to its contribution to the economy, the Libyan oil and gas industry is essential for the Libyan economy and life, and also provides many jobs for a large portion of the community. In addition, Libya has recently opened her doors to international contracts (joint ventures) and global trade; thus, implementing proper management systems such as TQM needs to be taken into consideration urgently in order to enhance the connectivity with the relevant organisations and other companies in the field.

It should be noted that many factors have delayed the adoption of modern management initiatives such as the philosophy of TQM in the Libyan oil and gas industry, resulting in the emergence of a set of obstacles and barriers to the effective and successful implementation of such programmes. Among them, lack of an accurate understanding of the concept of quality initiatives and its tools, techniques, and methods can be mentioned together with other factors, such as the absence of the

correct application of performance standards and the weakness of local standards compared with global standards.

As identified, considering all these dynamics, there is a need for a great deal of research to explore this area and find solutions to the observed problems, which could help organisations to compete in the global market and achieve their objectives.

1.5. RESEARCH METHODOLOGY

Being an empirical quantitative and qualitative research, this study relies on two types of data collection: quantitative and qualitative.

The quantitative method is utilised mainly through questionnaires to determine the barriers, constraints and the state of TQM in Libyan oil and gas organisations. The questionnaires were distributed to 'general managers', 'middle managers', 'controllers', 'heads of division', 'supervisors' and 'administrators and coordinators' in the Libyan oil and gas industry.

As for the qualitative method, semi-structured interviews were conducted as a complementary tool for data collection. Thus, semi-structured interviews were conducted with the organisations' managers, top managers and the managers of their quality departments.

It should be identified that both the questionnaire and interview surveys were conducted before the eruption of the Arab Spring in Libya and therefore should be understood within this context.

As part of the triangulation research method, documentary analysis is also utilised, based on the documents and data collected from oil and gas organisations, which include annual reports and other information published by the companies regarding the issue under investigation.

This study is presented in ten chapters, which are described as follows:

Chapter 1 provides a general introduction to the study, presenting the background, research questions, rationale and motivation, research aim and objectives, research methodology, and overview and structure of the research.

Chapter 2 presents a critical review of the literature related to TQM, which includes theoretical (definitions and concepts) and empirical (models) foundation of TQM.

Chapter 3 provides a literature review based on the available body of knowledge by making reference to the theoretical and empirical literature on TQM to build a framework for the current study.

Chapter 4 focuses on the Libyan business environment to contextualise the rest of the work, providing an overview of the historical background of Libyan oil and gas organisations.

Chapter 5 is the research methodology chapter and describes the research process by detailing the primary data collection process through questionnaires and semi-structured interviews and also data analysis. The data were analysed utilizing SPSS (Statistical Package for Social Scientists 19) software, and a number of statistical analysis techniques were utilised including frequency, mean and standard deviations.

Chapter 6 is the initial data analysis and presents the initial results based on descriptive analysis. Although the initial findings indicate that there is evidence to suggest that management is willing to achieve TQM philosophy in all companies, only a small proportion of the managerial categories surveyed confirmed that TQM is their real business direction.

Chapter 7 presents the second empirical chapter based on inferential data analysis of the questionnaire survey and reports the findings from the further analysis of questionnaires. The analysis in this chapter utilises a series of inferential statistical methods including mean analysis in the form of Kruskal-Wallis testing to provide a comparative analysis between several identified categories or control groups in relation to a number of statements. The main aim of this chapter is to strengthen the research findings and fulfil the research hypotheses and objectives. The findings from the analysis suggest that most of the respondent groups show no significant statistical differences regarding the concept of quality and TQM. In addition, the findings show that ‘lack of information and communication’ ranked as the greatest obstacle to the application of TQM and ‘lack of government support’ ranked lowest according to the lowest mean value.

Chapter 8 is the third empirical chapter and presents the process and the findings from the interview data analysis. The aims of this chapter are to further explore the state of TQM through the perceptions of particular managers and to determine the obstacles and barriers to the application of TQM. The findings prove that all the examined obstacles and barriers definitely exist within the studied companies.

Chapter 9 aims to provide an integrated and interpretative discussion on the results by considering all the results and discussion in the thesis together. Overall, findings suggest that there is a set of barriers preventing the effective application of TQM within the surveyed companies. In addition, the findings show that TQM philosophy is in its early stage in most of the Libyan companies studied.

Chapter 10 provides the conclusion and the implications of the findings. The significant contribution of the study is also identified, which is the empirical side of quality management, in particular in the field of TQM.

Chapter 2

TOTAL QUALITY MANAGEMENT: LITERATURE SURVEY

2.1. INTRODUCTION

With increasing globalisation, open economies and free-trade, more commitment is required than ever before from the internal and external economic, financial and management forces to ensure competitiveness and capability and to reinforce entire organisational dynamics. Among other factors, raising standards and productivity of quality in products and services is considered to be an important part of the process. In fact, the manufacturing and service industries have faced the highest level of competition from non-traditional institutions in which declining processing costs, growth of customer knowledge, new information technologies, demand for better quality products, the erosion of geographic boundaries and products, less restrictive government regulations, traditional approach/methods and forms regarding business growth have dramatically changed the modern business environment and effectively established new management methods and models.

These new models require knowledgeable and aware leaders in top management in order to deal with their customers' needs and expectations, along with organisational change and position in relation to competitors. Furthermore, this new environment also requires total employee involvement, strong leadership, proper resources and high commitment to quality.

Consequently, 'quality matters' has become the essential part of new organisation strategy in numerous organisations worldwide, and has become a predominant strategy for the manufacturing and service industries, which have attempted to implement Total Quality Management (TQM) to respond to 'quality' assurances. It should be noted that the philosophy of this paradigm is built on sustainability in the sense of a never-ending process of quality improvement. In other words, it is concerned with continuous improvement of all organisational aspects, including tools and methods, embracing employee involvement, maintaining and sustaining human

resources, management commitment, and strategic planning *etc*. Thus, it is clear that the main reason behind the application of TQM philosophy is that delivering better quality of products services, improving competitive power, achieving greater customer satisfaction, improving performance, cutting costs, increasing productivity and developing the workforce, *etc.*, namely efficiency and effectiveness are expected out of 'quality matters' strategy in service and production.

2.2. CONCEPTUAL DEFINITION: QUALITY AND TQM

There are many definitions of quality and TQM. This section aims to present and discuss the conceptual and definitional issues.

2.2.1. Defining Quality

In recent times, the business environment in all sectors has paid more attention to 'quality' as part of the management process. However, according to Juran (1995: 25) "there is misleading assumption that certain twentieth century individuals - Shewhart, Deming, Juran, Ishikawa, or others - invented quality", whereas the concept of quality is a continuing process developed over several centuries (Juran, 1995; Flood, 1993). Therefore, many definitions of quality are provided in the literature; this multiplicity of meanings may help to fill the gaps in understanding quality (Reeves and Bednar, 1994).

Oakland (2003) defines quality as the level of fitness for function and purpose, as do Sommerville *et al*. (2005). Juran (1988: 17) also considers quality as "fitness for use". These definitions commonly imply that quality is the ability of products and services to fulfil the requirements of use.

From an organisational perspective, Gronroos (2007) describes quality as organizational image that influences the perceived quality of service, which is shaped by functional and technical qualities. In addition, quality, as part of strategic approach which is essential for survival, includes: consistency, perfection, speed of delivery, eliminating waste, compliance with policies and procedures, having a usable product, doing it right the first time, delighting customers, providing a product, and total customer service and satisfaction (Djerdjour and Patel, 2000). In other words, quality as a concept refers to products and services, and includes quality of processes, time,

people, place, information, tools and equipment, as well as measurement, safety and environment (Dale, 2003 and Schonberger, 1990).

According to Reeves and Bednar (1994) many definitions of quality identify it with excellence, value, conformity to specifications, customer's viewpoint, avoiding losses, and meeting and/or exceeding customers' expectations.

In another line, Hansen (2001) describes the meaning of quality through the ways it is articulated: 'quality as consumer's perception', 'adaptation to expectations', 'as a value', 'adaptation to technical specifications' and 'business excellence'. These are based on the customer's and the producer's criteria.

Overall, depending on the approach taken to define quality, there have been many aspects to defining quality, such as a philosophy (as definitional issues); economics (profit and competitiveness); marketing (customer satisfaction) and operation management (manufacturing processes) (Garvin, 1984).

According to Garvin (1984) five key approaches may be utilised to define quality: the transcendent (philosophical approach); the user-based operations management, marketing and economics approach; the product-based economics approach; the value-based operations management approach; the manufacturing-based approach. Given this suggestion and in line with TQM literature, Goetsch and Davis (2006) identify the following elements inherently related to quality:

(i) Quality is composed of conforming to or exceeding customer expectations.
(ii) Quality applies to products, services, processes, environment and people;
(iii) The definition of quality is ever-changing (*i.e.*, what is measured as 'quality' or 'high quality' nowadays may not be good enough to be considered as an appropriate or 'minimum standard' in the near future).

It should be noted that the concept of quality, depending on how it is articulated, can imply certain things. For example, from a products-based perspective, 'quality' amounts to product attributes; transcendent quality implies excellence or superiority; user-based quality implies fitness for proposed use; value-based quality implies quality of price; and manufacturing-based quality refers to conformance to specifications.

Despite the fact that there is no universal agreement on the definition of quality, Feigenbaum (1997) determines some universal elements. For him, new requirements such as technology, global customers and the forces of business constitute the concepts of quality. He, therefore, lists the attributes of quality as: 'global business language', 'effectiveness of business', 'absolute satisfaction', 'continuity of competitiveness', 'partnering', 'time management', 'leadership' and 'contemporary managerial activity-based costing'.

For MacDonald and Piggott (1990), quality is related to 'delivery' of the service in the sense of it being attractive to customers by continuously meeting their needs and requirements. Indeed, meeting and exceeding customer requirements and needs is considered to be the main objective for many organisations. In supporting this, Ansell (1993) defines quality as full conformance, lack of errors and satisfying customers. In terms of quality as some attributes of products and/or service, in providing an institutional definition and supporting this perspective, the International Organization for Standardization (ISO) (1994: 43) defines quality as "The totality of characteristics of an entity that bears on its ability to satisfy stated and implied needs".

In addition, among others, Moore (1987), Creedom (1988) and Lewis (1989) stress that quality is all about achieving or meeting customers' expectations. Lastly, Schonberger and Knob (2001) are of the same view, describing quality as general performance which focuses on satisfying customers and achieving customer expectation and needs beyond what producers wish to build or manufacture. Sandholm (2000) referring to the ISO quality terms, provides a comprehensive definition in relation to customer satisfaction as, for him, quality represents the ability of a set of properties distinctive of products, services and processes or system to meet the expectations of customers and other interested parties.

Deming (1986: 23) provides a deeper understanding with an overall definition of quality as "a multidimensional approach to producing a product and/or delivering a service that meets the customer's exact expectations to ensure customer satisfaction". In this, Deming emphasizes that quality should be defined in terms of customer satisfaction and perspectives.

Furthermore, Feigenbaum (1983) defines quality through several attributes of manufacturing, engineering, marketing and maintenance, which assist products and services to meet customers' needs and expectations. In fact, Feigenbaum follows Deming and Juran's approach by defining quality in terms of customer satisfaction. By the same token, Ishikawa (1985: 36) focuses on quality control measures and procedures in his definition of quality, stating that "we engage in quality control in order to manufacture products with the quality which can satisfy the requirements of consumers". Ishikawa (1985) goes on to say that high quality is essential in order to satisfy customer needs and expectations. Deming, Juran, Feigenbaum and Ishikawa point out, regarding the concept of quality, that high quality and customer satisfaction are equated. In the same way, Ishikawa refers to the dynamic nature of quality, suggesting that consumer requirements and needs change constantly, therefore the definition of quality should also change.

In summary, 'quality' is defined in different ways in the literature, depending on the particular approach taken. Reeves and Bednar (1994) and Garvin (1984) indicate that the co-existence of different definitions of quality is appropriate in different circumstances. Hence, some approaches toward quality refer to more internal aspects of quality (manufacturing approach), while others, such as the marketing-oriented approaches, refer to more external aspects of quality (user approach). In fact, the main factor in most of these definitions is related to satisfying customers' expectations and needs. Furthermore, some of the mentioned definitions may include quality characteristics, such as performance, value, delivery, reliability, excellence, maintainability, conformance, cost effectiveness and price.

In this regard, organizations must identify such needs and expectations early and implement strategy and measurements to meet or exceed these requirements and perceptions of products and/or service. However, organisations that only focus on customers' expectations of quality and at the same time ignore the role of product, workforce and process quality might be at risk in the present or future of losing out to the competition. On the other hand, organisations that mainly pay attention to their product's quality are also at risk of losing out to organisations that incorporate customers' expectations of quality in their products and services. Therefore, it is

necessary that organisations should pay more attention to customer perceptions, and also to all organisational aspects including human resources, products and services.

2.2.2. Definition of TQM

Similar to the various definitions of quality, TQM has also been defined in many different ways. Reed *et al.* (1996) state that there is no general agreement on the definition for TQM, as the background of the researcher or scholar and their interest, together with their approach to quality, all determine the nature of the definition.

In this respect, Ljungstrom and Klefsjo (2002: 622) define TQM as "Management approach of an organisation, centred on quality, based on the participation of all its members and aiming at long-term success through customer satisfaction, and benefits to all members of the organisation and to society". In addition to this functional definition, TQM can also be defined as a philosophy of management and methods, system and procedures that formulate an overall systematic approach to quality that is the responsibility of everyone (Gunasekaran *et al.,* 1998). Furthermore, referring to the holistic nature of the process, TQM is defined as "a systems approach to management that aims to enhance value to customers by designing and continually improving organisational processes and systems" (Kartha, 2004: 331). By the same token, Flynn *et al.* (1994) define TQM as a holistic approach in attaining and continuing high quality output, focusing on the continuous improvement and maintenance of defect prevention and processes at all levels and in all functions of the organisation, in order to meet or exceed customer needs and expectations. This is consistent with Tobin (1990) who defines TQM as a total process for gaining competitive advantage through continuous improvement of each facet of organisational culture. Similarly, Temtime and Solomon (2002: 181) make reference to the outcome in defining TQM, which "seeks continuous improvement in the quality of all processes, people, products, and services of an organisation". Accordingly, TQM can also be defined as a set of procedures and techniques used to eliminate or reduce the variation of the production process or service-delivery system in order to develop quality, efficiency and reliability (Steingard and Fitzgibbons, 1993).

Anderson *et al.,* (1994) in their definition, related to the organisational aspect of the functioning of TQM, define it as an approach to organisation-wide quality, product design, internal/external cooperation, effective process management, learning,

customer focus and involvement, operational through leadership, employee fulfilment, and continuous improvement. Within the organisational perspective, Walsh *et al.*, (2002) also describe TQM as the establishment of an organisational culture, which seeks to meet the requirements of the client by using an integrated system of training, methods, and tools.

In referring to the constituents of TQM, Wilkinson and Witcher (1991) define TQM comprehensively as follows: *Total*: everyone in the organisation is involved (suppliers and customers); *Quality*: meets the customer needs and requirements; *Management*: top management are fully committed. In a similar vein, using an institutional approach, Ho and Fung (1994) describe TQM as a management approach to enhance the competitiveness, effectiveness, and flexibility of a business as a whole.

With all these definitions available, an extensive review by Mehra *et al.* (2001) summarises five key factors of quality management based on an extensive review of the literature on the definitions and elements of quality management as follows;

(i) Focus on human resources;
(ii) Management structure;
(iii) Quality tools;
(iv) Supplier support and
(v) Customer orientation.

In addition to such orientations, Dean and Bowen (1994) provide certain attributes for looking at TQM in terms of practices, techniques and principles. The principles are continuous improvement, customer focus and teamwork. Each principle comprises a set of practices, such as process analysis, group skills training, direct customer contact and collaboration with suppliers. In fact, researchers and practitioners have different ideas about the concept and elements of TQM; therefore there is no universally-accepted definition of TQM or its elements presented in the literature. However, general consensus is that TQM is an approach or a philosophy to management, which focuses on customer satisfaction, supplier partnership, systematic process management, maintaining and sustaining the workforce, teamwork, and continuous improvement (Goetsch and Davis, 2006).

2.3. WORKING OF TQM PROCESS

It is obvious that each organisation has a unique TQM framework; however, many organisations in the same industry and sector can learn from each other's experiences. Although, the basic components of TQM are the same, TQM is not a one-size-fits-all concept. TQM first of all involves understanding what customers' needs and expectations are. In addition, since it monitors diverse environments and customers, it is flexible and adaptable to change at any time with the objective of achieving customer satisfaction. Given this and in line with TQM literature, Tari (2005: 191) argues that "there is no unique model for a good TQM programme; and TQM is a network of interdependent components, namely critical factors, practices, techniques and tools".

Motwani (2001: 28) and Waldman (1994: 511) provide a structured understanding by identifying eight elements of TQM as follows:

(i) Upper management commitment to place quality as a top priority;

(ii) A broad definition of quality as meeting customers' expectations at the least cost, which encompasses all phases of the design, production, and delivery of a product/service;

(iii) The institution of leadership practices oriented toward TQM values and vision;

(iv) The development of a quality culture;

(v) Involvement and empowerment of all organisational members cooperating to achieve quality improvements;

(vi) An orientation toward managing-by-facts, including the prolific use of scientific and problem-solving techniques such as statistical process control;

(vii) Continual commitment to improving employees' capabilities and work processes through training and benchmarking, respectively; and

(viii) Attempting to get external suppliers and customers involved in TQM efforts.

Indeed, the critical element to successful TQM implementation is 'top management commitment'. By planning for change, controlling through visibility, allocating budgets and resources, and monitoring progress, management can sustain TQM

implementation. Furthermore, managerial categories should support their workers by using change agents to encourage them. Another important part of TQM implementation is ‘process management’, which includes raising quality levels, adding value to processes, enhancing productivity per worker, developing work methods, reducing waste and embracing continuous improvement; furthermore organisations should maintain total quality measurement. It is also useful to note that quality programs must measure and limit the recurrence of defect. In addition, quality programs should include monitoring the level of supplier quality; reduce the variability of procedures, and calculate quality cost. Quality cost might include warranty costs, relevant changes in market share inspection, scrap costs and reworking (Motwani, 2001).

An additional important factor of TQM is ‘product design’, which is the starting point of customer requirements. Therefore, organisations should consider customer needs and expectations, emphasise fitness of use, design reviews as a crucial matter of success, and avoid frequent redesigns in their design process (Motwani, 2001). In terms of ‘employee training and empowerment’, organisations must inform their employees concerning their philosophy of commitment to continuous improvement, inform them of company goals, and make them feeling part of the team. It should be noted that achieving effective results from training programs should include product quality specifications and explanation of overall company operations. In addition to employee training and empowerment leading to evaluating and measuring these types of programs, they should also look at employee autonomy in decision making, the extent to which employee suggestion systems are used, and the degree to which cross-departmental and work teams are used (Motwani, 2001).

Additionally, it is worthwhile noting that vendor quality management needs organisations to work closely with their suppliers and build strong relationships with partners towards new products, quality programs, and continuous improvement in quality. In fact, there are two main areas of customer service which should be addressed. The first is internal customer service and the second external customer assurance. Addressing these matters shows where improvement has been made and where further improvement is possible and measures need to be taken rather than merely monitoring people's work (Motwani, 2001).

Juran (1974,1993) states that the following ten steps should be taken to achieve quality management:

(i) Quality improvement must occur by creating awareness of its need and opportunity;

(ii) Continuous goals for improvement should be set, preferably with key success factors.

(iii) A quality council should be established for selecting a project, identifying problems, appointing teams and choosing facilitators in order to achieve the organisation's goals.

(iv) There should be training programs, tools, and techniques for everyone, as well as an understanding of the quality approach.

(v) Projects should be implemented to solve quality problems.

(vi) Regular progress reports should be provided.

(vii) Recognition of successful work should be shown to all levels of staff and management to show that the process is being undertaken.

(viii) Results should be communicated to all members of the organisation to indicate that progress is being made.

(ix) A record of successes must be kept, so that improvements can be demonstrated.

(x) An annual enhancement should be incorporated into the organisation's regular systems and processes and momentum thus maintained.

According to Saraph *et al*. (1989); Powell (1995), Li *et al*. (2003), Sila and Ebrahimpour (2002) and Arawati (2005), TQM comprises a set of critical factors. Given this and in line with TQM literature, Hunt (1993) concludes that critical factors of successful TQM are a primary strategy to achieve and maintain excellent organizational performance and assist in the implementation of a successful form of TQM. In support of this, Tari (2005: 188) lists thirteen points as critical factors and methods to attain successful and effective application of TQM (practices, tools, and techniques):

(i) Customer-based approach: channels for processing customer complaints, identifying customer needs (surveys, market investigation, and reports from vendors), and customer satisfaction surveys for after-sales service.

(ii) Management commitment and leadership: top management commitment and quality council, support of improvement activities.

(iii) Quality planning: mission/vision statement, quality policy, quality goals, business plan, communication strategies, control and improvement of plans.

(iv) Management based on facts: quality audit, employee performance evaluation, employee satisfaction evaluation, business evaluation, quality costs and use of indicators.

(v) Continuous improvement: PDCA cycle, self-assessment activities (ISO 9000, EFQM Model), seven quality control tools, seven management tools, other tools and techniques.

(vi) Involvement of all members of the firm: communication of information, suggestion systems, work teams, recognition and reward systems.

(vii) Training - individual training plan, training for job requirements and general training program.

(viii) Work teams - cross-functional teams and quality circles.

(ix) Communication systems: bottom-up, top down, and horizontal; communication between all staff, work information, posters, slogans and personal letters.

(x) Learning process management: continuous training and education, quality manual, quality system procedures, work instructions and ISO 9001 certificate.

(xi) Cooperation with suppliers: supplier audit, supplier evaluation, supplier training, and agreed quality.

(xii) Organizational awareness and concern for the social and environmental context: environmental manual, environmental systems procedures, and ISO 14001 certificate.

In fact, implementing the above elements will lead to an enriched TQM culture, which will promote the improvement of a business over time and provide significant benefits in both the short and the long term. In addition, effective implementation is extremely important in order to allow TQM philosophy to take root successfully in the long run;

in addition to which a positive influence will be seen on employees' behaviour and their attitudes and values (Ghobadian and Gallear, 2001). It is generally agreed that an organisation must identify its own particular strengths and weaknesses and tailor its individual approach to TQM philosophy. Many researchers have examined the process of TQM implementation in different types of organisation; however, the results emphasise that there is no single definitive formula for the introduction of TQM philosophy. The fact is that each organisation has its own particular style (Ghobadian and Gallear, 2001). However, there are also common goals, purposes, practices, tools and techniques underlying the activities that make up the implementation process.

By the same token, the model of Ghobadian and Gallear (2001: 355) suggests that the introduction of TQM consists of three stages: pre-implementation; planned implementation; evolutionary implementation and development. Pre-implementation is concerned with first gaining a thorough knowledge of what can and should be expected from the introduction of TQM, and of the implications of introducing TQM. It is recommended that particular attention be given to: customer expectations and the benefits to be gained, leadership, responsibilities and commitment required, and the probable impact of TQM on the organisation. The second stage that the introduction of a TQM approach into an organisation goes through is planned implementation. The model suggests that planned implementation comprises three phases: start-up; progressing into transition; progressing into consolidation. As the model suggests, these first three phases of "planned" implementation are concerned with the development of internal improvement capability.

The third stage that the introduction of TQM goes through, or more pertinently goes into, is evolutionary implementation. By this final stage, the organisation is now in a position to exploit the internal improvement capability and use it to effectively re-focus the organisation's efforts on improving the processes that will consistently deliver customer satisfaction (Ghobadian and Gallear, 2001: 355). Therefore, the above phases could be useful in assisting the business environment to establish TQM.

However, when implementing a successful and effective TQM program it may take three to five years for a company to obtain its expected goals and reap the benefits (Hendricks and Singhal, 2001). This is consistent with the fact that adopting TQM

culture cannot be realized overnight, in particular along with its implicit orientation towards internal and external customer satisfaction. Indeed, it is a complex topic that requires a long-term approach (Claver *et al*., 2001). Supporting this, Hendricks and Singhal (2001) point out that an organisation needs a couple of years after the effective implementation of TQM to begin to show an improvement in their financial performance. It is also broadly agreed that management commitment to the TQM philosophy is an important part of success in any quality initiative and activity (Rao *et al*., 2004). Furthermore, evidence shows that successful TQM is associated with the need for top management as well as the involvement of the majority of workers in its implementation (Taylor and Wright, 2003).

It should also be mentioned that TQM includes other forms such as ISO 9000 and the Malcolm Baldrige National Quality Awards (MBNQA). Wilson *et al.* (2003), describe ISO 9000 as a set of quality assurance standards, first published in International Organization of Standardization (ISO) in 1987. ISO 9000 is described as verifiable, codified, and easily adaptable with changes and updates (Wilson *et al*., 2003). The benefits include attaining access to organisations that deal only with ISO certified suppliers; so organisations need between one and two years to become ISO certified.

It should be noted that organisations, which have applied TQM philosophy, may gain fewer benefits from ISO 9000 certification because they have less room left for improvement. Furthermore, those organisations might be able to achieve ISO certification with less effort and at a lower cost as result of the higher benefits of TQM. In support of this a number of previous quality management studies have revealed a strong relationship between the financial impact of ISO 9000 certification upon an organisation and the extent of adopting TQM (Corbett *et al*., 2005). On the other hand, the MBNQA in terms of time takes longer to realize. This is consistent with the position taken by Wilson *et al*. (2003), who note that organisations may have begun their programs a mean of nearly seven years prior to winning the MBNQA. The United States Congress (USC) established the MBNQA in 1987 and the first award presentation followed in 1988.

Further, the award criteria include the following managerial steps: strategic planning, leadership, customer and market focus, focus on human resources, information and analysis, process management, and business results. In addition, there are five

categories for which the awards are given; (a) manufacturing sector, (b) service sector, (c) small business, (d) education, and (e) health care (Wilson *et al.*, 2003). Kartha, (2004) observes that all of the major elements of TQM are incorporated in the award criteria; in contrast, the criteria used in deciding the award include all of the main elements of TQM philosophy. It has been shown that the primary reasons for starting all quality programs were external and internal competition and customer demands, internal desire for improvement to be the best and reducing cost. Rao *et al.* (2004) state that the TQM program assists organisations by reducing product returns from 7% to 1% of sales, as well as reducing rework, and reversing the trend from losing sales to achieving sales, products, customers, and high profits.

It should be noted that there is also evidence indicating that organisations which win quality awards might be viewed as having high credibility and a lower-cost mechanism, signalling to the market and external clients that those organisations have implemented an effective and successful TQM program (Hendricks and Singhal, 2001). However, organisations must maintain the TQM program in order to be truly effective. Indeed, building an effective and successful quality program requires resources such as time, commitment to effort, and dedication. Given that both obstacles and benefits to TQM can be seen at the different phases of its implementation and maintenance, there are clear differences between the success and action factors used to start or to maintain it (Bullington *et al*., 2002). According to McDonald *et al*. (2002) the new direction of sustaining TQM program is that of improving work processes, experiencing positive work, focusing on customer demands and satisfaction, building strong supplier relationships, performance, support services, and competitive advantage.

From another perspective, Zairi (2002) also suggests that moving an organization toward continuous improvement is the responsibility of its leaders who must create and communicate a vision in order to allow TQM to work. McDonald *et al*. (2002) state that TQM must be a totally integrated, continuous, professional system, based on the commitment of top management and employees working together with clients to ensure that all needs are met. It is worthwhile noting that learning, visionary leadership, employees' empowerment, external and internal cooperation, process

management, and training have a significant impact on any continuous improvement initiatives.

The key objective of TQM philosophy, moreover, is internal and external customer satisfaction; so to achieve greater satisfaction and realistic results, customer satisfaction should be measured as a source of improvement in efforts. In support of this, previous quality management studies have revealed that there is a strong relationship between satisfaction of the end customer and satisfaction of the whole customer chain. For instance, if an organisation's wholesalers are not satisfied, then the end customer will possibly be dissatisfied (Kocakoc and Sen, 2006). From another perspective, Grover *et al*. (2004) also suggest that organisations need to remain competitive and grow successfully in the face of challenges and opportunities posed by the market; therefore flexible, adaptable and dynamic TQM programs are required in order to deal with the social-political-economic environment (domestic and international) and technological and scientific advances.

In relation to these, numerous studies have identified that the implementation of TQM and its acceptable programs are not dependent on organisation type or size. Thus, TQM philosophy can be implemented in any type and size of organisation effectively and successfully (Sadikoglu, 2004). It is broadly agreed that organizations seek to incorporate the idea of sustainability in TQM in order to maintain improved performance and to gain competitive advantage, at the same time avoiding the intense pressure of global competition (Zairi, 2002).

2.4. HISTORICAL DEVELOPMENTS IN THE CONCEPT AND PRACTICE OF 'TQM'

The roots of TQM philosophy can be traced back to the industrial sector, especially after the Second World War (IIWW) in Japan, followed by the USA and Europe. TQM was introduced in the United States in the early to mid-1980s, primarily as a result of strong competition from Japanese organisations (Prajogo, 2005). In fact, the pioneers concentrated on setting a comprehensive vision for quality that covered the management's responsibility to achieve quality, with customer satisfaction and quality improvement. It is obvious that the initial aims were to improve quality. However, the methods used were different. Indeed, the most famous TQM pioneers are the

American pioneers such as Deming, Crosby, Juran, and Japanese pioneers such as Ishikawa and Taguchi.

2.4.1. W. E. Deming (1900-1993)

Deming is considered to be the 'father' of what is known today as TQM. He believed that quality management should be the responsibility of everyone in an organisation. He is well-known for his '14 points of management' and also for his systematic approach to problem solving, known as the Deming control chart or the 'plan', 'do', 'check' (he later changed it to 'learn') and 'act' (PDCA) cycle, which is illustrated in Figure 2.1.

Figure 2.1: The Deming Cycle - PDCA

Source: Oakland (1993: 55)

His, 'plan' refers to establishing performance standards and objectives; 'do' refers to measuring actual performance; 'check' relates to comparing actual performance with the standards and objectives - determining the gap; 'act' is related to closing the gap through certain actions to make the necessary improvements.

It should be noted that Deming's ideas were formulated during his stay in Japan and utilised in the Japanese management style. These ideas were followed by 'Deming's chain reaction' to improve quality that was illustrated from the blackboard of each meeting with top management in Japan, which became a way of life for them (Deming, 1986: 3):

(i) Costs decrease because of less rework, fewer mistakes, fewer delays or snags; better use of machine-time and materials;

(ii) Productivity improves;

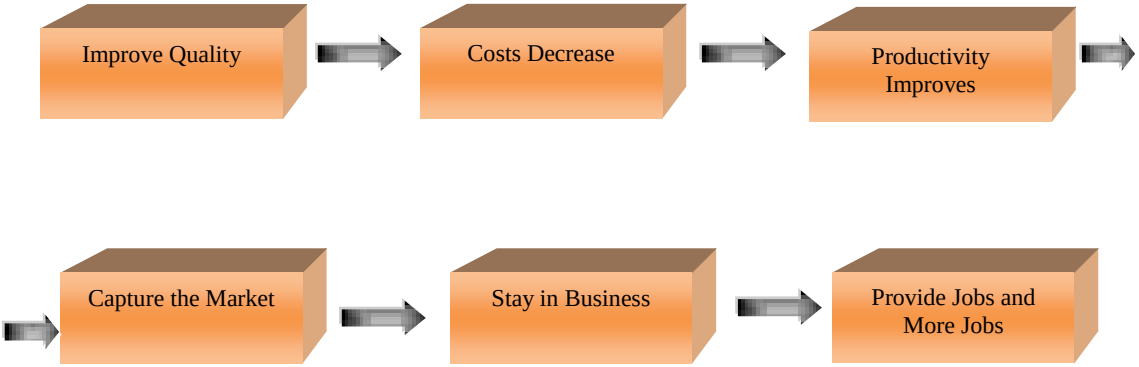
(iii) The market is captured by better quality and lower price;

(iv) Companies stay in business;

(v) More jobs are provided.

Deming (1986) suggested that once management in Japan adopted the chain reaction, their common aim should be 'quality'. It should be realised that the most important part of the production line is the consumer. Therefore, quality should be aimed at the needs and expectations of the consumer at present and in the future (Deming, 1986).

Figure 2.2: Deming's Quality-Chain Reaction



Source: (Deming, 1986: 22)

In order to achieve quality, Deming created a chart as depicted in Figure 2.2., based on the above chain reaction; the chart shows that improvement of quality envelops the entire production line from incoming materials to the final client.

Deming developed his '14 Points for Management' after the Japanese used his chart. It is the view of Deming (1986: 23) that if management intends to protect investors, improve quality, have a competitive position, increase productivity and jobs as well as achieving their goals and staying in business the following steps must be taken (Deming, 1986):

(i) Create constancy of purpose towards improvement of product and service, with the aim of becoming competitive and remaining in business and providing jobs;

(ii) Adopt the new philosophy;

(iii) Cease dependence on inspection to achieve quality;

(iv) End the practice of awarding business on the basis of price tag;

(v) Continuously improve the system of production and service, to improve quality and productivity, and thus continuously decrease costs;

(vi) Institute training on the job;

(vii) Institute leadership;

(viii) Drive out fear, so that everyone may work effectively for the company;

(ix) Break down barriers between departments;

(x) Eliminate slogans, catch phrases, and targets for the work force asking for zero defects and new levels of productivity;

(xi) a. Eliminate work standards (quotas) on the factory floor. Substitute leadership;

b. Eliminate management by objective;

(xii) a. Remove barriers that rob the hourly worker of his right to pride in his workmanship. The responsibility of supervisors must be changed from sheer numbers to quality;

b. Remove barriers that rob people in management and in engineering of their right to pride in their workmanship;

(xiii) Institute a vigorous program of education and self-improvement;

(xiv) Put everyone in the company to work to accomplish the transformation.

However, as there are fourteen points of successful and effective management, there are seven deadly diseases that stand in the way of transformation. Therefore, organisations must be aware of and try to eliminate them. Listed below are Deming's (1986: 97-98) 'seven points of deadly diseases':

(i) Lack of constancy of purpose to plan products and services that will have a market and keep the company in business and provide jobs;

(ii) Emphasis on short-term profits;

(iii) Evaluation of performance, merit rating, or annual review;

(iv) Mobility of management; job hopping;

(v) Management using only visible figures, with little or no consideration of figures that are unknown or unknowable;

(vi) Excessive medical costs. These costs are embedded in costs of products;

(vii) Excessive costs of liability, swelled by lawyers who work on contingency fees.

2.4.2. Philip B. Crosby (1926-2001)

Crosby viewed TQM as an 'approach for change', and is well known in relation to the concepts of 'zero defects' and 'do it right first time'. The main concern of Crosby's books is the meaning of quality and its attributes and finding a common understanding of what quality is and how people can achieve it by working together according to this understanding (Fox, 1993). It is clear that Crosby's philosophy focuses on output. Consequently the best description of his philosophy can be seen in his four absolutes of quality management as follows (Crosby, 1989: 50):

(i) Quality is defined as conformance to requirements, not goodness;

(ii) Quality is achieved through prevention, not appraisal;

(iii) The quality performance standard is zero defects, not acceptable quality levels;

(iv) Quality is measured by the price of non-conformance, not indexes.

Like Deming, Crosby provides his own programme that includes fourteen points in order to develop employees' commitment and their skills and support to the system, as well as these 14-steps known as guidelines for implementing a quality improvement program (Crosby 1989: 106-107):

(i) Management commitment;

(ii) Quality improvement team;

(iii) Quality measurement:

(iv) Cost of quality evaluation;

(v) Quality awareness;

(vi) Corrective action;

(vii) Establish an ad hoc committee for the zero defects program - arranging for the commencement day, when management will stand up in front of everyone and declare that they have been converted.

(viii) Supervisor training;

(ix) Zero defects day;

(x) Goal setting;

(xi) Error causes removal;

(xii) Recognition-acknowledgement;

(xiii) Quality councils and

(xiv) Do it over again.

2.4.3. Juran (1904-2008)

Juran has made a greater contribution to the literature of quality management than the others (Dale, 2003), with an emphasis on how to manage quality functions. In this vein Kruger (2001) states that Juran was the first to expand the understanding of quality control and also to place emphasis on the importance of the managerial aspect. He believed that the important part of management function is quality control. Destefani, (2005) mentions, therefore, that many people consider Juran to be the 'father' of quality management, and one of his contributions is the effort to adding the human element to quality and expanding it from its statistical origins.

William (1995), Rao, *et al*. (1996), Beckford (1998) and Nahmias (2005), mention that in the 1950s Juran developed his 'Quality Trilogy', which consists of the following three components:

(i) Quality planning: the process for preparing to meet quality goals, such as designing or creating products/services;

(ii) Quality control: the process for meeting established goals under operating conditions;

(iii) Quality improvement: the process for breaking through levels of performance;

In terms of conceptualising quality, according to Hoyer and Hoyer (2001) Juran divided quality in two ways:

(i) Quality consists of those product elements which meet the requirements and needs of the clients and thereby provide product satisfaction;

(ii) Quality consists of freedom from deficiencies.

From another perspective, Phillips (2004: 25) reveals that "Juran participated vigorously in and contributed extensively to the growth of industry, society and-perhaps most importantly to us - quality". He also suggests that quality committees must be at the top of every organisation. The cost of quality is extremely important and allows companies to measure quality in terms of finance. Furthermore, in terms of attaining leadership quality, an organisation needs years to achieve this.

Juran (2002: 5) discovered that the most common strategies used by leaders of quality are as follows:

(i) The chief executive personally led the quality initiative;

(ii) They trained the entire management hierarchy in managing for quality;

(iii) They enlarged the business plan to include strategic quality goals;

(iv) The goals included improving quality at a revolutionary rate, year after year;

(v) They set up means to measure progress against the quality goals;

(vi) The senior managers reviewed progress regularly;

(vii) They provided participation by the workforce.

Juran (2002: 5-6) suggests that in order to improve the process of quality the following should occur:

(i) Annual quality improvement is an essential success factor; without it there can be no quality leadership;
(ii) It is a big advantage for companies to have available a field-tested, proven managerial process as an aid to annual quality improvement;
(iii) Training is needed to enable company personnel to attain mastery of the quality improvement process, and
(iv) The training should include participating in actual improvement projects.

2.4.4. Feigenbaum (1922-)

Many know him as the originator of total quality control, particularly following the publication of his book *Quality Control* (1951), which deals with issues such as quality management, the system for total quality, strategies and quality, statistical technology and the application of total quality in enterprise. According to Powell

(2001: 45) when Feigenbaum was asked about total quality control he said, “When I originated total quality control, the fundamental theme was that improvements in quality lead to improvements in everything else in the organization; hence, quality is a way of managing”. Powell (2001: 45), states that according to Feigenbaum, “without quality, your customers, whether industrial or consumer, are simply not going to buy from you”.

Generally, the contribution of Feigenbaum regarding quality is articulated in two aspects (Kruger, 2001: 151 and TQM: A Snapshot, 2002: 56):

(i) Quality is the responsibility of everybody in the company, ranging from top management to the unskilled worker; and therefore long-term business success requires total participation of all employees and total integration of the company's technical and human resources.

(ii) Non-quality costs have to be categorized if they are to be managed and, in order to reduce failure costs, expenditures should be increased for prevention.

Additionally, Feigenbaum believes that manufacturing, engineering, marketing, and maintenance are important in shaping products and services in terms of quality. However, it should only be the customer who is responsible for determining quality rather than it being a marketing or engineering issue (Feigenbaum, 1983).

2.4.5. Ishikawa (1915-1989)

Ishikawa significantly impacted on the Japanese quality understanding. His four aspects of TQM as ‘circles of quality’, ‘the question of continuous training’, ‘the tool of quality,’ and ‘the chain of quality’ have become very common in the field of quality. In addition, today’s understanding of TQM has come very close to Ishikawa’s approach to TQM philosophy. Ishikawa advises that organizations must emphasize their internal and external clients. Furthermore, their needs and requirements have to be satisfied. Another important part of successful TQM is employees’ involvement in voicing their opinions in order to assist the organization to increase overall performance.

In order to determine root causes of errors and imperfections regarding processes, and to generate and organize thoughts concerning a desired effect, Ishikawa has created

what is called the ‘fishbone’ or ‘cause-and-effect diagram’, which is considered to be an important contribution to the quality field. The following steps will help to build up the fishbone diagram (Wikimedia Foundation, 2006):

(i) Draw a circle and label it with the desired effect.

(ii) Draw a horizontal line out from the left edge of the circle (if you read left to-right). This is the ‘spine’ of the fish;

(iii) Brainstorm about the key categories of things that could cause the desired effect; for each category, draw a horizontal line from the "bone" to the right (if you read left-to-right) for each cause in the category, and list the cause on this line;

(iv) For each cause, if you can identify something more fundamental (a ‘cause of the cause’), draw it on an additional diagonal line toward the head.

Ishikawa believes that to protect quality initiatives from failure and to sustain them and in order to attain successful TQM, actual support and leadership are required from the top management level. He also advises that to achieve effective and successful involvement of all employees in the organization in terms of problem-solving, the process requires continuous education and training for all staff members. Furthermore, Ishikawa argues that TQM starts with process of education and ends with education process; this is as result of frequent change of a business workforce.

Feigenbaum and Ishikawa advise that paying attention to the internal customer is extremely important and consider having a strong relationship with the internal customer to be a result of satisfying their requirements and needs (Ishikawa, 1985).

2.4.6. Shewhart (1891-1967)

Shewhart is regarded as the grandfather of TQM, and one of Deming’s teachers, who created the concepts of TQM and continuous improvement. Shewhart argues for two aspects of quality: objective and subjective. Objective attributes of quality are constant and measurable (Hoyer and Hoyer, 2001), while subjective attributes are closely tied to the utility of value of the objective physical properties of the item itself. He also indicates that satisfying human needs by translating those needs into physical attributes of the product manufactured are considered to be an important step in the engineering work design of products. In addition, he values setting ways and means of obtaining a product that vary from standards set for these quality attributes by no

more than might be left to chance (Shewhart, 1931). Thus his link between product and quality is established through the best way of satisfying the needs.

2.4.7. Genich Taguchi (1924-2012)

As a Japanese engineer and statistician, according to de Mast (2004), Taguchi's vocabulary and techniques are deeply rooted in his engineering background and therefore differ in some ways from the vocabulary and statistical techniques that are used in traditional quality improvement. Taguchi has contributed effectively to the industrial statistics. The key elements of his quality philosophy include:

(i) Quadratic Loss Function, which is used to measure financial loss to society resulting from poor quality and to show how variation plays a significant role in quality. It is important to note that the theory of loss function illustrates the relationship between cost and quality (Daigleish, 2006);
(ii) Off-line quality control philosophy, designing processes and products that are 'robust' to parameters outside the design engineer's control;
(iii) The innovations of the statistical design of experiments, notably the use of an outer array for factors that are uncontrollable in real life, but are systematically varied in the experiment.

Taguchi estimates that poor product design causes around 80% of most defective items; therefore the design stage is extremely important and the organisation should concentrate their efforts on it as it is easier to make changes (redesign) in the design of products than during the production process (Kartha, 2002). According to Hoyer and Hoyer (2001: 61), the main points emphasised by Taguchi are as follows:

(i) Poor quality is a loss to society. Instead of experiencing a decrease in quality as the supplier's product or service position moves away from the societal preferred point, society experiences an increase in loss when that occurs.
(ii) Loss caused by the intrinsic function of the product or service does not count toward the loss to society. The larger the distance between what societies actually get and the location of its preferred point, the less quality society will experience.

Thus, from Taguchi's point of view, to maximize quality, loss to society should be minimized. Finally, according to Antony *et al.* (2004: 447), "Taguchi has been very

successful in integrating statistical methods into the powerful engineering processes for achieving greater process stability, capability, and yield".

2.5. COMMON FACTORS AMONG THE SEVEN INNOVATORS OF TQM

Each of the seven leaders has their own distinctive view of and approach to the TQM concept. While there are some differences in views, all seven leaders actually focus on the fact that top management have the major responsibility for quality improvement in an organisation.

Deming believed that there is a need for total transformation and he was very theoretical-minded, therefore his definition of quality is a predictable degree of uniformity and dependability at low cost and suited to the market. Whereas Juran was more practical-minded in his approach to quality, so his definition of quality is fitness for use. The focus of Crosby and Juran is on training and teaching others about quality. In addition, both had their own unique focus concerning quality. Juran had his quality trilogy and Pareto principle for quality improvement and his general management approach towards quality highlights the human elements. Whereas Deming and Crosby both had 14 points for quality improvement, Crosby for his focus on zero defects and doing it right the first time. Furthermore, his general approach to quality was prevention not inspection. It is worth noting that Deming was well-known for his PDCA cycle, and his general approach was to reduce variability by continuous improvement, and cease mass inspection. Feigenbaum emphasizes cost of attaining quality and cost of the absence of quality and he developed total quality control. It is clear to see that the work of Ishikawa was based on Deming and Juran's work. His thought is that the price of products is an important part of quality. In addition, he is well known for his fishbone diagram (cause and effect diagram).

It should be noted that the original TQM concept was developed by Shewhart, with the SPC method and the Shewhart cycle. He believes that there are two sides of quality: the subjective and the objective side.

Overall, most of the above-mentioned contenders to the field believe that 'organisation management' is mainly responsible for ensuring the following ideas, which they should share;

(i) Commitment to quality and horizontal and vertical flow of information through the organisation;
(ii) A clear mission and vision of the organisation which should be known to everyone ;
(iii) A proper work environment which is essential for all levels and to improve employees' skills and attitudes;
(iv) Employees' empowerment, encouragement, and involvement;
(v) The importance of human resources and technical processes;
(vi) Education and training which is important to the organisation as a whole (all levels – all employees);
(vii) Control of processes in order to reduce inspection time and reduce the costs of quality to improve competitive advantage;
(viii) The importance of planning and measurement of quality;
(ix) Supporting decisions by facts and figures;
(x) Seeking the continuous improvement of all processes and functions;
(xi) The importance of a strong relationship between suppliers and organisation; and
(xii) The need for customer satisfaction.

In addition, all of the quality leaders believe that quality changes cannot occur overnight; therefore, organisations must be willing and able to change and consider that involvement of all employees focusing on the internal and external customer is an important part of implementing TQM. Moreover, they agree that TQM is a long-term approach to quality improvement rather than a quick-fix as many managers of organisations think, and they support, in one way or another, the fact that TQM can deliver unlimited benefits to various organisations and sectors.

2.6. 'TQM' MODELS

Many models have been established which articulate TQM in real life: the three frequent important uses are the Deming Application Prize, the Malcolm Baldrige National Quality Award (MBNQA), and the European Foundation for Quality Management (EFQM) Model.

2.6.1. Deming Prize Defining the Effective TQM Model

The Deming prize was established in Japan in1950 and was built on an intrusive and highly demanding process. The introduction of the award stemmed from Japanese Scientists and Engineers (JUSE) to honour W. Edwards Deming for his great contribution to the progress of industry in Japan and the dependability of products and quality. The Deming Prize, an annual award, highlights organisations that successfully and effectively implement TQM through statistical quality control and focuses on the quality of their services and products along with continuation of quality in the future. In addition, it examines their proper TQM implementation in order to achieve strategies and business objectives and the application of outstanding results.

It should be noted that while it is not a model in itself, since it defines the nature of TQM, we can consider it as a model, as described below.

The criteria of the Deming prize consist of ten points as following;

(i) Top management leadership and organisational vision and strategies;

(ii) TQM frameworks: policy management; organisational structure and its operations; daily management; relationship to other management improvement programmes; relationship to ISO 9000 and ISO 14000; and TQM promotion and operation;

(iii) Quality Assurance System: process control; new product and new technology development; testing, quality evaluation and quality audits; subcontracting, purchasing, and distribution management and activities covering the whole life cycle;

(iv) Management systems for business elements: quantity/delivery management; environmental management; cost management; cross-functional management and its operations; and safety, hygiene and work environment management;

(v) Human resources development: education and training; positioning of people in management; respect for people's dignity;

(vi) Effective utilization of information: information systems; positioning of information in management; support for analysis and decision-making; standardization and configuration of management;

(vii) TQM concepts and values: maintenance and improvement; quality; respect for humanity;

(viii) Scientific methods: understanding and utilization of problem-solving methods; and understanding and utilization of methods;

(ix) Organisational powers: core technology; speed; vitality;

(x) Contribution to realization of corporate objectives: employee relations; customer relations; social relations; supplier relations; realisation of corporate mission; shareholder relations; and continuously securing profits.

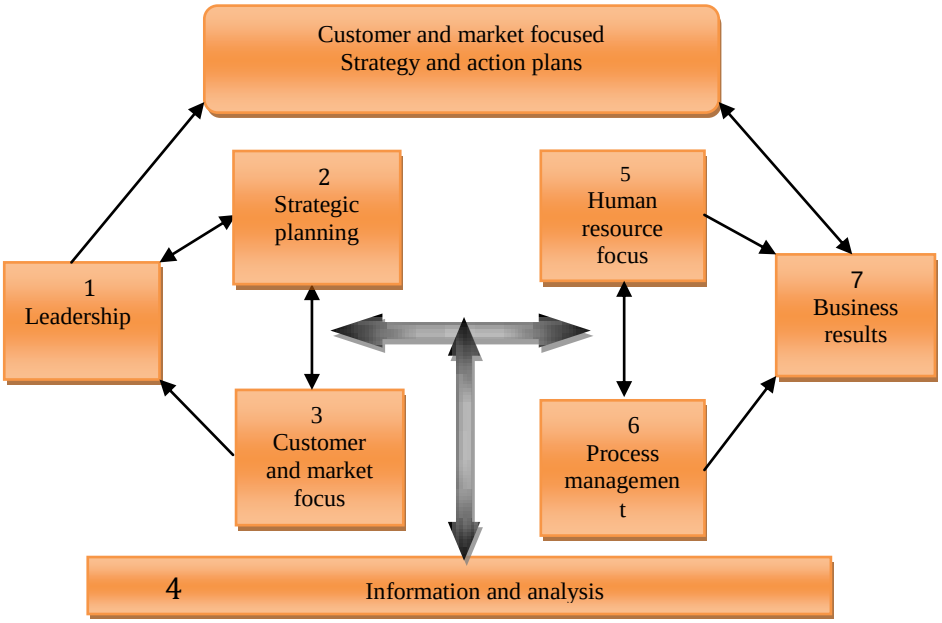
2.6.2. Malcolm Baldrige Model

Congress established the Malcolm Baldrige National Quality Award (MBNQA) in the late 1980s in the US. The introduction of this annual American quality award was prompted by the need to enhance US competitiveness; it offers a vehicle for sharing successful and effective strategies, and promotes quality awareness and achievements. The criteria of the Baldrige Award emphasise continuous improvement and results. It should be noted that MBNQA is the most famous and now widely-used award and it provides a framework that suits many organisations in terms of assessing, designing, and implementing a process for business operation. The award is presented annually to organisations that have excelled in quality management and quality achievement in the US.

Similar to the Deming Prize, the MBQNA is not a model in itself; but the criteria and process suggested by the prize can be considered to constitute a model, as explained below.

The criteria for MBNQA consist of seven elements (see figure 2.3, for more details) as follows; (i) Leadership; organisational leadership, public responsibility and citizenship; (ii) Strategic planning; strategy development, and strategy deployment; (iii) Customer and market focus; customer and market knowledge, customer relationships and satisfaction; (iv) Information and analysis; measurement and analysis of organisational performance, and information management; (v) human resource focus; work system, employee education, training and development, and employee well-being and satisfaction; (vi) Process management; product and service processes, business processes, and support processes; (vii) *Business results;* customer-focused results, financial and market results, human resource results, and organisational effectiveness results.

Figure 2.3: The Baldrige Model



Source: Oakland, (2003: 86)

2.6.3. The European Foundation for Quality Management (EFQM) Model

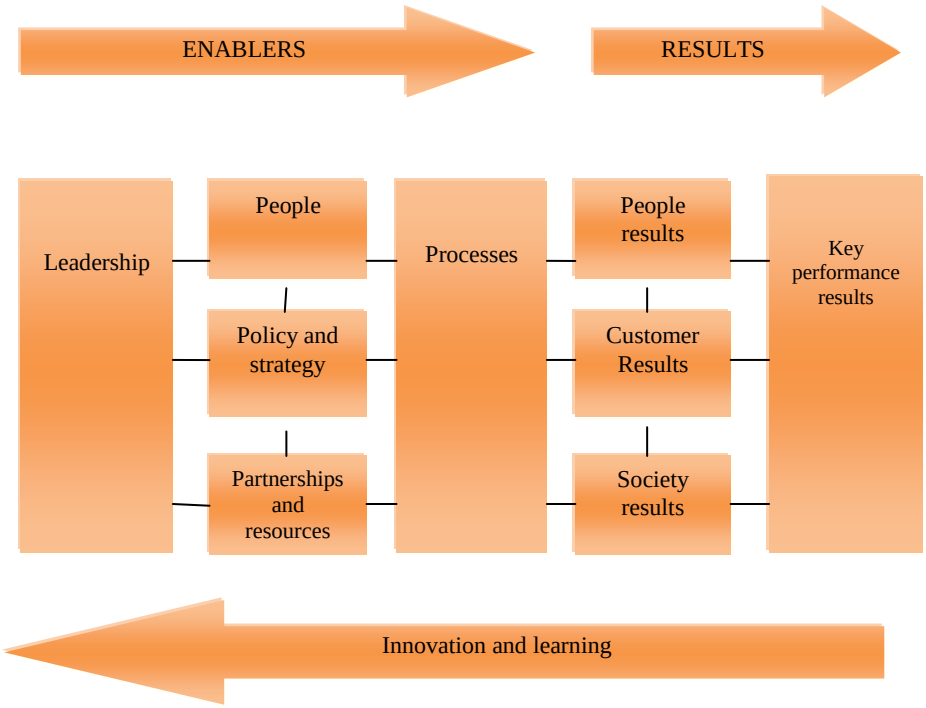
The EFQM award was launched in Europe in the early 1990s to promote self-assessment and as an approach to improving business in Europe; it aims to honour distinctive performance and successful implementation of TQM.

The criteria for receiving the award is that an applicant must prove that significant contribution has been made by adapting TQM as the organisation approach over the past few years. As well as ensuring that employees', customers' and others' needs and expectations have been satisfied. It should be recognised that the business excellence model was developed in order to provide standards in quality management to identify areas for possible improvement; evaluate an organisation's management system objectively and compare the organisation using benchmarking with others.

The EFQM model recognises processes as the key issue of attaining excellent results through people skills and performance. There is only one way to improve performance and that is by improving the processes involving people. Figure 2.4 illustrates the EFQM excellence model, which displays nine criteria. The enablers' side consists of five criteria: leadership, people partnerships, policy and strategy, resources and processes. The main concern of the enablers' side is related to how an organisation performs various activities leading to the results side, which consists of

four criteria: people results, customer results, results favourable to the society, and eventually excellence in key performance results. It is clear that the results driven by enablers reflect on the fact that each one of them represents 50% of the total that drives innovation and learning.

Figure 2.4: The EFQM Excellence Model



Source: Oakland (2003:88)

The EFQM model provides a framework by following ten steps to be used to form organisations:

(i) Determine and establish results and objectives they want to reach;
(ii) Set up directions throughout leadership;
(iii) Set up policy and strategy;
(iv) Establish an appropriate approach to processes, people, partnerships and resources;
(v) Achieve the policies and strategies, and eventually the results through deploying its approaches;
(vi) Lousiness performance evaluation for the customer;
(vii) Measure and evaluate the accomplishments of key performance results;
(viii) Review performance in order to determine weaknesses and strengths and find areas for improvement;

(ix) Innovation of performance improvements;

(x) Learn more facts about the influence of the enablers on the eventual results.

2.7. POSSIBLE BENEFITS OF 'TQM'

Even though organisations might face difficulties in implementing and maintaining TQM, there are many benefits and advantages to a successful and effective form of TQM programs. The fact is that TQM is used widely throughout the world due to its benefits, "There is hardly any management philosophy that is as much adopted by companies as quality management" (Fisscher and Nijhof, 2005: 150). This is because organisations which implement TQM philosophy outperform non-TQM organisations in quality performance and in most of the key elements of TQM practices (Prajogo and Brown, 2004). In supporting the benefits of TQM, Chin and Pun (2002: 273) argue that "The implementation of TQM can generate improved products and services, reduced costs, more satisfied customers and employees, and improved bottom line financial performance". Therefore, TQM is considered as a licence to practise (Zairi *et al*, 1994).

However, organisations cannot pick and choose only some techniques of TQM and expect to achieve full benefits from implementing a part of TQM (Kaynak, 2003). Consequently, creating an effective system and disseminating TQM throughout the entire organisation is significantly important in order to gather full benefits. Indeed, implementing TQM has many advantages such as cost saving, improving productivity, increasing profits and creating leading results for any organisation that wishes to succeed (Brah *et al.*, 2002). Joiner (2007), Mann and Kehoe (1994), Pegels (1994) and Terziovski *et al.* (1999) state that quality initiatives, in particular TQM, have beneficial effects on organisation performance. Similarly, Handfield *et al.* (1998) claim that there is a positive impact of TQM on organisation performance through two processes: first, improved internal performance within the organisation which leads to a reduced amount of waste, enhanced efficiency and eventually higher return on assets; secondly, improved customer satisfaction, loyalty and brand value which lead to higher sales and market share.

It has been shown that "if TQM succeeds in improving performance, the organization's customers may gain through lowered prices or improved satisfaction;

its shareholders gain through improved returns on investment and management gains through higher compensation" (Beer, 2003: 639). This is consistent with the statement by Yang (2006) that TQM significantly affects quality performance, especially with regard to employee and customer satisfaction. Vora (2002) points out that employee and customer satisfaction and modernization processes together guide improved operational and financial results which will ultimately lead to business excellence. Thus, "The experience with the TQM approach affected the customer satisfaction results positively, so the units that had started to apply TQM earlier had more satisfied customers than their less experienced counterparts" (Tanninen, 2010: 182). Moreover, in terms of 'profitability', the longer a unit applies TQM, the more profitable it is than non-TQM units. Also productivity increases as the experience of the TQM approach increases (Tanninen, 2010). "In fact, the awareness of major propositions of TQM philosophy can help to overcome the obstacles to effective project management. The integration of the customer-supplier chain as a means of better customer service, the error prevention, the employee development and care, and the good leadership are only some of the attributes of the TQM philosophy that can form a base for effective project management" (Hides *et al.*, 2000: 132).

In support of this, Sun (1999) mentions that all the TQM activities and practices contribute to increased client satisfaction and business performance to a certain extent; in addition to development of human resources, quality leadership and quality strategy which are paramount in terms of contribution. Additionally, one of the quality pioneers, Juran (2001), states that the benefits and aims of total quality are satisfied customers, higher revenues, empowered employees and lower costs. It is broadly agreed that higher quality through improved customer retention, satisfied internal and external customers, increased market share, premium prices, and more loyal customers can equate to higher revenues. It should be noted that costs could be lowered by reducing rework, limiting errors, and reducing non-value added work. Evidence shows that the costs of reducing errors during design are far less than the cost of correcting errors during production. In addition, the costs of reducing errors during production are far less than correcting following final inspection. Moreover, cost of discovering, finding and correcting errors at final inspection are far less than fixing the errors after the client has received the services or goods (Juran, 2001).

In addition to the short-term benefits, Deming (1981) attests that long-term and structural benefits which can arise during development of the process do not only provide good quality and long-range enhancement of market-position, but also better revenue and productivity. Indeed, development of the process will enhance the quality of output of a product, reduce waste of manpower, diminish mistakes; and reduce materials and time of machine work. Furthermore, a number of previous quality management studies have revealed that many internal and external benefits can be achieved, including customer and employee satisfaction, improved business results, enhanced management and improved leadership skills and a positive impact on society (Oakland, 2000 and Dale, 2003). In terms of 'processes', Kontoghiorghes and Gudgel (2004) state that organisations which place emphasis on quality and continuous improvement of process will achieve more cost-effective production. Thus, "continuous improvement of quality must be a fundamental component of the culture of the organisation" (Proposing a Framework for Your TQM Program, 2002: 60).

However, it is perhaps difficult for management to apply TQM, because the meaning of TQM is culturally overhauled (Rao *et al.*, 2004). Therefore, each organisation should build up its own individual framework for TQM that is proper and fitting to its particular situation and available resources. It has been shown that "TQM is an approach to improving the competitiveness, effectiveness, and flexibility of a whole organisation in ways that each activity is planned, organized, and understood" (Senapati, 2004: 684). It is obvious that all targets and organisational aims would be fulfilled through implementing TQM. Senepati (2004) and Agus and Sagir (2001) state that TQM programs have a strong impact on competitive advantage, which leads eventually to a more significant impact on the performance of finance and on the organisation as a whole. In fact, the implementation of TQM assists an organisation to build up capabilities, competence, and strategies to attain innovation and multidimensional competitive advantage.

From another perspective, Feigenbaum (1990) also suggests that quality is an essential strategy and no longer an optional extra, especially in an increasingly competitive world. Thus, it is worthwhile noting that organisations need to adopt TQM to reach their goals and to survive. Prajogo and Sohal (2003:514) state that

“TQM philosophy has significant and positive contributes to innovation performance, in terms of product and process”. It is clear that there is a significant and positive relationship between innovation performances, in particular process innovation, and quality performance. It seems clear that the main aim of TQM is to provide a service, product and/or process that meets or exceeds the customer’s needs and requirements. Indeed, applying TQM shows how to satisfy an organisation’s customers and assist in increasing profitability, quality of work life, job security for everyone, reputation, improving performance, safety (so your employees will think before they act) employee morale, cash flow, pride of workmanship, also increasing profits, enlarging market share, reducing employee turnover, lowering costs, preventing absenteeism, motivating employees, solving nagging problems, working together as a team, eliminating or reducing punch lists and eliminating recurring mistakes (Miller and Jack, 2007).

Given this suggestion and in line with TQM literature, another major goal of TQM is to create empowered employees, which is realized by most leading organisations today. It is useful to note that workforces have the means to evaluate the quality of their own work processes, to understand the measurements and judge on these measurements through comparing it to the aims and take action when the process is not on target. In addition, empowered employees lead to understanding who their clients are; what the clients’ requirements, wants, needs and expectations are; how to create and design new products and services to meet these requirements; how to increase and enhance the necessary processes of work; how to improve and use the necessary measurements of quality and how to continuously improve all organisational processes (Juran, 2001).

By the same token, one previous quality management study reveals that TQM culture has many advantages such as better communication for the organisation as a whole, cooperation within and between all units, developing the level of employees’ commitment, achieving customer satisfaction for the organisation to attain better position alongside the competition (Claver *et al.*, 2001). Moreover, paying greater attention to quality results in improving profitability, improving productivity and reducing costs; it also enhances certainty in operations, improves company image, increases morale and develops clients’ commitment and management. (Davies, 2003).

In order to gain a better, more successful and effective TQM form, Ugboro and Obeng (2000) point out that an organisation should involve and empower its employees, which includes delegating authority to make both collective and individual decisions and offering processes that allow employees to bring multiple perspectives regarding quality decisions. They also mention that such programs have an efficient system of communication, which facilitates the flow of information vertically and laterally, as well as other benefits such as problem-solving skills, determining and resolving clients' complaints in an effective and speedy manner and continuous teamwork training would be achieved. Research has shown that there is a positive relationship between an organisation's performance and the extent to which it applies TQM. For instance, operating performance might be affected directly by TQM practices such products/services design, process management, and supplier quality management (Kaynak, 2003).

In terms of 'financial performance and competitive advantages', evidence has proved that there is a positive relationship between the two. In other words, TQM programs have a strong impact on competitive advantage, which eventually leads to additional impact on financial performance (Agus and Sagir, 2001). Thus, organisations that implement TQM programs will amass numerous benefits in the long term due to an increase in economic value and competitive advantage. In addition, there is also much evidence indicating that

> The effects of TQM on the financial results are produced on the whole (74.5%) by the wealth of distinctive competencies that the introduction of TQM manages to generate or boost. The distinctive competencies associated with TQM are responsible for the fact that the introduction of this type of initiative can have a positive influence on performance. (Tena, *et al.*, 2001: 937)

Indeed, the benefits of adopting TQM are related to the entire organisation and its activities. However, serious efforts need to be taken by top management to so implement it. Managerial categories are considered to be the key to the successful and effective application of TQM. Thus, they are the main individuals to gain TQM benefits. In support of this suggestion, evidence shows that "Management leadership clearly has a significant role to fill in a successful implementation of TQM practices. The more aggressive top management is in the implementation of TQM, the more

training employees at all levels get" (Kaynak, 2003: 427). Other stated and implied benefits can be seen in the following statement by Grover *et al*. (2004: 4033):

> The desired goals or benefits of TQM are unarguable. Organisations adopt TQM not only for the stated reasons such (Customer satisfaction, Profitability, Quality of product) but also for the implied reasons of the benefits, include productivity improvement, increased customer base (market share), customer loyalty, reputation in market, low cost of quality, optimum utilization of resources, improved work culture, employee satisfaction, and avenues for diversification.

It is vital for TQM to be linked to 'strategy formulation'. It should be recognised that TQM plays a significant dynamic role in this regard; the implication is that TQM organisations at a strategic level have strong TQM programs with greater longevity as a consequence of using frequent regenerative approaches (Leonard *et al.*, 2003).

In summary, there have been tremendous benefits and advantages as stated in the TQM literature that can be gained from the successful and effective implementation of TQM. Indeed, proper TQM application achieves real cost savings arising from fewer errors, consequent reduced wastage cost, identifying customers' needs and requirements and setting standards for these needs. It also leads to greater customer satisfaction, makes an organisation more competitive and flexible to change, enhances the prospect of repeat business, provides a proper working environment for everyone which helps the organisation to succeed, leads to high morale and productivity, greater job satisfaction can be obtained by maintaining the entire workforce and eventually reduces stress, waste and friction. In addition, through systematic and logical analysis of the process, other benefits can be achieved such as effectiveness, partnerships, co-operation and team-building, improved communications and building up a new culture that enables growth and longevity. Generally, it should be noted that the significant and actual benefit is that it increases the overall performance of an organisation, both financially and operationally. Owing to these important implied and stated benefits there is no doubt that applying effective TQM is an urgent and critical matter for all sectors and organisations all over the world.

2.8. CRITICAL PERSPECTIVES ON 'TQM'

One of the current discussions in the management philosophy field is that TQM has not delivered its promises. As a result, TQM came under increasing criticism in the

early 1990s. In this vein, recent evidence suggests that implementing TQM philosophy failed to enhance and offered competitive advantage to a number of organisations (see: Schaffer and Thomson, 1992; Fuchsberg, 1992; Cole, 1993; Naj, 1993; and Collins, 2001). Also their criticism of TQM is that it is a 'management fad' or 'another program' and they mention that a number of organisations went bankrupt after winning the Malcom Baldrige Award (MBA).

Furthermore, TQM philosophy has been attacked from many perspectives such as in Stratton (1993) and Paton (1994). What is interesting is that, in the early 1990s much of the criticism based on survey evidence criticises the application of TQM. For instance, only a small percentage, namely 20% of 100 British organisations surveyed, mention that quality programmes achieved tangible results. In addition, another survey shows that 36% of 500 organisations point out that TQM significantly impacted on their ability to compete with their rivals (Hendricks *et al.*, 1997). Although the results of these surveys support the case against the philosophy of TQM, the fact is that these results are impressions, perceptions, and opinions regarding its value. Again, it is worth noting that there is no mention of the financial benefits that can be obtained by organisations fully adopting TQM (Hendricks *et al.*, 2000).

Furthermore, critics mention that in terms of 'competition' other paradigms such as six sigma, customer-focused organisations, re-engineering, learning organisations, supply-chain management, and process-oriented organisations *etc*., cause problems in the progress of TQM application. However, Drucker (1989) states that the principal reason for an organisation's failure is poor management and lack of knowledge about quality and its application. Van Allen (1994) points out that the source of the undesirable results stems from lack of leadership and poor management rather than any defects in the models of TQM. Therefore, to avoid implementation problems, a quality culture must exist throughout the organisation and each organisation should choose an appropriate application model.

According to the TQM literature, great contribution has been made regarding TQM development by many scholars and experts such as Deming (1986), Crosby (1979, 1992 and 1996), Juran (1974, 1986, 1988 and 1989), Feigenbaum (1982 and 1993), Haigh and Morris (1993 and1995), Hellard (1993), Flanagan *et al.* (1998), Egan (1998), Harrington (1999) and others. It is important to note that a number of

methods, management techniques, and models have been presented to organisations in order to assist them in enhancing their operations and obtaining success by transferring their approaches and methods into practice through the most appropriate model. Further, all the contenders in the field agree that TQM is the best way of reviving any type of organisation. In support of this Garvin (1988); Drummond (1992), Bank (2000); Oakland (2000) and Dale (2003) as advocates of TQM point out that the most important competitive and supportive tools for organisational survival are quality initiatives, in particular TQM.

Moreover, the above-mentioned contributors continue by emphasising that the Japanese economic phenomenon is the best proof of TQM success. Furthermore, hard evidence provided by the General Accounting Office GAO (1991) confirming that TQM works completely, beneficially and effectively is provided in the results of a survey of organisations in the US. The aim of the study was to reveal the impact of TQM on performance, and it showed that better results were achieved and greater customer satisfaction accomplished; it improved profitability and brought about better employee relations, higher productivity, and increased market share. Furthermore, numerous studies have identified a significant difference between the performance of organisations that attain quality awards compared with those that do not. The fact is that organisations that receive quality awards outperform others which do not over a ten-year period in terms of revenues and operating income (Hendricks and Singhal, 1997).

In supporting their first study and results, Hendricks and Singhal (2000) indicated in their second study that the long run stock performance of organisations that received quality awards was between 38% and nearly 50% higher than those who had not received a quality award in the same sector. This shows TQM to be a revelation in the management field that strives to overcome various problems as well as the criticism and disadvantages it faces (Santos and Esconciono, 2002). Consequently, TQM requires establishing and maintain operations and for all parts of the organisation to equally apply the TQM philosophy. The fact is that TQM is a philosophy that leads the entire workforce to have responsibility for the quality of their work.

Despite the criticisms, TQM has played a significant and important role in devolving many organisations worldwide and has facilitated trading between different countries and institutions throughout the world. According to the TQM literature great benefits can be attained from TQM philosophy; also based on the literature there are characteristics, fundamentals and features (management commitment, employee participation, knowledge and understanding of TQM, teamwork, leadership, internal and external customer satisfaction, and continuous improvement *etc.*) that TQM attempts to spread throughout the business environment. However, other considerations and issues should be considered in order to disseminate the quality culture and to assist in implementing the successful paradigm of TQM including understanding its tools, techniques and models.

2.9. CONSIDERIGN QUALITY IN PUBLIC SECTOR

This section briefly discusses quality in the public sector; in doing so, initially an understanding of public sector is provided, and also the importance of quality management within public sector is presented. The discussion also includes process of quality management in the public sector and as to why TQM is implemented across the public sector.

2.9.1. Public Sector

Public sector mostly referred to as the 'government sector' or 'state sector', which relates to the ownership, production and provision of tradable and public goods by government agencies (Barlow *et al.*, 2010). Thus, any activity that is conducted under various government agencies and is fully or partly financed through public finance is considered as part of public sector. Although state owned economic enterprises are owned by the state, they may finance their expenditures, partially or wholly, through the sale of goods, commodities and services they provide.

As to the components of public sector, each nation has a particular structure. The national accounts of UK, for example, outline public sector, as comprising of central government, public corporations and local government (David, 2002).

In overall, hence, the public sector represents the important part of the national economy by providing services or public goods that either are not or cannot be

provided by the private sector as well as the economic operations conducted under state-owned economic enterprises (Lloyd *et al.*, 1984; Jan, 1995; David, 2002).

2.9.2. Importance of Quality Management in Public Sector

Since production and distribution activities are essential part of public sector as well, ensuring quality remains an important issue in public sector in particular with the understanding of new public sector management styles for achieving efficiency and effectiveness.

The benefits of utilizing the philosophy of TQM in government levels are highly similar to those in the private industry and involving lowering operational costs, increasing productivity and quality along with improving public services as well as increasing employee morale (Mary, 1996; Frank *et al*., 1999). It is considered that application of quality initiatives and its principles to its process and external procurement, in addition to internally practices TQM in the public sector will provide extraordinary positive impacts on the economy will be accrued for the state/government that successfully applies (Ritter, 1991). Indeed, the implementation of TQM program could eventually assist the state to effectively make important savings (McKenna, 1991). In supporting this, empirical studies revealed that implementing TQM resulted in improvements in the quality and productivity for around 265 governmental companies and programs in the USA which significantly made quality a priority (United States General Accounting Office, 1990 and McLeod, 1992). According to Davies and Hinton (1993), Burbidge (1995), Marson (1993), Ryan (1995), Masterson (1995) and Harwick and Russell (1996), TQM currently is being introduced and wildly implemented in the public sector and government institutions across developing and developed countries.

2.9.3. Process of Quality Management in the Public Sector

There are many stages should be followed in the implementation process in order to achieve successful application of quality management in the public sector. These include *structural changes* aiming to facilitate the first stage of implementation through the creation of quality department along with deploying quality resources staff in order to consolidate the position (Morgan, 1994). In addition, *quality assessments and plans*, which play significant role in setting up the appropriate and

needed infrastructure to support quality management implementation and this should be in line with quality assessments, by utilizing one of quality management tools such as the 'Malcolm Baldrige Award' criteria or others. Moreover, *training and educating* managers and employees are extremely important through the design of a quality education and training plan. Managers should be initially educated and trained in the principles of quality in order to support the implementation process. For an efficient implementation of quality management, *employees' empowerment* is a key focus area that needs to be taken into consideration. Other factors need to be considered such as *information, government support, etc*., which are, in general, discussed in Chapter 3.

2.9.4. Why TQM in Public Sector

Some governmental bodies in various countries have realised that employing good quality management initiatives within the various government levels could have a positive impact on processes and culture (Mary, 1999; Umesh, 2002). In recent years, therefore, many governmental organisations and agencies worldwide have clearly decided to introduce the philosophy of TQM, with high expectations that they will gain the same impact on their operations and system in the same way that TQM has had in the private sector.

In fact, a number of modern management philosophies seem to be applied within government departments ten years after first appearing in private organisations, However, TQM implementation appears to be developing simultaneously across private and public sectors (McKenna, 1991; Mary, 1996). According to Dale and Plunkett (1995) and Crosby (1987) applying the concept of TQM for any types of organisations will largely increase quality performance in line with a simultaneous reduction in costs and efficiency in productivity. In evidencing this, many studies have revealed that there is a strong positive relationship between company performances and TQM (Zairi *et al*., 1994; Flynn *et al.*, 1994; Powell, 1995; Adam *et al*., 1997; and Easton and Jarrell, 1998). It should, however, be noted that number of public organisations are fast disappearing due to privatization in some developing and developed countries within the context that competition significantly increases quality of production and services and form other side decreases costs (Frank *et al.*, 1999).

Mary (1999:55) informs that "many agencies in the government have been

successfully implementing TQM', and argues that "the goal of total quality government is a revolutionary, new approach to public policy. When analysing the benefits of TQM, it appears that total quality (TQ) in the Government could have a larger impact on society as a whole than total quality in private companies". Therefore, implementing TQM in the public and private sector may produce similar results and benefits regardless of the ownership (see section 2.7 for further discussion).

In concluding, while TQM was initiated initially in the private sector companies, however, the growing body of management literature suggests that its principles and technics have been employed by various public sector across the world and TQM seen as the best management programs to overcome varied problems in the public companies (Hammons and Maddux, 1990; Flood, 1992; Redman *et al.,* 1995; Bennington and Cummane, 1997; Erridge *et al.,* 1998 and Umesh 2002).

2.10. CONCLUSION

This chapter renders a review of the existing body of knowledge and provided various definitions of quality and TQM from many researchers, experts and scholars, such as Deming, Juran, Crosby, Ishikawa, Feigenbaum, Taqushi and others.

As discussed, the concept of quality management has evolved over time; thus, TQM philosophy is considered as an extension of the previous concepts of quality management and its approach. TQM is a method for businesses that engages the continuous improvement of quality of people, environment, processes, services and products to compete in the world market and improve organisations' position therein. This chapter has discussed the process, methods and TQM mechanism; in addition, it has displayed the historical developments of 'TQM'. This was followed by an overview of the benefits of TQM.

In order to arrive at an understanding of TQM theory, seven contenders with their contribution to quality were cited which any single organisation should adopt. Attention was paid also to the criticism of TQM, in an attempt to present the various perspectives for and against the theory of, and in order to make it more reliable and to learn lessons from the failure of some organisations. Finally, TQM models such as the

Deming Quality Award, Malcolm Baldrige National Quality Award in the United States of America, and the European Model for TQM in Europe have been discussed.

After establishing the foundational aspects of TQM, Chapter 3 reviews the literature on the empirical TQM studies from various countries.

Chapter 3

OBSTACLES AND BARRIERS TO THE IMPLEMENTATION OF TQM: AN EMPIRICAL LITERATURE REVIEW

3.1. INTRODUCTION

In recent years, many organisations have obtained excellent results after implementing TQM philosophy in their organisations, whereas others have tried it without much success (Ruggieri, 1998). In addition, a number of organisations have introduced, developed and measured TQM, but experienced considerable obstacles to its introduction and implementation (Whalen, 1994). The available empirical literature provides findings related to various situations and cases as evidence of the success and also of the failure of TQM.

Although there have been many reports that TQM is a successful quality management initiative, a high percentage of TQM failure quoted in the literature shows that some organisations held unrealistic expectations of TQM implementation and therefore they concluded that TQM did not deliver what it promised. To support this, one previous quality management study stresses that "For the last two decades, TQM has been seen as a source of competitive advantage… however, the credibility of TQM has been undermined by the failure of a large proportion of those programs" (Proposing a Framework for Your TQM Program, 2002:58). In addition, it should be noted that the TQM literature does not provide enough research on the obstacles and difficulties affecting the implementation of TQM (Milakovich, 1990; Morgan and Murgatroyd, 1997; Vouzas, 1997). The literature also demonstrates several methods that have been developed to overcome such obstacles. Furthermore, several frameworks and models have been established for the successful and effective implementation of TQM (Rao, 1996). This chapter, hence, reviews some common obstacles and barriers, which are discussed in the empirical body of knowledge in relation to the application of TQM.

3.2. GENERAL OBSTACLES AND BARRIERS TO 'TQM'

It should be noted that, internationally, models and measures have been developed in order to explain and measure various methods of quality management implementation, as well as to show how to achieve the effective and successful implementation of TQM. Models such as the Deming Prize System, the European Foundation for Quality Management Model (EFQM), which assesses the implementation of quality management in Europe, and the Malcolm Baldrige National Quality Award (MBNQA) which is applied in the US can be mentioned.

Most of the studies on quality management empirically attribute the main reason for TQM failure to the failures in its implementation rather than to the TQM method and theory (Beer, 2003). Furthermore, there is also much evidence indicating that incomplete application of TQM and superficiality in implementing it, which is the case in many organisations, is the main reason for its limited success (Baxter and Hirschhauser, 2004; Young and Wilkinson, 2002). This clearly suggests that some organisations are not willing to fully implement TQM technique and tools; therefore the real problem is an acute lack of commitment and understanding of TQM. Given this suggestion and in line with TQM literature, Ugboro and Obeng (2000) report that TQM philosophy is not properly and fully implemented due to the fact that some organizations only claim to have a TQM program without fully understanding its entire process. In fact, it might be that organisations do not recognise the benefits of implementing TQM.

In addition, other obstacles and difficulties have been identified by other studies in relations to MENA region, such as Al-Qahtani (1993), Al-Hamdany (1999), Al-Dabal (1999), Al-Khalifa and Aspinwall (2000), Al-Omern (2002), Al-Khawaldeh (2002), Al-Zamany *et al*. (2002), Magd (2003), and Najeh and Zaitri (2004), all of which show that the implementation of quality management initiatives in many Arab countries are still in the early stages and suffer from the following difficulties and obstacles:

(i) Lack of management participation, commitment, planning, vision, and a clear purpose. They also focus on quick-fix and short-term plans;
(ii) Insufficient understanding of TQM and lack of awareness of such initiatives;

(iii) Lack of knowledge or experience of key TQM success factors;
(iv) Strategic planning is given very little attention with more attention paid to the issues that appear after its implementation;
(v) Lack of organization of central information systems, inadequate reporting and inadequate equipment and supplies, which lead to difficulties in logistic process;
(vi) Seeking certification is a response to the pressures of competitors/foreign partners;
(vii) Lack of relationship between supplier and organisation. Also the supplier is not considered to be of paramount importance.

By the same token, many previous quality management studies including Villinger (1996), Mulej and Kazjer (1996) and Dickenson *et al*. (2000) show that Eastern Europe suffers from particular difficulties of quality implementation, which is the lack of provision of quality management in the education process, especially in higher education; lack of worker involvement as a cultural legacy; inadequate resources preventing the uptake of western quality methods; lack of in-depth training programs that assist in understanding and upgrading the necessary managerial techniques; difficulty in finding quality management books on modem tools and techniques, especially in local languages; difficulties facing organisations wishing to upgrade quality management systems, and the cost of developing infrastructure in order to meet international standards.

In a country case study on Saudi Arabia, Alamri (1995), Aly (1997) and Kadasah (2000) identify that Saudi Arabian infrastructure organisations face a number of obstacles concerning the application of TQM such as:

(i) Lack of understanding of the TQM concept;
(ii) Insufficient training for employees to improve the quality of their own work, and inadequacy of the methods of production quality control;
(iii) Lack of communication system and information across organisations' departments, and inefficient cooperation within the various units;
(iv) Lack of methods used to assess customers' requirements and expectations, and the gap between product standards and specifications and final productions;
(v) Insufficient encouragement for workforce to share their ideas and suggestions. Also, lack of work policies to explain the organisation's objectives. Consequently,

a failure of team spirit and lack of a sense of belonging can be seen in the workforce of many organisations.

In another empirical study, Frederick Hau (2000), Macdonald (1998) and Black (1993) locates evidence for ten critical obstacles facing the effective implementation of TQM: inadequacy of vision and planning, lack of management commitment, failure of management to change its behaviour, lack of personnel involvement, conflict between culture change and project approach, the quick fix approach, bureaucratic quality management, lack of TQM measurement, and the change process becoming tool-bound.

From another perspective, Juran and Godfrey (1999) mention that a number of obstacles have prevented quality improvement in developing countries; these factors are as result of discussions with a number of developing countries' representatives: the significant obstacles include: inadequate knowledge, inadequate leadership, incomplete infrastructure, constraints of foreign exchange, absence of competition and shortage of goods and low purchasing power.

In the same vein, Oakland (1993, 2000) in their study on quality management identify eleven main obstacles to effective and successful TQM: reluctance by management to change, lack of management commitment, lack of involvement by personnel, lack of vision and planning, culture changes versus project approach, quality becoming constrained, creation of a quality empire, the process becoming tool-bound, satisfaction with the quick fix, lack of real business evaluation and easy acceptance of packaged methodologies.

Through a political economy approach, significant obstacles in developing countries may stem from their administrative systems, such as being authoritarian, bureaucratic organizational structure and hierarchical traditional culture. In support of this, Harrigan (1985: 112) mentions that "the barriers to flexibility can be asset-specific, but they are more likely to be mental. Too many managers refuse to face the ugly reality that they are in a sick business or that their firm's strategic posture is simply wrong".

Overall, a number of obstacles have been identified by the empirical studies preventing the successful implementation of TQM in various countries. In an attempt

to identify and resolve quality problems Dory and Schier (2002) see the philosophy of quality as requiring managers, leaders and employees across organisations' departments to work actively together. Thus, many organisations worldwide have faced many different barriers and difficulties in the implementation of TQM. Therefore, discussing certain common obstacles in this study is likely to be beneficial.

3.3. OBSTACLES RELATED TO THE UNDERSTANDING AND AWARENESS OF 'TQM'

Evidence, as articulated by Wong and Fung (1999), shows that the failure of TQM application in many developing countries is a result of poor understanding of quality management. In support of Wong and Fung (1999), Yusof and Aspinwall (2000) located top management as the main reason for TQM failure, due to their lack of understanding and awareness of TQM requirements, implementation process, ways to measure it and benefits it may provide. It is broadly agreed that it is important for all personnel to understand the processes (internal and external processes) in order to bring about a positive impact in any improvement process (AI-Zamany *et al*, 2002).

Some research has shown that quality managers in a number of American and Spanish organisations have a similar common lack of understanding and knowledge concerning TQM (Lewis, 1992). Therefore, providing managers and employees with a comprehensive knowledge, understanding and awareness of TQM is a real challenge but is extremely important to many organisations worldwide (Schmoker and Wilson, 1993). It is worth noting that awareness is a key issue, which can lead an entire workforce to feel that they are a part of a quality organisation and encourage them to achieve quality in all aspects (Crosby, 1996). In addition, awareness of TQM philosophy results in continuous improvement processes within an organisation as a whole and individually, as well as attaining better process results (Juran, l986).

Zairi (2002), in his study, indicates that organisations should raise awareness of quality at different levels and lay out simple strategies to implement proper programs to start with; they should also accomplish a certain level of maturity by establishing an approach to quality and rules Moreover, many benefits can be achieved from awareness; for example, staff will understand the management's quality procedure, structures and policy. Interestingly, there is a positive relationship between awareness

of quality management system (QMS) and the performance of a company's staff (Al-Zamany *et al.,* 2002). The evidence seems to indicate that nothing is more important than raising awareness and understanding of quality in an organisation. Therefore, attention needs to be paid to the awareness and understanding of TQM philosophy as a matter of urgency.

3.4. OBSTACLES REGARDING INFORMATION AND COMMUNICATION

Further obstacles can stem from inadequacy of information and communication. Goetsch and Davis (2000: 307) define communication as "the transfer of a message (information, idea, emotion, intent and feeling) that is both received and understood". Furthermore, Thiagrajan *et al.* (1997) and Sharp *et al.* (2003) reveal that successful and effective communications involve understanding the roles and responsibilities in processes, employees being fully involved, maintaining enthusiasm and improved personnel capabilities. Schall (1983) and Macedo-Soares and Lucas (1996) highlight that the communication rules of an organisation could be used as a way of studying organisational culture. In this regard, Fuentes *et al.* (2000) mention that lack of information and communication routes are considered as an obstacle to TQM implementation in Spanish organisations. It is a fact that information and communication is vital to successful TQM implementation. Another view given by Samson (1997) reports that failure to share information between management and employees to close the loop between enhancement actions and their sequences is considered to be a significant obstacle to TQM implementation in New Zealand and Australia.

Furthermore, many previous quality management studies reveal that a lack of integration between existing management information system and quality information system is a major obstacle to TQM implementation (see: Laza and Wheaton, 1990; Boyett *et al.,* 1992; Katz, 1993; Brown, 1993; Zangwill, 1994; Goodman *et al.,* 1994; Dale and Cooper, 1994; Tatikonda and Tatikonda, 1996; and Najmi and Kehoe, 2000).

Indeed, the principles of customer focus reflect the need to address the problems of communication by the management and customer. Conti (1999) and Vouzas and Gotzamani (2004) point out that one of the key requirements for verifying the success

and effectiveness of TQM implementation is customer satisfaction, which could be done through sufficient and effective information and communication system and channels.

3.5. RESISTANCE TO CHANGE AS AN OBSTACLE

Another possible obstacle to TQM implementation is workforce resistance to change, as it is becoming increasingly difficult to ignore the issue of human resource (employee resistance to change), which can create an obstacle during the implementation of TQM (Reis and Pena, 2001). It must, therefore, be recognised that along with management, workers also fear change and thus, by listening to their feedback, understanding their needs and respecting them, their fears could be dispelled, according to Deming (1981). Thus, in order to work and to understand better as a team, all work matters should be explained, using a common language and a handbook of basic terms could be very helpful to employees. Further, there is also much evidence indicating that certain conditions must be removed for an organisation to be ready to change, such as the following (Reis and Pena, 2001: 674-675):

(i) The use of functional/vertical hierarchies instead of self-directed work teams that are truly empowered to make changes;
(ii) Communication flowing downwards instead of going 360 degrees in all directions;
(iii) Customer requirements being inferred from top or senior managers instead of being incorporated through quality functional deployment;
(iv) The organization recognizing and rewarding only individual performance instead of teamwork and collaboration;
(v) Measures in the organisation being monitored by accountants and senior managers instead of teams and process owners;
(vi) Goal setting being maintenance-oriented instead of renewal-oriented;
(vii) Managers not setting an example by truly working hard, not merely shuffling papers and stamping other people’s work.

In this respect there is also evidence indicating that resistance to change is a major reason for TQM failure facing several companies worldwide (Warwood and Antony, 2003).

Passmore (1990) and Sanderson (1992) point out that resistance to change is a human reaction; as resistance may come through misunderstanding, different assessment of expectations and needs, varying interests, individual low tolerance to change, and in some cases different reasons for wanting change. This can also be seen in organisational culture. In evidencing this, Low and Ling Pan (2004) mention that resistance to change is an obstacle to the effective implementation of TQM and its maintenance in organisations in Singapore.

The main reason for resistance can be traced back to middle managers because they fear losing their position and influence especially in terms of decision-making. It also stems from employees, particularly when new responsibilities and tasks are given to them. In this respect Lipovatz *et al.* (1999) report that there are some elements that cause resistance to change and are considered as obstacles, for example, to the effective implementation of TQM in Greek organisations, such as the avoidance of new responsibilities and tasks, mistrust and change of mentality.

3.6. MANAGEMENT ATTITUDE AS AN OBSTACLE

The implicit orientation towards the implementation of TQM culture is a complex issue. In addition, in order to achieve desirable results, a long-term approach and suitable management style should be followed. Changing from a bureaucratic culture style to one emphasising quality requires an appropriate management style (Claver *et al.*, 2001).

In line of this, Hickson and Pugh (1995) state that Arab organisations are characterised by the following features: position and seniority significantly outweigh ability and performance in importance, the opportunity for lower-level managers to bear responsibilities, most companies are-centrally controlled with a low level of delegation, initiative can be restricted, failures are blamed on the head of the organisation personally, the power to decide is centralised and rarely delegated, authoritarian management style is predominant, decision-making is constantly pushed upwards in the organisation, the decision-making process is more or less influenced by a paternalistic prevalence and there is an absence of western-style democratic systems. In addition, they go on to say that innovation and risk-taking are activities that seem to be more often punished than rewarded, social formalities are extremely

important, there is a strong preference for a person-oriented approach rather than a task-oriented approach in managerial activities and organisation members are motivated by affiliation and power needs rather than by performance objectives. In addition, an atmosphere of low trust and political gamesmanship characterises many Arabic companies, together with closed information systems and low levels of disclosure to organisation members. It should be noted that these issues clearly prevent successful TQM application.

3.7. LACK OF TEAMWORK AS AN OBSTACLE

According to the literature on TQM, the role of the employees have changed from that of a worker to that of a problem solver. In addition, the most effective and successful way to harness the talents and ideas of the entire workforce is the use of teamwork to overcome obstacles and solve problems (Kumar *et al.*, 2011).

Many studies have revealed that lack of teamwork is a critical barrier to TQM, including that of Yeh (2003). In addition, team spirit is considered an important factor in improving working conditions and ignoring this would result in failure and be deemed to be a barrier to quality initiatives, as evidenced by a number of studies including Alamri (1995), Aly (1997), Kadasah (2000), Lee *et al.* (2003) and Glover and Siu (2000). Consequently, problems and difficulties could be easily addressed with effective cross-functional teamwork (Dale, 1999).

3.8. INTERNAL AND EXTERNAL CUSTOMER SATISFACTION AS OBSTACLES

Fuentes *et al.* (2000) and Quazi *et al.* (2002) point out that organisations that attempt to fully implement TQM programme suffer from many obstacles including: lack of commitment to customer satisfaction, vision and knowledge of customer needs and expectations, lack of integration of customer satisfaction in organisation's goals, lack of usage of customer feedback in new product design, lack of cooperation from customers, responsiveness to customer complaints and levels of interaction with customers and monitoring customer satisfaction.

From another perspective, Al-Momani (2000) reports that public sector organisations in some Arab countries suffer from obstacles that prevent the effective application of

TQM such as lack of customer choice between acceptance or not, and the customer not having a voice. In support of Al-Momani (2000), Milakovich (1990) states that one key element of TQM success is customer satisfaction and that customer satisfaction regarding products and services should be improved through the appropriate channels of information and communication and continuous improvement process. In fact, determining customers' needs and expectations is the responsibility of top management and is also an essential requirement for successful TQM. In evidencing this, Milakovich (1990) mentions that awareness of customers' requirements and the importance of the organisation meeting customers' needs should be considered more seriously and additional promotion should also be considered for a representative of management providing accurate and reliable information via effective communication channels. On this basis, it may be inferred that having up-to-date information and good communications with the customer is an important element of successful implementation of TQM.

3.9. MEASUREMENT AND EVALUATION PROBLEM

Measurement and evaluation is also a critical point in the success process. It must, therefore, be recognised that lack of management's ability to identify any gaps between the TQM program and actual practice is essential; as a poor process of enquiry, action, and analysis can play a huge part in causing implementation of TQM to fail. In addition, Beer (2003) reports that the main reason for failure of changing to TQM is that its process fails to develop, evaluate and assess a high quality at every level of management. In addition, poor performance evaluation is a hindrance to TQM in some Arab countries (Ali, 2005).

3.10. ORGANISATIONAL CULTURE AS AN OBSTACLE TO CHANGE

Activities, programmes and methods such as strategic plans, downsizing efforts, re-engineering, adoption of technology and total quality management fail or suffer due to obstacles which affect an organisation's survival (Cameron and Quinn, 1999). In order to achieve successful and effective TQM implementation in any sector or organisation, an investigation and evaluation of the existing management approach and organisational culture appear to be an important factor that must be taken into account. In this regard Ghobadian and Gallear (1997) point out that there are six

obstacles affected by organisational culture including: top management behaviour, education and training, employee involvement, enhancement of communication programs, modification of reward systems and evaluation and frequent revision of policies and procedures.

Tata and Prasad (1998) found that an organisation with a positive culture is characterised by employees who are both empowered and involved; top management that are involved and committed; behaviour which matches slogans; work and tasks, which is conducted by teams; availability of sufficient resources for continuous improvement; promotion and reward systems based on contributions to continual improvement of quality; suppliers who are treated as partners; education and training being provided; employees on every level who have the skills and knowledge needed for continuous quality improvement; customer input being actively sought and used for continuous quality improvement and fellow employees being viewed as internal customers.

It should also be noted that, within an organisation the culture contains behaviours based on interactions between people, rules and the climate of the organisation (Oakland, 2000). In providing evidence for this, Maull *et al*. (2001) mention that employees in an organisation acquire a culture, which includes belief, knowledge, art, law, morals, capabilities, and customs and habits. In this regard Vanisina (1990) points out that an assessment of the organisational culture is considered to be a requirement of the successful implementation of TQM and the implementation of an integrated process for change in organisational behaviour. The importance of culture and its influence must be recognised by management, in addition to which compatibility and incompatibility should be recognised in different cultures; for instance, each culture may have different work ethics (Triandis, 1994).

Triandis (2002b) emphasises that ignoring the efforts that require changing skills and behaviour is the mistake of an organisation's top management seeking to implement organisational changes throughout radical restructuring; hence surprising results can be seen a few years later when the tasks or the exercises need to be repeated. It should be remembered that all quality experts, such as Deming (1986), Juran (1974, 1986, 1988 and 1989) and Crosby (1979, 1992 and 1996) recognise the importance of an appropriate quality culture, and based on their work there are elements which need to

undergo change in order to sustain a philosophy of continuous quality improvement. Indeed, any form of change requires the right culture, because culture is considered as a key factor underpinning the successful development of the necessary commitment. Furthermore, Kamensky (1996) states that obstacles often force an organisation to re-evaluate and change four aspects related to implementation: mission, culture, process, and structure.

From another perspective, Brown (1995) argues that organisational culture is the key to effective leadership and a powerful tool for improving performance and efficient organisational development. It has been shown that the TQM culture can be considered as one which allows participative management, promotes leadership in place of supervision, uses teamwork, drives out fear, promotes long-term orientation among members of the organisation and promotes pride in workmanship (Kumar *et al.,* 2008). In support of this, Kumar *et al* (2008), and Al-Khalifa and Aspinwall (2000) demonstrate that the culture of an organisation provides a foundation for modifying and forming attitudes, behaviours, and values that are considered very important to the organisational power structure.

It is obvious that culture can be an obstacle to change in TQM programs. In fact, culture change is essential in order to bring about changes in attitudes and behaviours to gain the desired behaviours. Nevertheless, managing cultural change in adverse economic and social environments is the greatest challenge with respect to removing the obstacles of the effective application of TQM (Claver *et al.,* 2001). Dale (1999) and Farid and Wahba (2004) express a similar view that organisational culture-related obstacles are the most important obstacles to overcome in order to drive the organisation towards the successful implementation of TQM.

It is, hence, worthwhile highlighting that any organisation's culture is definitely affected by the culture of the society; also the assumptions about how people should relate to each other are different in each culture. It should be stressed that changes in a group are significantly more important than individual changes. Therefore, managers in general and personal managers in particular should know to what extent culture can possibly be changed and find the proper way for change to be followed for which they need to understand that culture needs time to be adapted (Quazi *et al.,* 1998).

The available literature shows that organizational culture can be an important obstacle to the effective application of TQM. Nwabueze (2001: 402), for example, states that "Nobody knows exactly what culture change is and how best to approach cultural transformation, which is argued to be the most essential ingredient if TQM is to succeed". In fact, internal culture and social life has a significant influence on management approach (Zairi 1996; Al-Hamdany 1999 and Al- Zamany *et al.,* 2001). Therefore, awareness is required in order to introduce a new quality initiative such as TQM, as people may have suffered for years from poor quality of life as a result of ignoring quality (Lee, 1991). In this respect, Jabnoun and Anwar (2006) point out that national culture is based on shared values, which is distinct from one group to another. It is interesting that national culture can affect organizational culture significantly and consequently there will be implications for the organization's efficiency.

It is worthwhile pointing out that a change in organisational culture towards efficiency and effectiveness is a fundamental TQM requirement. In order to accomplish the best results from TQM implementation, the TQM culture should be built on cooperation and collaboration created by management, teamwork, an open system, organisational learning support and focus on the customer (internal/external).

Jabnoun and Anwar (2006) suggest a contingency model for TQM implementation. It should be noted that this model is suited to various cultures. It also focuses on the four TQM components in relation to the articulation of various cultures: Continuous Improvement (CI), Quality Control (QC), Quality Assurance (QA), and Total Customer Satisfaction (TCS). These components are based on Hofstede's dimensions of cultural differences.

Many notable studies have been undertaken regarding national culture and its definition and variations worldwide (Kluckchorn and Strodbeck, 1961; Glenn and Glenn, 1981; Hofstede, 1980 and 1991; and Triandis and Albert, 1987). Thus far, many programmes have been established by various organisations in an attempt to overcome culture as an obstacle to effective TQM application with feasible models and frameworks (Philippe, 1997).

3.11. CONTINUOUS IMPROVEMENT FOR SUSTAINABLE QUALITY

A number of previous quality management studies have revealed that obstacles to TQM implementation include: management style, quality methods, *etc*.; one of the main barriers is lack of continuous improvement (Ljungstrom and Klefsjo, 2002 and Masters, 1996). Therefore, efforts to improve quality should be oriented and redirected in order to meet expectations in terms of desired results and also to enhance the level of performance, as overall performance is associated with continuous improvement. According to TQM theory, the best way to develop organisational output is to continually improve performance (Corbett and Rastrick, 2000), as TQM can be described as a management philosophy that focuses on working towards continuous improvement throughout the entire organisation's activities (Brockman, 1992; Oakland, 2000; Harrison and Petty, 2002 and Rajab, 2010).

3.12. RESOURCES AND REQUIREMENTS FOR TQM

Many organisations fail to provide the necessary resources to achieve significant and desirable results, though the return from investment in a quality improvement project is very high (Juran, 1986). It is also worth noting that, despite their importance many quality departments are understaffed and over-worked (Newall and Dale, 1990). In this respect, Nwabueze (2001) states that TQM requires available resources in order to sustain an organisation over the full period of implementation and beyond. The study reveals that the main reason for ineffective TQM implementation is top management. This is due to the fact that top management is closely linked to the process of providing the organisation with appropriate resources. In other words, if top management is less concerned with TQM, the organisation will fail to implement it effectively.

This statement reflects the fact that lack of commitment on the part of management is a huge obstacle to implementation; therefore employees who look to management as a role model will adopt their way of thinking. In addition, a high level of leadership and management turnover actually creates obstacles to effective and successful TQM implementation. The reason for this is that management and leaders are the critical driver for any changes and programs such as quality initiatives; consequently if managerial categories are unstable the result will be failure. Recently, Sebastianelli

and Tamimi (2003) found that inadequate resources are considered to be the top two obstacles for the effective implementation of TQM.

3.13. POOR LEADERSHIP AS AN OBSTACLE TO 'TQM'

Poor leadership is another obstacle facing the application of TQM in many organisations worldwide. A distinguishing factor of good leadership is that it respects all individuals, maintains communications, facilitates change and offers clear vision (Baker, 1999). In this respect, Hoyle (1994) indicates that it is mainly the responsibility of leadership to maintain and create an internal environment, which encourages employees and involves them fully in fulfilling the objectives of their organisation. In fact, the importance of leadership can be seen in the planning and setting of objectives, internal communication, policies and creating an effective work environment. In order to achieve desirable results from employees, both commitment and ability must be addressed by leaders. Also, understanding awareness of project delay costs would assist employees in reaching commitment effectively. It is broadly agreed that encouraging all participants and promoting interactive discussion is considered a huge challenge for leaders (Burke, 2007).

Given this suggestion and in line with TQM literature, Juran (1989) highlights that effective implementation of TQM firstly requires leadership to have a good understanding and knowledge. It is useful to recognise that an extremely important step towards the successful and effective application of TQM is to understand its principles. Thus, leaders should value the ability of their employees' creativity and be modest enough to learn from them. Therefore, the main responsibility of leaders is to set the direction that the organisation needs to take, create a healthy environment that aims to encourage the workforce to attain the organisation's goals and establish a unity of purpose.

3.14. LACK OF TOP MANAGEMENT COMMITMENT AS AN OBSTACLE

Further obstacles may stem from the lack of top management commitment (Williams *et al.,* 2004). The evidence seems to indicate that CEOs and other managers who are not actually committed to TQM and its importance to the organisation are unable to

encourage and motivate a workforce, or an organisation that allows its initiative to trail off before bringing about any development.

One important condition of a successful quality initiatives program is full commitment from management; in fact it is essential in the application and practice of TQM. Indeed, high visibility, devotion and completely encompassing the management theory are key requirements for successful TQM implementation. This is consistent with the statement by Juran (1986) that many organisations' managers have extensive experience in finance and business; however weakness and lack of quality improvement can be seen in their operations and position. In supporting Juran's (1986) observation, Bhote (1988) suggests that top management do not have to be quality experts. However, many quality initiatives have failed as a result of not recognising the contribution of TQM techniques and tools, which make for profitability and customer satisfaction.

It has been shown that no improvement can be achieved without top management commitment. In this regard Dale *et al.* (1994) report that without the total commitment of top management and other levels of management in an organisation, the outcome of a project will be unsatisfactory and nothing much will happen. In evidencing this, one of the major determinants identified as providing successful and effective implementation of quality is top management commitment (Deming, 1987). In fact, management is considered to be mainly responsible for problems associated with quality (Juran, 1974). This means that a successful and effective quality management program and initiatives are greatly dependent on the commitment of top management.

This view is supported by Dale *et al.*, (1997), who states that encouraging business is the priority and responsibility of top management and this function requires huge investment of time rather than personal commitment. Therefore, management must take the leading role and drive the organisation towards improvement and quality management. This indirectly indicates that managers must show visible commitment through their actions and devote enough time to the issue of improvement. In support of this, Peters (1987) concludes that commitment reflects attitudes, while all attitudes must be translated into everyday life.

It can be safely stated that top management can drive an organisation to success or to failure. In this respect Schein (1989) mentions that many companies in the American Quality Council (AQC) suffer from a lack of top management commitment. Indeed, lack of senior management commitment is a major obstacle to TQM implementation mentioned by all quality experts.

Given this suggestion and in line with the TQM literature, the reasons for lack of top and senior management commitment should be considered as lack of knowledge about what TQM is, as well as low engagement of other levels of management and ineffective communications between management and employees within organisations (Soltani *et al.*, 2005). Moreover, mobility of management is another obstacle to TQM implementation. Due to the fact that some organisations replace their managers frequently (every 2-3 years or less), initiatives such as efforts toward continuous improvement will be interrupted as new leaders and managers come on board. It is also worth noting that leaders and managers seldom seek to develop or bring about radical changes during their time leading an organisation, because such actions might put their position at risk and lead to problems. In support of this, a study by Soltani *et al.* (2005) reveals that senior management and the CEO often attempt to do easier things, such as asking consultants to apply programs regarding certain organisational functions.

This indirectly indicates that the importance of training, communication between the levels of an organisation, the engagement of managers with the employees, and understanding the philosophy and benefits of TQM and how to implement TQM successfully and effectively are extremely important strategies in overcoming the obstacles facing senior management. Thus, comprehensive training is the best way to achieve these aims. In the context of top management commitment, Ebrahim *et al.* (2005), Brown *et al*. (1994) and Al-Zamany *et al*. (2002) mention that top management commitment is considered to be a serious obstacle to the implementation of TQM. The main reason for this is that top management is the controller and is mainly responsible for the entire operation and production process; therefore full commitment by top management to TQM will assist the organisation to eliminate all other obstacles. It can be safely stated that many problems, such as the change of organisational philosophy and its failure, poor planning and employees' resistance to

change, clearly result from a lack of top management commitment (Ebrahim *et al.*, 2008).

3.15. LACK OF EDUCATION AND TRAINING AS AN OBSTACLE

While TQM requires highly-educated and well-trained employees, the evidence shows that there is a lack of understanding and poor education and training concerning TQM in many organisations at all levels.

It should be noted that finding solutions to work problems depends on employees' innovative ideas. Consequently, training is another important aspect of success alongside relationships, culture and cooperation between departments; hence its lack can be a barrier to effective TQM programs.

It is clear therefore that the obstacles to the successful and effective implementation of TQM are mostly similar worldwide, thus many foreign industries can be looked at in order to evaluate these obstacles (Amar and Zain, 2002). It is obvious that many benefits can be gained from proper training programs, such as work methods, values, and accurate communication of new organisational strategy, *etc.* Indeed, education and training are considered to be the key issues for improvement and continuous development. It is important for human motivation to be intrinsic in order to bring about growth, learning, and general self-improvement (Deming, 1986). Therefore the learning and development process should be inherent in employees, and this can be developed through training and further education.

Education and training in TQM practice and theory at all organisational levels (operative and management) and during all processes (design, operation, and production) are essential to improving competitiveness. Therefore, insufficient education and training can be a significant obstacle to the implementation and development of a quality program (Newall and Dale, 1990). It should be noted that in order to gain maximum benefits from training, the first step should be taken by top management and then applied throughout the organisation. In addition, training programs should include metrics, quantitative and qualitative measures along with training in project management and leadership (Kwak and Anbari, 2006). However, the first step for TQM managers is to understand the organisation's existing culture

and decide whether it is compatible with a quality culture or not (Kujala and Lillrank, 2004). In this regard, Kwak and Anbari (2006) found that one of the challenges and obstacles of the Six Sigma as a TQM method is lack of training. It is clear, therefore, that to accomplish an organisation's aims and to bring about a successful and effective organisation, quality must become a part of that organization's strategy and culture by embedded in its activity.

3.16. LACK OF QUALITY STRATEGIC PLAN AS AN IMPEDIMENT

Quick returns and short-term successes and financial measures are considered self-defeating and as a result the long-term effect will corrode investment and the eventual result of the investment will be failure (Deming, 1985). With this in mind, and in line with the TQM literature, Deming (1987) argues that long-run plans and commitment are an essential requirement of a management seeking transformation. It is also worthwhile noting that in addition to looking for quick results, the notion that 'our problems and difficulties are different' is another significant obstacle (Deming, 1985). Although specific problems might differ, the principles that will assist to improve quality are similar worldwide. The indications are, therefore, that without the full participation and support of leaders and management any new initiative will soon fail. From another perspective, Chin and Pun (2002) also comment that insufficient planning conflicts with the philosophy of TQM, and will eventually lead to failure. Further, there is also evidence indicating that (Juran, 1992: 300):

> Obstacles to bringing workers actively into the quality planning process include managers who are concerned about losing "prerogatives" and about the relative value of employee time spent on projects, versus time spent producing the product; staff specialists who face competition in planning and analysis, workers who are concerned with threats to their job security or with extra rewards for project work, and unions that are wary of shifting employee loyalty from the union to the company.

It is useful to recognise that Juran (1992) considers quality planning to be the first step toward quality management. In addition, he writes that the cause of failure for some organisations in applying TQM initiatives is their inability to determine which quality strategy is best for their organisation, and that their decision regarding quality is not planned, which means that their choices are based on a gamble. This might be as a result of leaders and managers not having been trained in the process of quality

management. Juran (1993) states that upper management is the most decisive factor in the success or failure of quality initiatives and that failure may be caused by neglecting the process of approving or setting quality goals and providing personal leadership. Thus, understanding quality strategy is vital to the success of TQM initiatives, as is the training of top management both in the short and long-term.

Other quality management studies have revealed that insufficient alignment of TQM with strategic issues is less than necessary, which has led it to being considered as an obstacle to successful TQM implementation (Leonard and McAdam, 2001b). It is worthwhile noting that due to the divide between strategic and operational functioning, it is difficult for management to describe TQM in strategic terms and find the link between the operational and strategic issues. As a result of this, many organisations discover that limiting their TQM efforts to operational levels rather than adopting strategic TQM leads them to failure. Indeed, the best way to derive TQM goals is from corporate strategy rather than other way around. It is clear, therefore, that management should be aware of TQM in terms of improvement and strategic matters (Williams *et al.*, 2004).

3.17. PEOPLE'S INVOLVEMENT AND EMPOWERMENT

Many changes in an organisation's infrastructure need to be implemented in order to achieve full empowerment, which is articulated by Costin (1994) who points out that having the authority to make decisions will assist employees in achieving their organisation's goals and objectives in the best way. Indeed, involving all levels of the workforce will be extremely beneficial to the entire organisation. In support of this Hoyle (1994) highlights the essence of an organisation as their people at all levels, therefore a fully-involved workforce will enable their abilities to be used for the benefits of organisation. Thus, all organisations must help and push their employees to use their abilities, starting with maintaining their job satisfaction and encouraging them by involving all individuals and groups at all levels. It is worth noting that some previous management studies found a positive relationship between job satisfaction and employee participation in decision-making (Cotton, 1993).

In supporting this suggestion, Werther (1981) states that employee participation in decision-making and other activities must become a part of an organisation's culture,

because organisational culture is a key to effective employee participation. Furthermore, to be successful in employee participation, especially in decision-making, this new culture must be a part of the management's philosophy and not just a systematic approach. It is important, therefore, to realise that people within an organisation need to understand the relevance of their activities and then they will communicate with each other. Juran (1998: 30) points out that:

> Workers have knowledge in depth with respect to needs for quality. That knowledge is derived from extensive 'residence' in the workplace and from the repetitive performance of numerous cycles of processing in that workplace. As a consequence of all that residence and processing, they develop expertise in such matters as condition of facilities, environmental variations in the workplace, support provided (or denied) by service departments, variations in inputs to the process, and consistency of management actions. Such expertise is a useful input to many planning projects. For some projects the input is indispensable. All of this means that the workforce should be regarded as internal customers who can tell us a great deal about quality needs.

From another perspective, Crosby (1999) claims that the primary assets of any organisation is its employees. However, many managers worldwide fail to realise this. He goes on to state that the same equipment and materials could be available for all competitors, but the only distinguishing factor is the workforce. Regarding the full involvement of employees, Ishikawa (1985: 112) reports that:

> Top and middle managers must be bold enough to delegate as much authority as possible. That is the way to establish respect for humanity as your management philosophy. It is a management system in which all employees participate, from the top down and from the bottom up, and humanity is fully respected.

It is the view of Dale (1999) that other crucial issues affecting an organisation's quality improvement efforts are employee involvement and top management participation, in terms of spreading quality consciousness throughout an organisation. It is therefore clear that employee involvement and empowerment is fundamental to the effectiveness of TQM, Thus, the absence of this element will lead to failure.

3.18. LACK OF GOVERNMENT SUPPORT AS AN IMPEDIMENT

As part of the macro-environment, the regulative role of government is also important in essentialising quality and hence TQM. Rad (2006) further to his earlier study (Rad,

2005) shows additional details concerning obstacles and barriers to TQM implementation: one of these is the lack of official support. In addition, Hau (2000), Macdonald (1998) and Black (1993) refer to a lack of government support as a barrier to fully establishing TQM, as government support is critical in order to speed up and drive developments in organisations (Brown, 1998). Furthermore, as the main body responsible for providing an appropriate environment, in particular across developing countries (Curry *et al.*, 2002), the government should establish a co-operation and coordination system between organisations in addition to encouraging them to exchange best practices.

3.19. CONCLUSION

As the discussion so far indicates, the most common problems and obstacles to TQM cited in the literature are: lack of goals, poor planning, lack of management support and commitment, lack of proper and adequate training, lack of resources, incompatibility of attitudes of top management and workers, and failure to ensure that everyone in the organisation is moving in the same direction. In addition, other prevalent obstacles are: insufficient knowledge, failure to use the right framework, lack of effective management, lack of information and communication and lack of understanding and awareness of TQM principles.

It is useful to recognise that to be successful in TQM implementation and to accomplish desirable results, senior managers and top management need to guarantee that the structure of the organisation, training, all organisational facets, management style, promotion and compensation systems, communications, procedures, processes and systems reflect the values and principles of TQM (Rad, 2006). It can safely be stated that in the present and in the near future TQM philosophy will again become a priority for top management (Williams *et al.*, 2004).

Nevertheless, it is worthwhile noting that in order to improve long-term performance embracing TQM is critical for organisations (Singhal and Hendricks, 2005). This view is supported by Douglas (2006) who states that TQM philosophy remains the only way to survive and to thrive. In addition, recent reports stress that the idea of the demise of TQM is premature. It should be noted that in today's climate flexibility, continuous improvement and a dynamic environment are critical. Ultimately, it is

clear that TQM philosophy can assist in providing the best products/service for customers and create competitive advantage through a high standard of commitment. Therefore, exploring and determining the existing barriers and obstacles is imperative for all organisations, together with identifying an appropriate and suitable model to apply successfully and effectively.

Chapter 4

LIBYAN ECONOMY AND OIL AND GAS INDUSTRIES: AN INTRODUCTION

4.1. INTRODUCTION

In order to contextualise the research, this chapter profiles Libya and its oil industry. The purpose of including this profile is to draw a complete picture of the importance of the oil and gas sector in Libya. Thus, this chapter rationalises research by locating the subject matter in the Libyan context.

The structure of this chapter is as follows: the next section presents some facts and general information on the economic structure of Libya, followed by a section on the oil and gas industry. The following section describes the sampled oil companies (brief description) and the final section provides some concluding remarks.

4.2. THE ECONOMIC HISTORY OF LIBYA

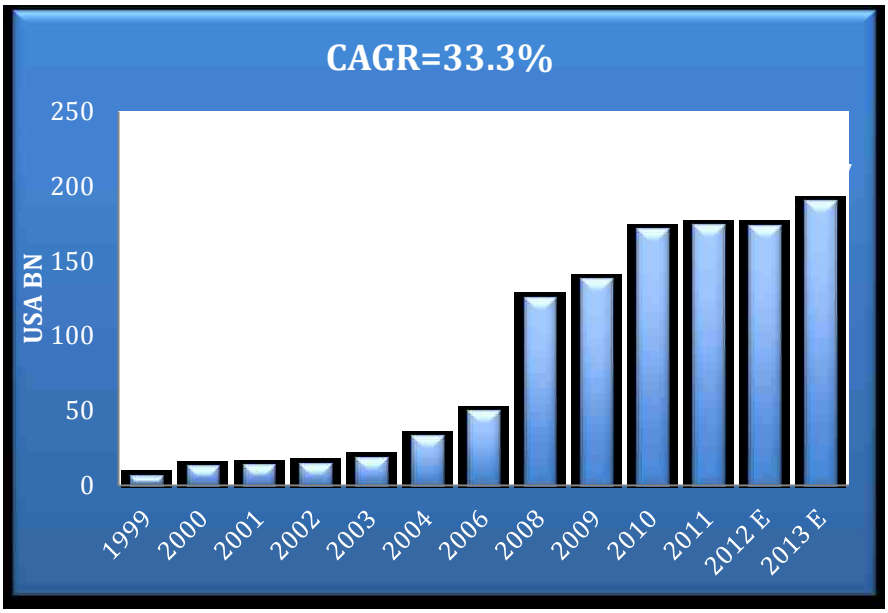
The assets of the Libyan economy during the 1950s were based heavily on primitive agriculture and livestock products, even though agriculture was dependent on climatic conditions and the rare resource of groundwater which was in short supply. Indeed, agriculture as an important sector employed around 70% of the total work force and contributed about 30% of the GDP. However, at that time (the independence period) Libya was considered as one of the poorest countries in the world.

Dramatic changes occurred in Libya's after the discovery of oil, and now the Libyan economy is dominated by hydrocarbon, which has contributed greatly to the country's economic and social development. Thus, with a population close to 5.7 million, Libya had an estimated *per capita* income of US$ 6,800 in 2005. The share of the hydrocarbon sector has been constantly increasing which reached to about 70% of GDP in 2005. It is important to note that oil revenues also provide 93% of government revenues. According to the International Monetary Fund (IMF) oil revenues accounted for 95% of export earnings and an estimated 80 percent of fiscal revenues in 2008. Indeed, preliminary data and short-term forecasts indicate that

these figures will remain relatively stable through 2014 (Libya Energy Data, 2010). However, the share of oil in the economy was on a slightly declining trend during the 1990s before rising to 32% in 2004. Considering heavy reliance on oil, Libya appears to be one of the less diversified oil-producing economies of the world.

As can be seen due to the oil revenues, Libya has had a regular source of income, and as a result of the increasing oil price over recent years, there has been a significant build-up of foreign reserves, reportedly totaling some USD 171.7 bn during 2011, and reach around 174.5 USD in 2012. Figure 4.1 depicts the developments.

Figure 4.1: Libyan Assets in Foreign Countries, 1999–2013E



Source: Porter and Yergin (2006); CBL (2012)

It is clear, therefore, that Libya's GDP has grown solidly over the past few years, which made Libya the wealthiest country in North Africa. Indeed, the country's remaining oil and gas potential is substantial; therefore, the hydrocarbon sector will continue to play an important role in the national economic strategy. Additionally, oil and gas will remain a key source of finance for many other sectors across the economy, as well as for financing social development programs and infrastructure.

4.3. OVERVIEW OF THE OIL AND GAS INDUSTRY

In 1970, the government abolished the Libyan General Petroleum Corporation (LGPC) and replaced it with the National Oil Corporation (NOC). On 12 November 1970, Libya's oil industry was taken over by the state-owned NOC, under Law No:

24/1970, the new company was given wider power to assume the responsibility of oil and gas sector operations (NOC, 2005). The main aim of establishing NOC was to manage the oil and gas sector, raise official export prices, maintain overall control over the national oil production level, handle exploration and production operations along with its own affiliated companies, take responsibility for implementing the Exploration and Production Sharing Agreements (EPSA) with IOCs, as well as reduce the rate of depletion of oil reservoirs, participate in petroleum investment agreements such as service contracts, take responsibility for field development and improvements and downstream activities and run marketing operations of oil and gas locally and abroad. Indeed, NOC has its fully-owned companies that carry out exploration, development and production operations, which is the concern of this research.

4.3.1. Crude Oil Production and Export

Libya is a member of OPEC with its large oil reserves. This section provides a brief explanation of the discoveries, drilling and production of oil and gas. It also looks at exports, developments and trends of the sector and other related data.

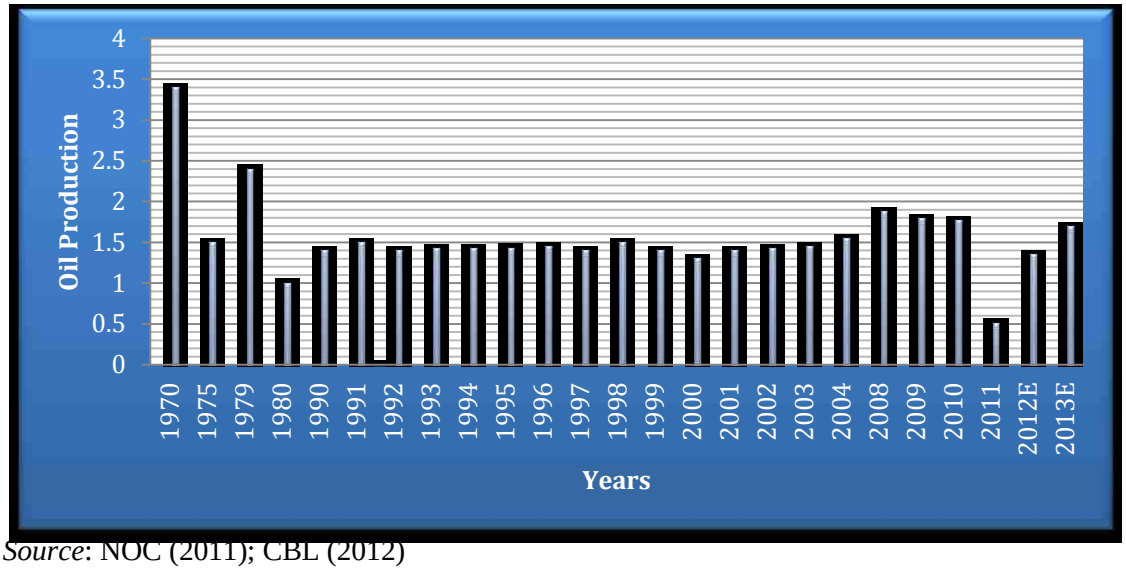
4.3.1.1. Developments in oil production

In June 1955, the process of oil exploration began in Libya, with the first oil fields being discovered in 1959 (at Nasser, known as Amal and Zelten). The operations of crude oil exports began in 1961 in Libya. In fact, the highest level of oil production was 3.3 million bbl/d (barrel per day) in 1970. However, in later years oil production was affected by government restrictions and declined to 1.5 million bbl/d during 1970-1974 period; a few years later, by 1979 the level rose to 2.1 million, bbl/d.

Average oil production during the 1980's was approximately 1.2 million bbl/d, rising to around 1.4 million bbl/d in the 1990's. However, the sanctions period, namely 1992-1999, had a negative effect on production. In the post-sanction period, NOC managed or raise the production to 1.8 million bbl/d by 2010.

Indeed, the discovery and exploration of oil in Libya was characterised by attractive investment due to the low cost of oil recovery (EIA, 2004). However, the production level of crude oil has been unstable for many reasons including political, economic, managerial and technical matters. Figure 4.2. illustrates the trend of oil production in Libya from 1970 to 2013E.

Figure 4.2: Libya's Oil Production from 1970 to 2013E (Million Barrels)



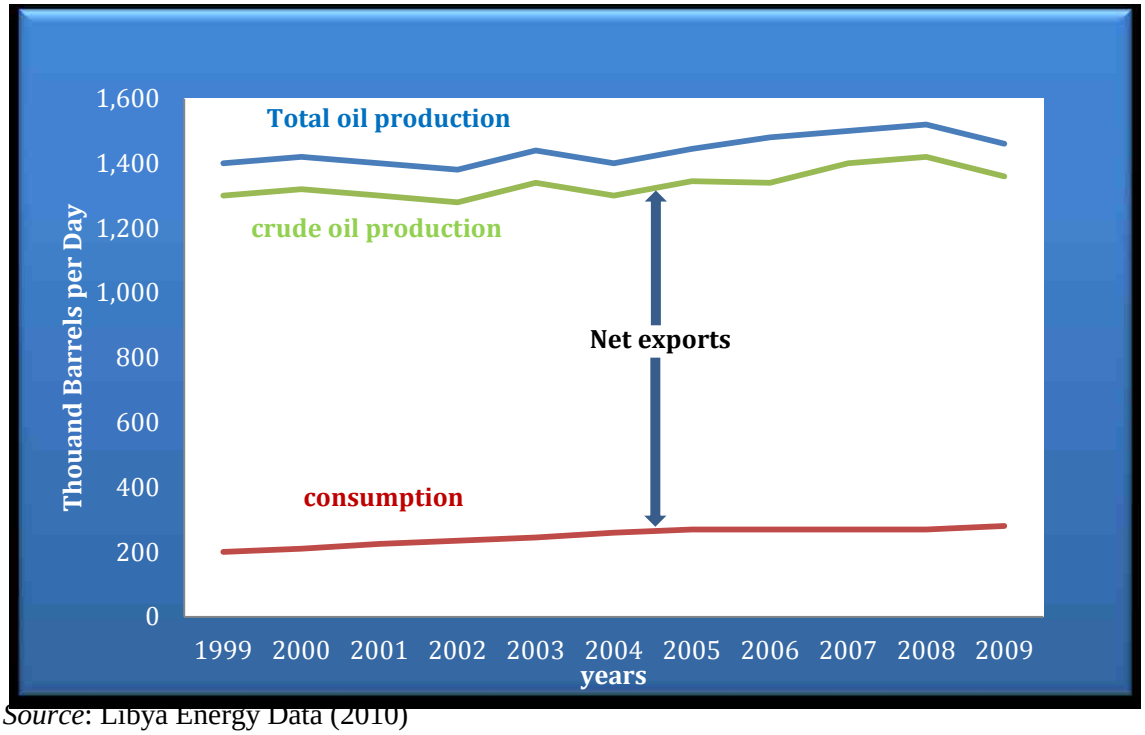
Source: NOC (2011); CBL (2012)

As can be seen from Figure 4.2., the crude oil production in 2009 was approximately 1.65 million bbl/d, which is still above the current production quota of 1.47 million bbl/d set by OPEC. Libya's domestic consumption has been increasing gradually as well from 200,000 bbl/d in 1999 to 280,000 bbl/d in 2009. Furthermore, Libya's estimated net exports which included all liquids in 2009 was 1.5 million bbl/d as can be seen from Figure 4.3.

4.3.1.2. Export, Developments and Trends

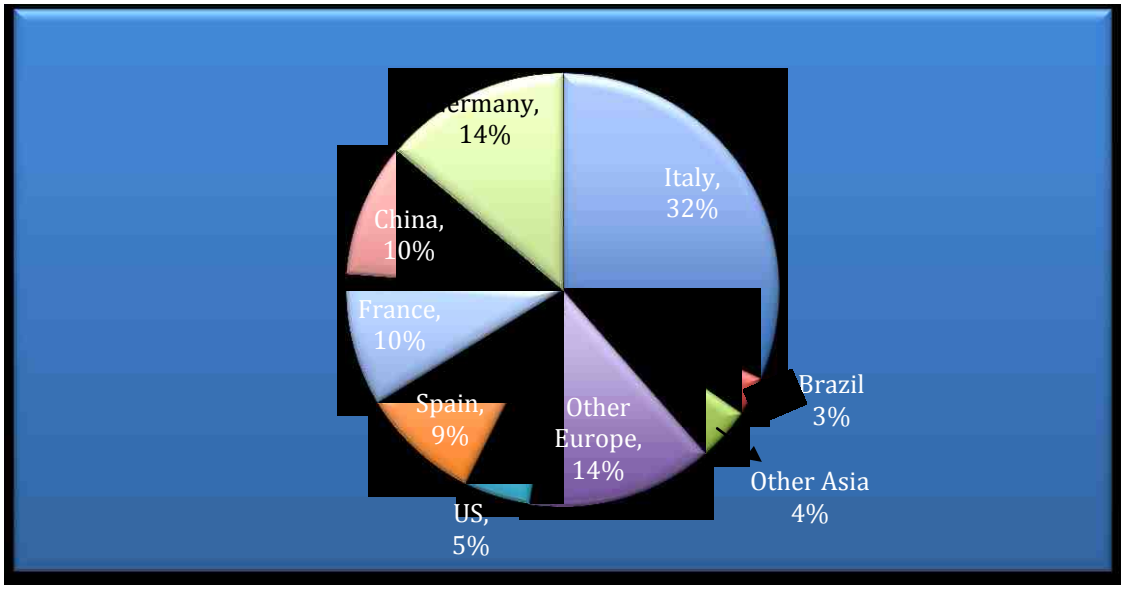
Libyan oil organisations started the exportation process to the world from the beginning of 1961, It is worth noting that European countries import around 72% of Libyan oil production, with the biggest importer being Italy followed by Germany, France, and Spain. In addition, the United States has increased its imports of Libyan oil, in particular since lifting the sanctions against Libya in 2004 (United States sanctions). EIA Libya Energy Data, Statistics and Analysis, (2010) estimated that the average of United States imports increased from 56,000 bbl/d in 2005, to 80,000 bbl/d in 2009. Figure 4.4 depicts the breakdown of Libyan oil exports.

Figure 4.3: Libyan Oil Production and Consumption



Source: Libya Energy Data (2010)

Figure 4.4: Libya's Oil Exports by Destination 2009



Source: Libya Energy Data (2010)

4.3.2. Gas Production

Libya started the operation of exporting natural gas in 1971 and in the mid-1970s began to develop its natural gas resources. As a result Libya was ranked second in the world (after Algeria) in exporting Liquefied Natural Gas (LNG). There were two reasons why gas production was considered a high priority for Libya; firstly, high

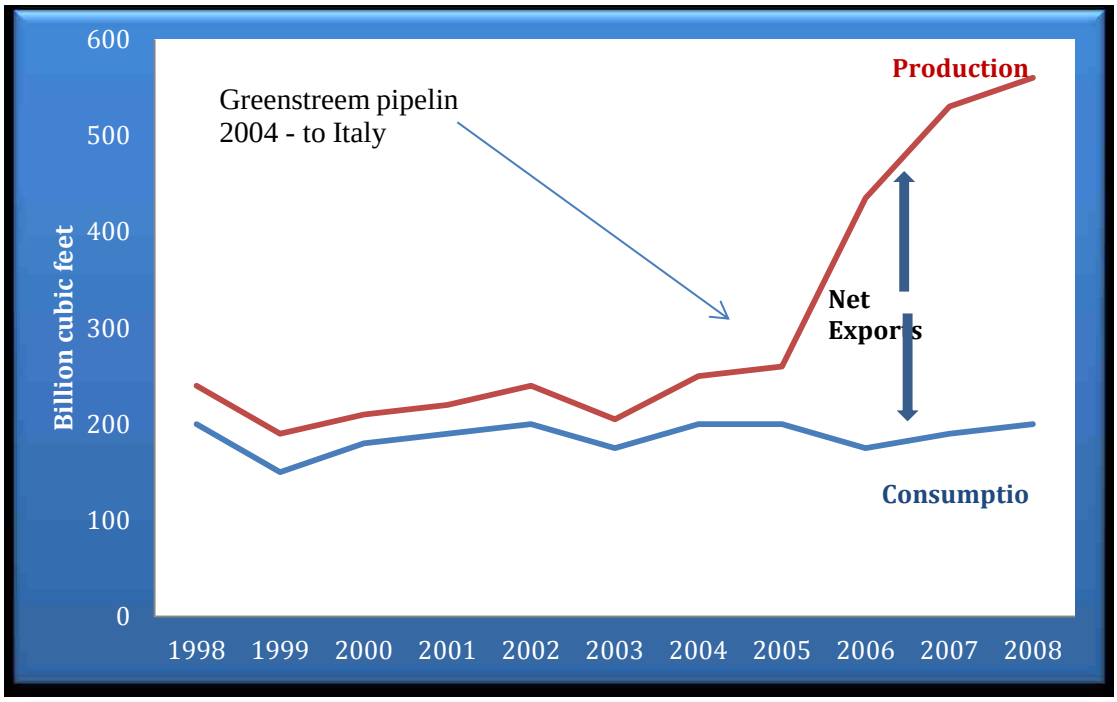
domestic consumption of gas instead of oil nowadays as Libya's future plan is to rely on gas more than oil; secondly, the existence of vast natural gas reserves.

In 1979 the production of natural gas increased in line with oil production to reach 2.2 billion cubic feet (Bcf) (Don, 2002). However, gas production fell to 1.2 Bcf in 1994, due to technical limitations which meant that Libya's LNG exports generally languished to a great extent. It is important to note that Libya aimed to raise its gas exportation, in particular to Europe, as well as to increase its gas production, distribution and marketing. Therefore, 'Greenstream' underwater gas pipeline was established. The supply operation began in late 2004 and accounted for 280 Bcf of natural gas (EIA. 2004).

According to EIA, Libya produced 1,070 Bcf of gross natural gas in 2008 (Libya Energy Data, Statistics and Analysis, 2010). Indeed, as can be seen in Figure 4.5, Libya consumed 194 Bcf and exported 368 Bcf of natural gas to Europe. A pipeline was used to export 348.5 Bcf, with the remaining 19.5 Bcf in the form of LNG in 2008 (Libya Energy Data, Statistics and Analysis, 2010).

Additionally, the consumption of natural gas for the generation of electricity currently accounts for around 45% of the resources. In fact, domestic consumption has been relatively stable over the past decade due to infrastructure limitations and project delays. However, it is estimated that domestic consumption could increase by as much as 50% by 2012 due to the establishing of gas-fired plants and when planned pipelines come online (Libya Energy Data, Statistics and Analysis, 2010). For such a development, however, foreign investment and participation is needed and the use of up-to-date technological innovations in line with proper and modern management philosophy is considered as a priority of Libyan oil and gas production companies in order to enhance and improve all operations (NOC, 2005)

Figure 4.5. Gas Productions and Consumption



Source: Libya Energy Data (2010)

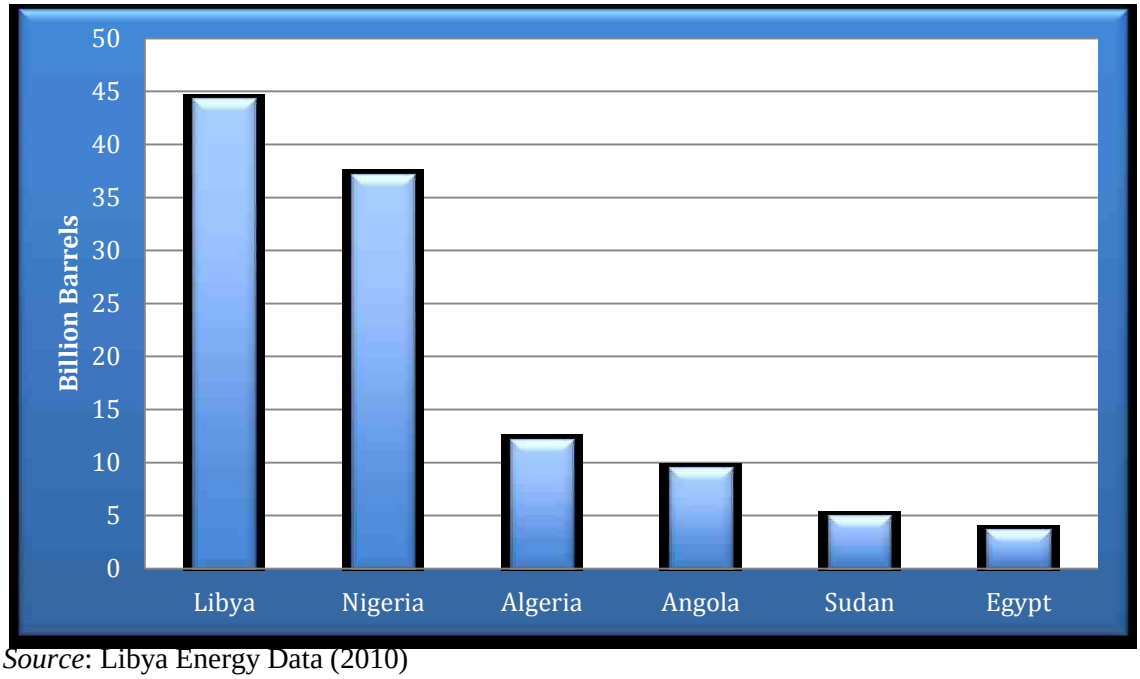
4.3.3. Oil and Gas Reserves

Libya's proven oil is the largest in Africa and gas reserves constitute around 46.4 trillion cubic feet (Tcf) which places Libya 14th in the world. Thus, this section highlights the potential reserves of oil and gas in Libya, as well as providing data for the entire sector.

In 1963 the official proved reserves was 3 billion barrels (bb) of crude oil, followed by a dramatic official government estimated increase to 29.8 bb in 1999. Again, in 2003 the official reserves were claimed to be 44 bb, which implies that Libya has a reserve-production ratio of 76 years.

Libya has an excellent potential for more oil discoveries and it remains a highly unexplored area. It should be noted that just around 25% of Libya's land has been covered by agreements with oil companies (NOC, 2005). As can be seen in Figure 4.6, Libya has the largest proven oil reserves in Africa, followed by Nigeria, Algeria, Angola, Sudan and Egypt.

Figure 4.6: African Proven Oil Reserve Holders 2010



Source: Libya Energy Data (2010)

As regards to gas reserves, in January 1990, the proven natural gas reserves were estimated at 1.208 billion cubic meters (bcu/m). A slight increase occurred in 1993 when the official estimation was 1,299 bcu/m (45.87 Tcf). It is important to recognise that despite the large figure, unexplored and unexploited reserves could be as high as 70-100 Tcf (Oil & Gas Journal, 2004). In addition, the last estimation regarding proven natural gas reserves was made in 2010, at 52 Tcf.

4.4. THE CONTRIBUTION OF OIL AND GAS TO THE LIBYAN ECONOMY

In Libya the oil and gas industry has become the most value-creating industry, and it plays a critical role in financing government revenues. Due to the decline in oil prices in the early 1980s, which had a significant effect on the Libyan economy, the contribution of petroleum products to the GDP declined, registering 41.4% at the beginning of 1985 and 23% at the end of 1989 (African Development Bank, 1995). However, since 1991, the situation has improved with the contribution rising to approximately 30% each year (Arab Monetary Fund, 1990; Arab Monetary Fund, 1993b; African Development Bank, 1995). According to Central Bank of Libya, (2000d, 2001a), in 1995 Libya's GDP was 10,048,700 million L.D with 2,468,000 million L.D of it generated from the hydrocarbon sector, while in 1999 the GDP

increased to 14,285,800 L.D with 3,254,100 L.D of it generated from the hydrocarbon sector.

Indeed, oil receipts reached more than 65% of' the budget sources over the second half of the 1990s. With a steady increase, the share of oil and gas revenues in the GDP reached to 68% of total government revenue in 2001, and the sector's share in total exports was over 95%. As can be seen in Table 4.1a, Since 2000, real national GDP growth has been boosted by high energy revenues reaching 4.6% in 2004 and an estimated 3.5% in 2005 (Socialist People's Libyan Arab Jamahiriya Country Economic Report, July 2006, document of the World Bank). In fact, in 2009, the oil and gas sector contributed around 60% of Libya's GDP, while Libya's non-oil and gas sectors (public services) including construction and manufacturing, agricultural, education, healthcare and other sectors contributed around 40% of Libya's GDP (CBL, 2010).

Table 4.1a: Libyan GDP by Economic Activity from 1975 to 2000

Sector	1975	1980	1985	1990	1995	2000
Agriculture	82.9	236.4	342.2	482.9	933.4	1437.7
Oil & Natural Gas	1961.1	6525.7	3500.4	3243.8	3380	7761.9
Mining	20.7	48.7	49.6	105.5	132.9	293.9
Electricity, Gas & Water	17.6	48.7	111.7	152.2	216.7	270
Manufacturing	65.5	210.4	421.7	457.6	743.1	889.7
Construction	434.7	1102.3	677.4	457.8	477.9	1013.9
Transport	175.8	420.1	471.8	645.8	905.4	1213.9
Commerce	224.6	516.9	572.2	789.5	1267.1	1685.9
Finance	98.9	246.4	253.7	285.3	232.6	357.2
Housing	131	210.4	250.5	302.6	398.8	475.5
Services	461.5	987.8	1200.9	1321.9	1984.4	3057.3
Total GDP	**3674.3**	**10553.8**	**7852.1**	**8244.9**	**10672.3**	**18456.9**
Oil & Natural Gas	1961.1	6525.7	3500.4	3243.8	3380	7761.9
Non-Oil	1713.2	4028.1	4351.7	5001.1	7292.3	10695

Sources: Central Bank of Libya, Economic Bulletin, (2001)

Table 4.1b: Libyan GDP by Economic Activity from 2001to 2005

Sector	2001	2002	2003	2004	2005
Agriculture, fishing, and forestry	1.390	1.349	1.376	1.440	1.527
Oil & Natural Gas	7.450	14.916	20.673	29.259	44.507
Mining	307	387	360	418	459
Electricity, Gas & Water	285	294	303	334	379
Manufacturing	878	813	765	761	794
Construction	1.063	1.342	1.249	1.450	1.648
Transportation and communication	1.299	1.429	1.516	1.641	1.950
Trade, hotels, and restaurants Commerce	1.882	2.090	2.205	2.418	2.859
Financing, insurance, and business services	377	415	440	477	564

Housing	499	515	534	592	665
Public services	2.901	2.859	3.205	3.800	4.149
Public services (except education and health)	1.301	1.282	1.437	1.704	1.861
Educational services	1.035	1.020	1.143	1.355	1.480
Health services	566	558	625	741	809
Other services	411	428	451	477	539
Total GDP	18.745	26.836	33.076	43.067	60.04
Oil & Natural Gas	7.450	14.916	20.673	29.259	44.507
Non-oil sector	11.295	11.920	12.403	13.808	15.533

Sources: International Monetary Fund (2007)

Table 4.1c: Libyan GDP by Economic Activity from 2006 to 2011*

Sector	**2006**	**2007**	**2008**	**2009**	**2010 ***	**2011 ***
Agriculture, hunting, forestry and Fishing	1,643.1	1,905.3	2,382.7	2,382.7	2,543.6	844.3
Mining and Quarrying and other related activities	53,867.8	62,282.6	81,149.8	47,087.1	60,814.5	19,008.0
Mining and Quarrying (including oil and gas)	85.5	114.5	127.5	144.1	155.3	64.8
Manufacturing industries	3,602.6	4,032.1	4,888.8	5,447.6	5,809.5	978.0
Electricity, Gas And Water	972.7	1,019.1	1,204.5	1,334.6	1,420.5	561.2
Building and constructions	3,129.3	4,198.4	5,994.5	7,577.5	8,066.8	1,391.7
Wholesale and retailer and repairing personal and house-hold goods	2,724.8	3,225.0	3,761.6	4,092.7	4,388.1	2,873.6
Hotels and Restaurants	138.5	171.3	187.9	205.4	219.4	49.5
Transport, Storage and Telecommunications	2,724.2	3,299.5	3,884.2	4,125.8	4,432.1	3,317.7
Financial Intermediary	816.5	980.8	1,081.3	1,181.8	1,262.0	745.9
Real-estate and Renting and business activities	4,643.5	5,218.9	5,723.8	6,154.8	6,636.4	1,506.4
Government, Defense and Mandatory Social Insurance	4,935.1	6,507.3	6,670.7	6,870.8	7,128.8	12,319.3
Education	84.9	98.9	122.4	133.8	141.4	39.8
Health care and Social Activities	132.4	153.7	155.5	164.7	175.1	87.1
Other services	61.9	69.4	82.3	91.0	98.2	33.7
Total	**79,562.9**	**93,276.9**	**117,282.6**	**86,994.4**	**103,291.6**	**43,385.1**
Financial services indirectly computed	-533.0	-364.3	-643.1	705.5	753.365	435.989
GDP	**79,029.9**	**92,693.6**	**116,639.6**	**86,289.0**	**102,538.2**	43,385.1
Mining and Quarrying and other related activities	53,867.8	62,282.6	81,149.8	47,087.1	60,814.5	19,008.0
Other economic activities	25,162.1	30,411.0	35,489.8	39,201.9	41,723.8	24,377.1

Sources: Central Bank of Libya, Year Report, (2010) *Preliminary data

As can be seen from table 4.1b, it is clear that the most effective contributor to the economy is the hydrocarbon sector. Consequently, if oil revenues increase, the GDP

and per capita income will increase substantially. During 1990-2000 GDP per capita hovered around US$ 9,269 reaching US$ 9,965 in 2004. In a relatively short space of time, Libya turned into a rapidly developing country with accumulated gross international reserves equivalent to US$24.6 billion and income from oil revenues of US$14.2 in 2003 (CIB, 2005). According to the IMF (2005) a constant increasing of the share of oil sector resulted in claim the 70% of GDP as a contribution. In addition, Libya has registered solid growth and outpaced a number of comparable countries in the region due to major foreign investment in oil and gas sector which accounts for around 80% of foreign investment in Libya (Porter and Yergin, 2006).

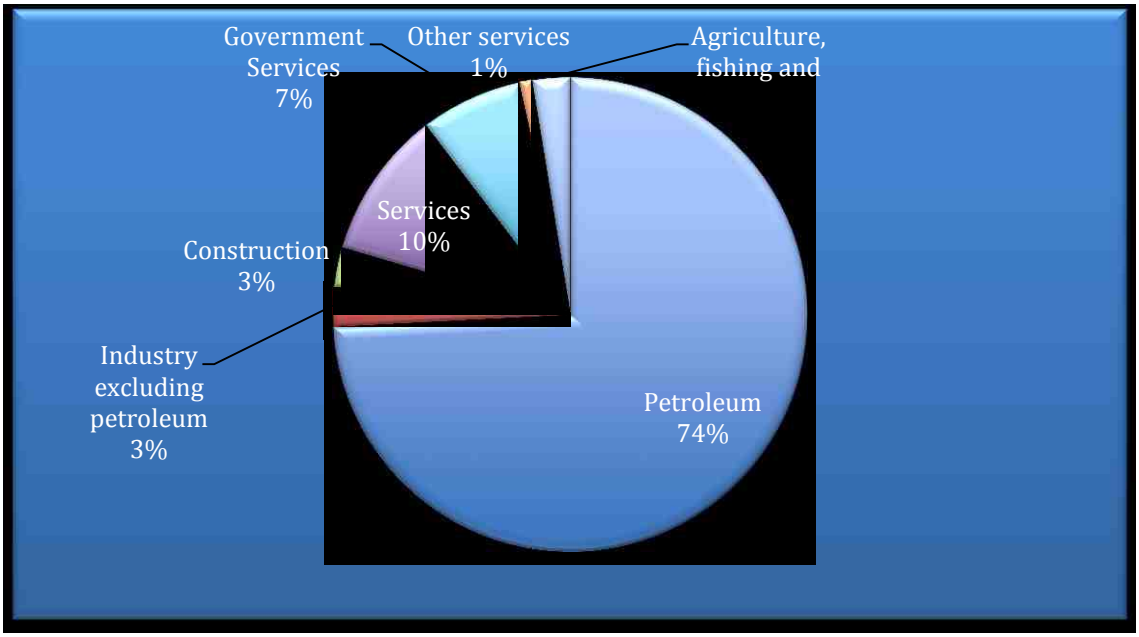
Table 4.2: GDP Growth from 2005 to 2013 E

Statement	2005	2006	2007	2008	2009	2010	2011	2012 E	2013E
Real GDP	9.9%	5.9%	6.0%	2.8%	-1.6%	10.3%	-60.0%	69.7%	20.5%
Non hydrocarbon	13.6%	7.9%	9.9%	8.0%	6.0%	7.0%	-50.0%	20.0%	15.0%
Hydrocarbon	4.3%	2.8%	2.8%	0.0%	14.0%	4.3%	-70.9	163.3%	25.2%
Per capita GDP in thousands of U.S. dollars	7.5	9.5	11.8	14.3	9.5	12.1	5.8	11.8	13.9
Nominal GDP in billions of U.S. dollars	44.0	56.5	71.7	88.9	60.2	73.2	37.4	77.7	93.4

Sources: IMF Executive Board Concludes (2010); CBL (2012)

Table 4.2 depicts that in 2007 oil and gas provided more than 99 per cent of all export earnings and 78 per cent of government revenue. Thus, the oil and gas sector continued to dominate Libya's growth, by contributing 74 per cent of GDP in 2006 (African Development Bank, 2008), further details can be seen in figure 4.7. Moreover, the Libyan economy still remains largely controlled by, dominated, led and is heavily dependent on the oil sector (IMF, 2006). Therefore, the energy sector has not only had a direct impact and effect on overall economic performance, it also affects the quality of the country's business environment in many ways, including investment, incentives and developments for non-oil and gas sector activities (Porter and Yergin, 2006).

Figure 4.7: GDP by Sector In 2006



Source: African Development Bank, (2008)

4.5. HISTORY AND ECONOMIC STATE OF THE OIL AND GAS COMPANIES

Libya has a number of oil and gas companies owned by NOC and other joint ventures with foreign companies (see appendixes 4.1 for the chart of NOC). It is important to know that the focus of this research is only fully-owned Libyan companies including Arabian Gulf Oil Company (AGOCO), Ras Lanuf Oil and Gas Processing Company (RASCO) and Sirte Oil Company (SOC) as the case study of the research (see appendixes 4.2 for the chart of fully owned companies of NOC). Justification for the selection of these companies is discussed in the methodology chapter, while this section provides brief information on these main companies in the sector.

4.5.1. Arabian Gulf Oil Company (AGOCO)

AGOCO is considered to have been one of the first oil companies, after the decision for nationalization, completely owned by NOC, which is one of the largest oil companies in North Africa. It is also one of the biggest oil companies in Libya since the nationalization of British Petroleum Company (BP) shares, which led to the establishment of AGOCO in 1971 under law 115/71.

AGOCO oil production comes mainly from five major oil fields: Messla, Sarir, El Beda, Naffora, and Hamada. Indeed, in 1959 the El Beda and El Hamada fields were

both discovered, situated on the southern border of the Gdhames Basin and the east of the Sirte Basin respectively. The Sarir oil field, one of the largest fields in Libya, was discovered in 1961 and it is situated in the southeast part of Libya. The Naffora field was discovered in early 1965, and it is situated in the north eastern part of the Sirte Basin. The Messla field is situated five hundred kilometres south east of Benghazi and was discovered in 1984; it is also considered to be one of the biggest fields in the Sirte Basin.

In addition, AGOCO operates an oil refinery and terminal in Sarir and Tobruk. In the early 1980's the Tobruk refinery started its operations and entered the production phase in 1989. The refinery is designed to refine 20,000 barrels of oil per day. Construction of Marsa El Hariega Terminal (Tobruk) started by the end of 1964, which is situated on the southern coast of Tobruk trade port. In 1966 the terminal was completed and the first load of crude oil was exported from Sarir field through the terminal in 1967. In addition, in 1989 the Sarir refinery, designed to refine around ten thousand barrels of oil per day, started its operations.

NOC estimated AGOCO's production in 2003 to be around 430,000 billion barrels per year (bbl/y). In addition, AGOCO produced around 440,000 barrels per day (bbl/d) (70,000 m^3/d) in 2007, representing around 40% of total Libyan crude oil production. Table 4.5 provides a summary of AGOCO.

Table 4.3: Summary Information on AGOCO

Required	Description
Company name	Arabian Gulf Oil Company (AGOCO)
Ownership	Subsidiary of Libya National oil corporation (LNOC)
Head office	Bengazi – Libya
Focal point	Chairman & management representative
Telephone	Bengazi (+218) 61 222-8931/ 36
PO Box	Benghazi 2134
Fax	(+ 218) 61 222900640099
Email	-
Website	http://www.agoco.com.ly
Legal form	Contributed company
Activity field	Crude oil and Natural gas exploration, production and refining
Main products of company	LPG - Liquefied Petroleum Gas Straight run Naphtha Straight run Kerosene (Jet) Straight run Diesel Oil Fuel Oil

Plants main products	Refinery products: Lignified petroleum gas (L.P.G) - virgin naphtha (S.R. Naphtha) kerosene- gas oil – fuel oil.
Workforce: Total employees Operation department employees Quality employees	 7650employees 270 employees non
Awarded certifications	ISO 14001:2004

(Created by the researcher)

It is useful to note that AGOCO, as an important company in the oil and gas sector in Libya, intends to develop its business environment and has reached ISO certifications for quality environmental, ISO 14001:2004 as proof of its orientation. Further details regarding organisation chart can be seen in Appendix 4.3.

AGOCO aims to be highly competitive among other companies both locally and abroad, and has also endeavoured to enhance its overall operations to be in line with international standards.

4.5.2. Ras Lanuf Oil and Gas Processing Company (RASCO)

Ras Lanuf Company or RASCO is a petrochemical complex and gas processing plant, which is an incorporated national company wholly owned by NOC. RASCO as a topping and reforming oil refinery started its operations in 1984, and as a subsidiary company of NOC. It produces an estimated 220,000 bbl/d (35.000 m^3/d).

The formation of the company was divided into three phases: the first was the refinery plant with a capacity of 1.2 million tons per year (mt/py), the ethylene plant with 330,000 tons per year (tpy); it also produces other RASCO products such as gas oil, fuel oil, naphtha, LPG, and kerosene. The second phase included the polyethylene (petrochemical) and propylene 170,000 tpy, Mix C4 130,000 tpy and gasoline 335,000 tpy. Extension and upgrading the previous stages and phases are regarded as the third phase. RASCO worked through the second phase until the beginning of 2011; this included the following plants: refinery, ethylene, and polyethylene, polymer handling system, utility and harbor along with other functions. Table 4.3., provides summary information for RASCO.

RASCO, hence, is one of the most important industries in Libya, and as a petrochemical company, it has a high production standard and is internationally competitive, currently holding ISO certifications for quality environmental and safety

management systems OHSAS 18001:2008, ISO 9001:2000/ ISO 9001:2008, ISO 14001:2004 and Company Policy of Quality, Environment, Occupational health and safety; a copy of these certificates is provided in Appendixes (4.4a), (4.4b), (4.4c) and (4.4d).

It should be noted that RASCO' organizational chart was changed in 2008 in order to develop an efficient organization structure with the objective of having a positive effect on the entire organization process. Further details concerning the organisation chart can be seen in Appendixes (4.4e) and (4.4f).

RASCO as an organisation aims to develop and upgrade all its operations including management matters. Therefore adapting a complete and effective TQM model is also considered by RASCO.

Table 4.4: Summary Information on RASCO

Required	**Description**
Name of the Company	Ras Lanuf Oil & Gas Processing Company. (RASCO)
Ownership	A subsidiary of Libyan National Oil Corporation
Head office	Ras Lanuf city – Libya
Focal point	Chairman & management representative
Telephone(s)	Tripoli (+218) 21 3605177- 82 Bengazi (+218) 61 2230271- 77 Sirte (+218) 54 3842001- 07
PO Box	1971 Bengazi 2323 Tripoli
Fax	(+ 218)21- 3605174
Email	info@raslanuf.com
Website	www.raslanuf.com (old one) http://www.raslanuf.ly
Legal form	Contributed company
Activity field	Oil and gas processing
The main products of the company	LPG - Liquefied Petroleum Gas. Straight run Kerosene (Jet). Straight run Naphtha. Fuel Oil. Straight run Diesel Oil. Propylene. Ethylene.
Plants main products	Refinery products: Lignified petroleum gas (L.P.G) - virgin naphtha (S.R. Naphtha). Kerosene- gas oil – fuel oil. Ethylene products: ethylene- propylene- mix c4 (butadiene) – PY gas (mix B. T. X). Polyethylene- high density polyethylene. Polyethylene products: low linear density.
Workforce: Total employees Management employees Quality employees	 3552 employees 285 employees 128 employees
Awarded certifications	ISO 9001: 2000, IMS (OHSAS 18001: 2007and ISO 14001: 2004).

(Created by the researcher)

4.5.3. Sirte Oil Company (SOC)

Sirte Oil Company (SOC) produces and refines oil and gas, which distinguishes from those of other companies working in Libya by the comprehensiveness of its oil operations It was known in the past as Esso Standard Libya, one of the first companies to discover oil in commercial quantities in the field of Zilten in July 1956.

SOC as a leading oil and gas company operates fifteen oil and gas producing fields including Nasser (Zelten) one of the largest in Libya, Ragub, Lehib (Dor Marada), Jebel, Wadi, Ralah, Arshad, Ain Jerbi and Al Wafa. It also has Natural gas fields including Hateiba, Sahl, Assamoud, Meghil, Sorrah and Attahaddy.

In addition to SOC operating a petrochemicals complex, its oil and gas industrial activity comprises the following; oil and gas fields producing more than 100,000 barrels of crude oil and 660 million of standard cubic feet of natural gas daily; Methanol plants producing over 2000 metric tons/day(m t/d); ammonia and urea; LNG plant producing 30,000 bbl/d of LNG, 3000 bbl/d of LPG and 40,000 bbl/d of Naphtha; Brega oil refinery which was established with designed capacity of 90,000 bbl/d to produce the following products: Super benzene (Light fuel), kerosene, diesel oil, heavy oil(ADO), Light Naphtha and Jet fuel. Moreover, gas transmission facilities supply 460 mmscf/d for a huge manufacturing complex along the Libyan coast, in addition to storage of products (13 tanks with a total storage capacity of 240,000 barrels) and port which is considered to be one of the most important oil ports of the sector in Libya. Additional details can be seen in Table 4.5.

SOC also includes the following functional units: pavements for product transportation; safety and firefighting units; commercial pavements; stores; workshops; central diagnostic and medical center; restaurants; quality monitoring and buildings of general management and other services buildings.

Table 4.5: Summary Information on SOC

Required	Description
Company name	Sirte Oil Company for Production, Manufacturing of oil and gas (SOC)
Ownership	Subsidiary of Libya National oil corporation (LNOC)
Head office	City of EL Brega - (Marsa EL Brega) – Libya
Focal point	Chairman & management representative
Telephone	Tripoli (+218) 213610376 / 90

PO Box	385 Tripoli
Fax	(+ 218)213610604
Email	info@sirteoil.com
Website	www.SOC.com
Legal form	Contributed company
Activity field	Production and manufacturing Oil and gas
The main products of the company	crude oil and natural gas Methanol, ammonia and urea; LNG - Liquefied Petroleum Gas
Plants main products	Refinery products: Lignified petroleum gas (L.P.G) Super benzene (Light fuel), kerosene, Diesel oil, Heavy oil(ADO), Light Naphtha, Jet fuel
Workforce: Total employees Operation department employees Quality employees	 6652 employees (begging of 2011) 850 employees 6 employees
Awarded certifications	ISO 9001: 2008, ISO 9004: 2009, ISO 9001: 2000, ISO 9000: 2005

(Created by the researcher)

SOC is one of the biggest and most important oil and gas companies in Libya, with further plans to enhance its business environment and maintain its resources. It currently holds ISO certification for quality management system - requirements ISO 9001:2008, quality management system - Guideline for performance improvements ISO 9004:2009 and quality management system - fundamentals and vocabulary ISO 9000:2005 and Quality Policy; Copies of these certificates are provided in Appendixes (4.5a), (4.5b) and (4.5c). Further details can be seen in Appendix 4.5d, regarding the organisation chart.

Similar to other companies in the field, SOC aims to be highly-competitive with other companies, both locally and abroad. By achieving such quality certificates and has attempted to improve its operations by adopting appropriate management methods and philosophy.

4.6. CONCLUSION

This chapter provides a brief description of Libyan economy and the role of oil and gas in its economy alongside brief information on the sampled companies. This chapter identifies that after the discovery of oil, which played a critical role in both financing government revenues and the budget, the Libyan economy grew rapidly. As, the sector has contributed significantly to the GDP, which represents more than 70% of GDP. In addition, more than 20% of the entire Libyan workforce is employed in the energy sector.

In fact, the Libyan economy could be divided into two parts: a low value/high employment non-oil and gas sector and high value/relatively low employment energy sector. There is a significant need to raise the investment size and Libya hopes to reach three million barrels a day in the near future. It is obvious that this figure will be both a challenge and a high priority at the same time, as it will depend on successful exploration and other factors such as good organisation and adopting an appropriate management style to maintain the resources and encourage progress.

It is clear that the oil and gas sector is vital, important and essential for the Libyan economy; therefore, the government should pay more attention, and concentrate on taking major steps to reform the sector, both in the short- and the long-term. The process should include: improving workers' skills and maintaining them, enhancing the organisational structure, reducing production costs and limiting the migration of professional workers and other skilled employees to other foreign companies, as well as successfully and effectively adopting modern management methods such as TQM in order to reach all targeted objectives.

The following chapter explains the research methodology and the method that used to collect and analyse the primary data.

Chapter 5

RESEARCH PROCESS AND METHODOLOGY

5.1. INTRODUCTION

Since it is essential for the researcher to adopt a suitable methodology coupled with proper planning throughout the research process, this chapter focuses on the research methodology related matters in relation to this research. In addition, this chapter discusses the methods employed in the research and presents the appropriate research methods in order to fulfil the objectives and answer the research questions. It concentrates on methodological issues, justifies the choice of research methods, and illustrates the reasons behind the choices made. This chapter aims to respond to and detail every aspect of the research as part of the research process.

5.2. AIMS AND HYPOTHESIS

As states in Chapter 1, the main aim of this research is to explore the practice of TQM in Libyan oil companies and identify the barriers and obstacles to the successful and effective implementation of TQM within the companies in the Libyan oil and gas sector. With the help of the literature, several possible obstacles have been identified which could negatively affect the application of TQM within these organisations. In operationalizing the research aims, objectives and research questions, a number of hypotheses developed in relations to the perceptions and opinions of the participants on the practice of TQM in Libyan oil and gas companies. The followings are only the main hypotheses, the sub-hypotheses aiming to further operationalize the research aims are presented and discussed in Chapter 9 due to the length.

(i) Knowledge, awareness and understanding of quality, quality management techniques, the concept of TQM and the necessity and importance of TQM.

Hypothesis 1: The majority of Libyan oil and gas organisations' managerial categories have appropriate level of awareness about quality.

Hypothesis 2: The majority of Libyan oil and gas organisations' managerial categories have appropriate and fair level of knowledge about quality management techniques.

Hypothesis 3: The majority of Libyan oil and gas organisations' managerial categories have appropriate and fair level of understanding of the concept of TQM.

Hypothesis 4: The majority of Libyan oil and gas organisations' managerial categories have appropriate and fair level of awareness and understanding regarding the reason behind employing TQM within their organisation.

Hypothesis 5: The majority of Libyan oil and gas organisations' managerial categories have appropriate and fair level of awareness and understanding regarding TQM.

(ii) Possible obstacles and barriers to TQM implementation.

Hypothesis 6: There are many possible obstacles and barriers to the successful and effective application of TQM from the majority of Libyan oil and gas organisations' managerial categories perspective.

- *Top management and leadership commitment*

Hypothesis 7: The majority of Libyan oil and gas organisations' managerial categories consider top management and leadership lack of commitment to be an obstacle to the successful and effective application of TQM across the oil and gas sector.

- *Organisational culture*

Hypothesis 8: The majority of Libyan oil and gas organisations' managerial categories consider poor organisational culture an obstacle to the successful and effective application of TQM across the oil and gas sector.

- *Employee involvement and empowerment*

Hypothesis 9: The majority of Libyan oil and gas organisations' managerial categories consider lack of employee involvement and empowerment to be an obstacle to the successful and effective application of TQM across the oil and gas sector.

- *Employee resistance to change*

Hypothesis 10: The majority of Libyan oil and gas organisations' managerial categories consider employee resistance to change to be an obstacle to the successful and effective application of TQM across the oil and gas sector.

- *Quality strategic plan*

Hypothesis 11: The majority of Libyan oil and gas managerial categories consider poor quality strategic planning as an obstacle to the successful and effective application of TQM across the oil and gas sector.

- *Employee training, development and education*

Hypothesis 12: The majority of Libyan oil and gas organisations' managerial categories consider lack of employee training, development and education to be an

obstacle to the successful and effective application of TQM across the oil and gas sector.

- *Information and communication*

Hypothesis 13: The majority of Libyan oil and gas organisations' managerial categories consider lack of information and communication as an obstacle to the successful and effective application of TQM across the oil and gas sector.

- *Continuous improvement and innovation*

Hypothesis 14: The majority of Libyan oil and gas organisations' managerial categories consider lack of continuous improvement and innovation to be an obstacle to the successful and effective application of TQM across the oil and gas sector.

- *Team work*

Hypothesis 15: The majority of Libyan oil and gas organisations' managerial categories consider lack of team work as an obstacle to the successful and effective application of TQM across the oil and gas sector.

- *Internal and external customer satisfaction*

Hypothesis 16: The majority of Libyan oil and gas organisations' managerial categories consider lack of internal and external customer satisfaction to be an obstacle to the successful and effective application of TQM across the oil and gas sector.

- *Measurement and evaluation*

Hypothesis 17: The majority of Libyan oil and gas organisations' managerial categories consider lack of measurement and evaluation as an obstacle to the successful and effective application of TQM across the oil and gas sector.

- *Government support*

Hypothesis 18: The majority of Libyan oil and gas organisations' managerial categories consider lack of government support as an obstacle to the successful and effective application of TQM across the oil and gas sector.

- *Recourse and requirement of TQM*

Hypothesis 19: The majority of Libyan oil and gas organisations' managerial categories consider lack of resources and requirements of TQM as an obstacle to successful and effective application of TQM across the oil and gas sector.

- *Management Attitude*

Hypothesis 20: The majority of Libyan oil and gas organisations' managerial categories consider poor management attitude as an obstacle to successful and effective application of TQM across the oil and gas sector.

(iii) Further Possible Obstacles and Barriers for TQM Implementation

Hypothesis 21: There are further possible obstacles and barriers to the successful and effective application of TQM from the perspective of the majority of Libyan oil and gas organisations' managerial categories.

After presenting the hypotheses, the following section the discusses research methodology of this study.

5.3. RESEARCH METHODOLOGY

Research methodology is defined as "the overall approach to the research process, from the theoretical understanding to the collection and analysis of the data" (Hussey and Hussey, 1997:55). In a more function sense, Silverman (2006) states that research methodology refers to the process of how the researcher will go about studying any phenomenon. In a more systematic manner, it is defined as a "combination of techniques used to enquire into a specific situation" (Easterby-Smith *et al*., 2002:31).

Tomkins and Groves (1983, cited in Ryan *et al*., 2002:35) state that "the selection of the most appropriate research methodology is dependent on the nature of the phenomenon being researched". Consequently, the underlying purpose of research methodology is to fulfil the research aims and objectives, and also to answer the question of how the research is constructed and conducted, which includes all processes that will be carried out by the researcher.

It is useful to note that most social science research divides research methodology into two types, namely, quantitative research methodology and qualitative research methodology (Punch, 2000; Kumar, 2008).

According to Leedy (1993) and Kumar (2008) quantitative research methodology focuses on numerical data (see also: Crotty, 1998; Johnson, 1994; Robson, 2002 and Patton, 2002). Thus, the motive in quantitative research methodology is examining, explaining, evaluating and correlating. On the other hand, qualitative research produces and deals with large quantities of data that represent ideas and words rather than statistics and numbers (Rudestam and Newton, 2001), and therefore it helps to respond to exploring type of motives, as aims to understand the research questions mostly through the perceptions, opinions and behaviours of others. Taylor and Bogdan (1984:5), therefore, state that "qualitative methodology refers in the broadest

sense to research that produces descriptive data, people's own written or spoken words and observable behaviour." As Rudestam and Newton (2001:36) states in qualitative research "the data are usually reduced to themes or categories and evaluated subjectively".

In the words of Patton (2002) qualitative research methodology aims to get close enough to the subjects with the objective of capturing what is happening. In this vein, Arksey and Knight, (1999) assert that qualitative research applies direct attention to discover what happens, what people think, and why. In taking all these descriptions into account, Bryman (1995:46) defines qualitative methodology as an "approach to the study of the social world which seeks to describe and analyse the culture and behaviour of humans and their groups from the point of view of those being studied." It is, therefore, clear that the goal of the qualitative approach is to focus on people's subjective state in order to give an insight into it and explains a great deal regarding how people interact.

Since the aim of this study is to explore and investigate a particular aspect of social reality through the behaviour and perceptions and opinions of participants, on the issue of TQM and other related matters, it is framed and hence conducted as a qualitative research. Additionally, since the Libyan oil and gas sector has a short history regarding TQM philosophy, very little is known about the topic, which also justify as to why qualitative research methodology is considered as appropriate to accomplish the aims and objectives of this study.

5.4. RESEARCH DESIGN

Based on the fact that there is no absolute method and design that is suitable for all type of research, Bailey (1982) suggest that the process of selecting methods and design largely depends on the nature of the aims of the research and data collection approaches. Research design has been described as a road for the researcher; it is a plan for gathering data in order to test research questions/hypotheses. Research design is, therefore, seen as a critical factor in any research, through which the research question(s) are properly put into perspective and a suitable plan can be formulated in order to fulfil the research aims and objectives (Saunders *et al.*, 2007; Bryman and Bell, 2007). A research design is, hence, defined as "the overall plan for relating the

conceptual research problem to relevant and practicable empirical study" (Ghauri and Gronhaug, 2002:47). In other words, it provides a structure and method for the collection and analysis of data (Bryman, 2008).

According to Saunders *et al*. (2007) research design types can be classified as exploratory, descriptive or explanatory research. There are other classifications of research design which include: experimental design, comparative design, survey design, action research, grounded theory and archival research (see: Gray, 2004; Bryman and Bell; 2007; Saunders *et al*. 2007). The process of choosing the appropriate type of research should be undertaken with care and accurate determination in order to achieve correct and reliable results and conclusions. Table 5.1. provides definition and description of various research designs through the main contenders.

Table 5.1: Research Design Types

Exploratory research	**Source**
"What is happening; to seek new insights; to ask questions and to assess phenomena in a new light"	Robson, 2002:59.
Assists in choosing suitable research design along with data collection method. It aims to collect preliminary information and data that will assist the researcher to define problems and suggest hypotheses.	Kotler *et al*, 2006:122.
Descriptive research	
"Portrays an accurate profile of persons, events or situations"	Robson, 2002: 59.
Focuses on an accurate description of the variables under investigation.	Tull and Hawkins, 1993.
The problem(s) is/are structured and well understood in this type of research.	Ghauri and Gronhaug, 2002.
Used to identify and gather information on the aspects and elements of a particular problem.	Collis and Hussey 2003.
Answers the question 'what is going on' (this is the main concern of descriptive studies)	De Vaus, 2001.
Provides a profile or describes problem(s) or phenomena that the researcher needs to study from an individual, industry-oriented, organizational or other perspective.	(Saunders *et al*., 2000; Sekaran, 2000.
Explanatory research	
The main function of the research is to explain the result of certain causal relationships between variables or differences between groups.	Saunders *et al*. 2007.
Case study research	
"A strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence".	Robson, 2002:178.
Cross-Sectional Design	
A process where the collection of data is undertaken based on more than one case and at a single point in time.	Bryman and Bell, 2007.

Refers to the study of a particular phenomenon at a particular time	Saunders *et al*., 2000.
Is called one-shot research since the process of data collection occurs once in order to answer a research question(s).	Sekaran, 2000.
Frequently referred to as a survey research design, is possibly the most important and popular type of research design.	Churchill, 1995; Edwards and Talbot, 1999.
Longitudinal Design	
Refers to those studies where data are collected twice, in other words over an extended period of time.	Edwards and Talbot, 1999.
The researcher investigates and explores the same problem/ phenomenon over a period of time which might take years**.**	Collis and Hussey, 2003.

Research design is typically classified according to the nature of the research objectives (Kinnear and Taylor, 1996). For this research, a combination of 'exploratory', 'case study', 'cross-sectional design' and 'survey designs' are considered as the most appropriate design to achieve the research aims and objectives.

(i) This study is constructed as an exploratory study, as it aims to explore the perceptions and opinions of the individual participants on the subject matter, i.e. to determine application and practice of TQM, and to determine the obstacles and barriers and also to explore what the surrounding issues are.

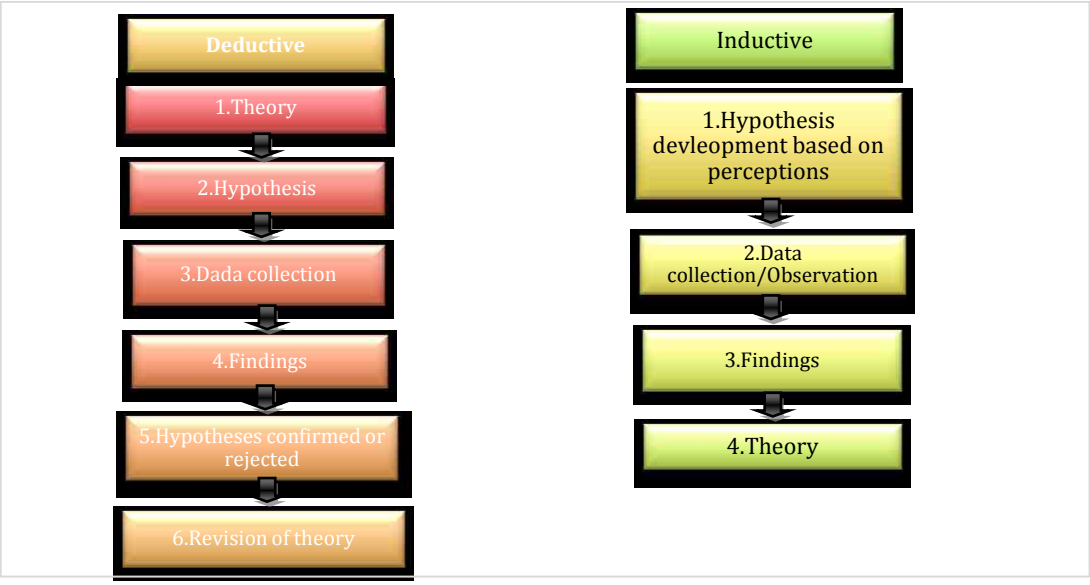
(ii) In addition, since this study focuses on the case of Libyan oil and gas companies it should be considered as a case study, since there is little known about these companies in relations to the research aims of this study. In other words, since the present research focuses on a particular group of individuals (managers at all levels) in particular organisations (Libyan oil and gas companies) to determine particular factors (obstacles and barriers), it is considered as a case study. In other words, this research addresses a specific and complex issue (obstacles and barriers regarding TQM). Therefore, large companies AGOCO, RASCO and SOC, are studied, as these organisations experience complex problems with the application and also have the relevant staff to provide the researcher with in-depth information on the particular issue. Thus, the case study method is used to obtain a rich set of data surrounding the specific research issues and to capture the contextual complexity (Yin, 1994).

(iii) This research is also framed as survey design, as the data were collected through questionnaire and interview survey, which, also, makes this research as cross-sectional study as data collected from all the participants at the same interval.

5.5. RESEARCH STRATEGY

Research strategy is considered to be another important aspect of research methodology. The review of the social science research illustrates that there are two types of research strategy that can be adapted: deductive and inductive research, as depicted in figure 5.1. According to Robson (1993), the research strategies and the techniques or methods employed, must be appropriate for the questions that the researcher need to answer.

Figure 5.1: Deductive and Inductive Research Strategy



Source: Bryman and Bell (2003:12); Gray, (2004); Bryman & Bell, (2007)

Bryman and Bell (2003:570) define deductive research method as "an approach to the relationship between theory and research in which the latter is conducted with the reference to hypotheses and ideas inferred from the former." Thus, in deductive research the first step is to propose a theory as a way of discussing the issue and resolving the problem(s), followed by the process of research and then testing the theory. The research findings will come afterwards, to approve/accept or reject the validation of the theory. Findings can, in most cases, propose suggestions and recommendations that can perhaps lead to amendments; in other words, they lead to revision of the theory (Gray, 2004; Bryman & Bell, 2007).

As for inductive research, it is defined as "an approach to the relationship between theory and research in which the former is generated out of the latter" (Bryman and Bell, 2003:569). The process of inductive research, hence, actually starts by

identifying the problem or begins with an idea/expectation, and then specific hypotheses need to be formulated. Thereafter, the hypotheses or expectations need to be tested, a theory proposed or a general proposition formed as the outcome of the research (Gray, 2004; Bryman and Bell, 2007).

It should be noted that the research processes of this study is consistent with the deductive method, as the research begins with a defined meaning of TQM and aims to evaluate whether its application in Libyan oil and gas industries to such a meaning. The data collected through observing and surveying (through questionnaire and interview) the field helps to test the hypotheses identified. In addition, since this study aims to explore and evaluate the subject matter, by definition it is consistent with the deductive research strategy by observing the field through data collection hypothesis development and conducting tests as a result. Furthermore, since this study is constructed as a qualitative methodology it is generally known that qualitative methodology and exploratory study necessitate deductive research.

5.6. RESEARCH METHOD

Another important element of research process is the research method. While research methodology refers to the overall approach to the research process, research method refers specifically to the means by which data is collected and analysed. Sarantakos (2005:30) defines research method as "instruments employed in the collection and analysis of data". In a more systematic manner, Jankowicz (2005:220) defines method as "a systematic and orderly approach taken towards the collection and analysis of data so that information can be obtained from those data." In a functional manner, Bryman (2001:27) defines research method as "simply a technique for collecting data. It can include instruments, such as questionnaire, or a structured interview, or participant observation in which a researcher listens and watches others".

Generally, data collection methods in social science research are divided into two main categories: quantitative method and qualitative method (Robson, 2002). Qualitative method is defined as "research involving analysis of data/information that is descriptive in nature and non-quantified" (Sekaran, 1992:424). Some examples of data collection methods are field-based interviews, observations, focus groups, letters and diaries (York, 1998). On the other hand, a quantitative method as Denscombe

(1998:208) describes "uses numbers and can present findings in the form of graphs and tables; it conveys a sense of solid, objective research". In a quantitative method, the data collected is considered as quantifiable and also can be analysed using statistical tools.

The present research uses a quantitative method in the collection and analysis of primary data in the form of a questionnaire to gather data on the perceptions and opinions of the participants. In addition, a qualitative method is used in the form of interviews to gather primary data to gauge the perceptions and analysis of another category of participants. Lastly, documentation method is also used to gather secondary data with the objective of exploring and investigating participants' perceptions and attitudes towards TQM application using an exploratory case study design and deductive strategy in three oil and gas organisations in Libya.

5.7. RESEARCH METHOD: DATA COLLECTION

To answer the current research questions, multiple sources were used for data collection: questionnaires, interviews, and documentation. According to Hussey and Hussey (1997:67), "it is usually best to combine data collection methods such as interviews and questionnaire". None of these particular techniques can be singled out as superior to another, as it is largely depends on the research design, research questions, aims and the type of data required (Saunders *et al*., 2007). This is supported by Creswell (2003), who also suggests that in several fields of social scientific research mixing methods with the integration of quantitative and qualitative techniques has become widely used and increasingly popular.

There are different data collection methods. Denscombe (1998:83) states that "when it comes to selecting a method for the collection of data, certain research strategies will be associated with the use of certain research methods... each of the methods has its particular strengths and weaknesses." This study mainly utilises two types of data collection for its primary sources (qualitative and quantitative) and for the secondary sources (qualitative). The primary data were collected using the interview survey and questionnaire survey; and the secondary data was obtained from libraries in the form of reports, articles, books, and magazines, along with organisational documents such as leaflets, books, reports and certificates.

Since this study utilises different data collection methods, it benefits from triangulation

5.7.1. Triangulation

Triangulation technique has become quite common in recent years and is increasingly used in social science research as well as in management and business studies (Saunders *et al*., 2007; Sarantakos, 2005; Modell, 2005). Triangulation combines different types of data collection or different approaches of looking at data, in order to answer the research question(s) (see: Mason, 2002; Patton, 1999; Neuman, 2003; Yin, 1994 and Denzin, 1978). Formally, Hussey and Hussey (1997: 74) defines it as "The use of different research approaches, methods and techniques in the same study".

The key purpose of using triangulation is to ensure the validity of the research by producing a more holistic, complete, and contextual portrait of the aims under research (Ghauri and Grønhaug, 2002). Jick (1979:603), therefore, states that "the effectiveness of triangulation rests on the premise that the weaknesses in each single method will be compensated by the counter-balancing strengths of another". It is, therefore, believed that collecting data using a number different methods will perhaps reduce the chance of making errors (Arksey and Knight, 1999), which obviously implies that using triangulation can allow the researcher to have further confidence in terms of their results.

In terms of actually conducting triangulations, Punch (2000) and Creswell (1995) stresses that qualitative and quantitative approaches/methods perhaps can and should be combined as appropriate to gain a better understanding of the phenomenon being studied. In explaining this, Saunders *et al.* (2000) state that to "combine quantitative and qualitative methods ... for example, semi-structured group interviews may be a valuable way of triangulating data collected by other means such as a questionnaire". In other words, the use of triangulation actually overcomes most of the limitations of certain methods of primary data collection (questionnaires, semi-structured interview), including bias (Claver *et al*., 2007; Patton, 1999). In this regard Hussey and Hussey (1997:74) states that "triangulation can overcome the potential bias." In addition, it is used to enhance and ensure the validity of the study findings (Scapens, 1990; Modell, 2005). In support of this view, Modell (2009: 208) states that

"Triangulation is generally seen as a vital validation technique in mixed methods research".

It should be noted that there are four basic types of triangulation which the researcher should be aware of as illustrated in Table 5.2.

Table 5.2: Types of Triangulation

descriptions	Reference
Data triangulation: uses multiple ways to collect and analyse data involving space, persons and time.	Seal (1999); Easterby-Smith *et al*. (2002); Hussey and Hussey (1997) and Mason (2002).
Investigator triangulation: consists of the use of multiple, rather than single observers	
Methodological triangulation: involves using more than one quantitative or qualitative data source or method in a single piece of research	
Theory triangulation: uses more than one theoretical scheme in the interpretation of the issue under investigation	
Multiple triangulation: refers to the situation where the researcher combines, in one investigation, multiple observers, theoretical perspectives, sources of data and methodologies	Jick (1979)

Since this study collected data from diverse sources through multiple means such as qualitative methods in the form of semi-structured interviews and documentations, and quantitative method in the form of questionnaire survey, this study is framed as triangulation. Triangulation was also pursued in data analysis, as qualitative method of data analysis in the form of coding analysis of interview data, and quantitative method in the form of statistical analysis is used. Thus, using triangulation is expected to overcome the inherent limitations of each of the method in attain valid results.

5.7.2. Data Collection Process: Questionnaire

Since this study utilises questionnaire survey in order to gather data from the target population, this section discusses the process of administering the questionnaire for this research. The questionnaire is perhaps a major tool for the purpose of collecting primary data (Clarke, 1999). According to Oppenheim (1992) refers to the questionnaire as an important and efficient research tool for data collection, especially when the researcher knows precisely what information is needed and how to measure the particular variables of interest. Ghauri and Gronhaug (2002: 94), therefore, state

that “questionnaires are among the most popular data collection methods in business studies, and the major types of questionnaires are descriptive and/or analytical”.

Collis and Hussey (2003:173) define a questionnaire as “a list of carefully structured questions, chosen after considerable testing, with a view to eliciting a reliable response from a chosen sample. The aim is to find out what a selected group of participants do, think or feel”.

The questionnaire method is chosen in this study due to various factors, such as its ability to provide a more reliable and complete picture. Questionnaire method also gives participants the opportunity to provide genuine responses that may not be accessible through other methods, as it would generate more valuable and richer data by saving the time of prospective participants whose time is perhaps limited, and it is considered to be the best method of gathering data in a relatively short time from a small or large population who are scattered geographically.

5.7.2.1. Question format and design

The type and format of the questions in the questionnaire are essential as they affect the outcomes and efficiency of the research questionnaire. Based on the literature, there are two types of questions used in the process of planning questionnaires, namely ‘close-ended type questions’ and ‘open-ended type questions’ (Moore, 2000). The former is considered the easiest both for the respondents and the researcher, because it gives choices to the participants so they are able to choose a quick and appropriate answer from a limited number of alternatives (multiple choice questionnaire) and this requires little writing by the participants (Nachmais and Nachmais, 1993). In other words, as Moore (2000) and Remenyi (1998) states ‘closed-ended’ questions are extremely easy to complete and for the researcher to collect and analyse; in addition they reduce the likelihood of respondents giving an ambiguous response. ‘Open-ended’ questions are used in questionnaires to give the respondents the opportunity to answer the questions by choosing any methods that allows them to express themselves in their own words. However, the information and details given by the respondents may in some cases get lost (Nachmais and Nachmais, 1993). Considering both the options, this study utilized ‘closed-ended’ type of questions and a few optional ‘open-ended’ questions as the main style of questionnaire.

As for further question format, Likert-scale questions based on five categories (‘strongly disagree’, ‘disagree’, ’neutral’, ‘agree’ and ‘strongly agree’) were utilised in order to avoid overloading the options and to make it easy to answer. This particular format is expected to lead to an improved response rate. Likert-scale formatting has been utilized in most questions in the second part of the questionnaire used for this study and in the rest of the questionnaire to provide the respondents with the option to express their preference in terms of how strongly they agree or disagree with the statements provided. In addition, the first part of the questionnaire mainly incorporated questions regarding general information along with multiple choice questions.

5.7.2.2. Questionnaire Design

Through the questionnaire design process, certain criteria need to be effectively investigated and taken into account by the researcher, such as making sure that the questionnaire is clear and comprehensible to the prospective respondents, ensuring that the questionnaires reach the appropriate participants and that respondents are motivated to complete and return the questionnaires, and arranging for the return of questionnaires (Johnson, 1994). It is a fact that questionnaire surveys have been used widely by numerous quality management practitioners and researchers to measure TQM implementation (Anderson *et al.*, 1995).

As for this research, the process of designing and developing the questionnaire was carried out after an extensive review of the most relevant previous literature that included, among others, books, articles, journals, internet materials, and PhD theses. In addition, the researcher reviewed previous questionnaires on the subject of TQM in order to draw up the final version of the questionnaire. This was done in order to ensure that the content and the structure of the questionnaire are completely valid.

Indeed, to ensure the questionnaire’s validity and reliability and to maximize the response rate, it was necessary to give careful consideration to the design of each question, lucid explanation of the purpose of the questionnaire, clear layout of the questionnaire form, and pilot testing (Saunders *et. al*., 2000). Indeed, the researcher considered certain factors when designing the questionnaire such as length of

questionnaire[1], clarity and unambiguous nature of the question[2], and also the objectives of the questions. The questionnaire was designed to target all levels of managerial categories , namely top management, middle management, controllers, heads of divisions, administrators, supervisors, and coordinators, of fully-owned Libyan oil and gas organisations. The questionnaire consists of 94 questions and is divided into three main parts (see Appendix 5.2a for the questionnaire).

Part one consists of seven questions (question 1 to question7) and deals with demographic information.

Part two deals with awareness and understanding and contains five sections:. Section 1 deals with respondents' understanding and awareness of quality concept; Section 2 aims to measure respondents' knowledge and understanding of quality management techniques; Section 3 focuses on respondents' knowledge and understanding of the concept of TQM; Section 4 aims to investigate respondents' knowledge and awareness of the necessity of TQM; and Section 5 consists of five questions (questions 12 to 16) covering the awareness and understanding of the participants regarding TQM.

Part three consists of fifteen sections and deals with possible obstacles and barriers to the implementation of TQM. Section 1 consists of eleven questions (question 17 to question 27) which are intended to gauge whether top management and leaders are a possible obstacle to the successful and effective implementation of TQM within the oil and gas sector. Section 2 consists of four questions (question 28 to question 31), which test whether organisational culture is a possible obstacle to the successful and effective implementation of TQM within the sector. Section 3 consists of five questions (questions 32 to 36), which are intended to measure whether employee involvement and empowerment are a possible obstacle to the successful and effective implementation of TQM within the sector. Section 4 consists of five questions (questions 37 to 41), which are intended to explore whether employee resistance to change is a possible obstacle to the successful and effective implementation of TQM within the sector. Section 5 includes five questions (questions 42 to 46), which are

[1]Long questionnaires as a general rule have a lower response rate than short questionnaires. However the content of the questions is more important than length.
[2] The researcher attempted to eliminate the possibility that the questions would mean different things to different respondents.

intended to measure whether lack of quality strategic planning is a possible obstacle to the successful and effective implementation of TQM within the sector. Section 6 consists of eight questions (question 47 to 54), which are intended to explore whether lack of employee training, development and education are a possible obstacle to the successful and effective implementation of TQM within the sector.

Section 7 includes five questions (question 55 to 59), which are intended to gauge whether lack of information and communication is a possible obstacle to the successful and effective implementation of TQM within the sector. Section 8 consists of seven questions (questions 60 to 66), which are intended to measure whether lack of continuous improvement and innovation is a possible obstacle to the successful and effective implementation of TQM within the sector. Section 9 includes four questions (questions 67 to 70), which are intended to explore whether lack of team work is a possible obstacle to the successful and effective implementation of TQM within the sector. Section 10 consists of five questions (question 71 to 75), which are intended to gauge whether lack of internal and external customer satisfaction is a possible obstacle to the successful and effective implementation of TQM within the sector. Section 11 consists of four questions (question 76 to 79), which are intended to measure whether lack of measurement and evaluation is a possible obstacle to the successful and effective implementation of TQM within the sector.

Section 12 consists of three questions (question 80 to 82), which are intended to determine whether lack of government support is a possible obstacle to the successful and effective implementation of TQM within the sector. Section 13 includes questions regarding gender (question 83 to 88), which are intended to measure whether lack of resources and requirements of TQM are possible obstacles to the successful and effective implementation of TQM within the sector. Section 14 consists of four questions (question 89 to 92), which are intended to determine whether poor management style is a possible obstacle to TQM within the sector. Section 15 consists of two questions (question 93 to 94); question (93) is intended to explore further obstacles and barriers to the application; question 94 is designed to collect and gain comments or notes from the participants regarding the implementation of TQM within their organisation through open ended questions.

5.7.2.3. Administering questionnaires

When the researcher intends to target particular groups of people and/or their work place and the survey is limited to a local area of research that deals with behavioural aspects of human beings, the personally-administered questionnaire is one of the most popular survey methods used in the area of social science research and also a suitable and convenient way of collecting data (Sekaran, 1992). With this type of method the researcher is able to explain the purpose and the importance of the research, to have personal contact with the respondents, and to clarify any questions that the respondent may have (Kumar, 1999). The use of this method perhaps requires less skill to administer than others, such as conducting interviews; in addition it assists in obtaining completed questionnaires within a reasonably limited period of time. Moreover, this method allows the researcher to check all the questionnaires in terms of completeness (Oppenheim, 1992). However, the main disadvantage of employing this method is that individuals and organisations might be reluctant to give up company time for the survey (Sekaran, 2000).

Mailed questionnaire is another way of administering questionnaire survey. Sending the questionnaire to prospective respondents by mail is the most common way of gathering data (Kumar, 1999). With this technique the respondent is usually provided with a stamped addressed envelope and/or specific address (email) and asked to complete the questionnaire form and mail it back to the researcher or a representative. An important factor in increasing the response rate with the method is a good covering letter, and the questionnaire should be structured with closed-ended style of questions. For the present study the researcher used both personally-administered questionnaires and mailed questionnaires. However, in the case of latter the researcher relayed them via the internal network[3] in some organisations to help in the process of distribution and collection of some of the questionnaires. In either event, the completed questionnaires either returned on the spot or later by post[4] or in person. In

[3] Some organisations have an internal email system which most manager levels (top management, middle management, controllers, heads of divisions) can use internally; the researcher used this technique to distribute some of the questionnaires.

[4] The sample organisations have internal post which they use to collect and distribute their documents. The researcher used this to collect some of the questionnaires.

terms of the questionnaire time, a cross-sectional[5] survey was used to collect the information from the target population.

As for the actual process of administering the questionnaires, once the researcher obtained permission from the supervisor to conduct the field study the actual data collection process was carried out in the period between the 2ed of November 2010 and 6th January 2011 just before the Libyan Arab Spring commenced in February 2011. The researcher distributed 210 copies of the questionnaire among different levels of management and leaders, namely top management, middle management, supervisors, controllers, heads of division, administrators, and coordinators, in three of the identified oil and gas organisations (AGOCO, RASCO and SOC) in Libya.

During the visits made to the identified organisations, the target respondents were given a survey questionnaire form consisting of 12 pages to be answered individually at their own pace and returned to the researcher at a collection point or by post once completed. It should be noted that the participants were randomly selected and were asked about their willingness and desire to participate in the study survey.

Once consent was obtained from the participant, a copy of the questionnaire form either in English or Arabic language was given to potential participant, based on their language preference. Before being given the questionnaire form to complete, the respondents were given a brief explanation of the general purpose of the questionnaire in order to ensure their accurate and appropriate response to enhance the efficiency of the return rate.

In fact, most of the prospective respondents were approached personally by the researcher. Those who received the questionnaire in person were given enough time to complete it and in order to avoid bias to the response they were not disturbed during the process. Nevertheless, the participants were allowed to ask questions, for explanation and clarification regarding special terms or statements on certain sections/area related to TQM. In addition, the researcher attempted to distribute the

[5] Cross-sectional: the meaning of this technique is that the distributions of the questionnaires take place at a single point in time, whether days, weeks or months, in order to answer the questions raised by researchers from prospective participants (Sakaran, 1992). Another technique is Longitudinal: this refers to the process where the collection of data occurs at several points in time (Bryman and Bell, 2007).

survey form at an appropriate time when the respondents had the energy and enthusiasm to fill out the form. Moreover, in order to make respondents more comfortable about participating in the process they were assured that all information and data provided would be treated as highly confidential. The completed questionnaires were returned to the researcher or to a collection point[6] either on the same day or at a later date, according to the preference of the participants.

5.7.2.4. Response rate

In this research, as can be seen in Table 5.3, out of 210 questionnaires that were distributed to the Libyan oil and gas companies (managers' and leaders' levels) 172 were returned, of which 120 questionnaires were perfectly usable for the final analysis and dissection, resulting in a response rate of 57%. The other 52 questionnaires were excluded from the analysis due to missing data. The view taken is that the omission of this data may have been because the respondents did not have enough time to fill in all the sections of the questionnaire or they may have lacked sufficient knowledge or confidence to provide answers concerning the TQM issue. In either event, the data were excluded as it was impossible to discriminate between the various reasons.

Table 5.3: Number of Respondents and Response Rate

Description	Number	% Rate
Distributed questionnaires	210	100
Total response	172	81.9
Usable questionnaire	120	57.1

5.7.2.5. Translation of the Questionnaire

The first version of the questionnaire was originally written in English and was validated through feedback from professional colleagues in academics and industry The English version was then translated into Arabic by professionals from the university and industry, each of whom was fluent in English and Arabic. However, both versions of the questionnaire were distributed because some of the participants understand both languages very well; this was to ensure that every respondent could

[6] Each department has its representative or collection point for the completed questionnaires; the researcher discussed this matter with the heads of the department of targeted respondents to obtain cooperation, especially regarding those who were late submitting their completed forms. Therefore, with their kind and unlimited help the researcher was able to collect the rest of the completed questionnaires in each organisation smoothly.

understand and answer the questions and also to avoid misunderstandings regarding the meanings of the questions.

5.7.3. Data Collection Process: Semi-Structured Interviews

In social research, interviewing technique is considered an extremely powerful research tool (Nachmias, 1992). As an another method of data collection, interviews are defined as "a conversation with a purpose" (Hannagan, 1986:37). As reported by Greenfield (1996:169), Patton (1980) states that "the purpose of interviews is to find out what is in and on someone else's mind. We interview people to find out from them those things we cannot directly observe". In fact, there are numerous advantages of using interviews. Table 5.4 illustrates these advantages.

Table 5.4: Advantages of Interviews

Advantages
"Length, the possibility of great length." (Oppenheim, 1992; Nachmias and Nachmias, 1992; Sarantakos, 2005:286).
"Spontaneous answers can be recorded." (Sarantakos, 2005:286).
"Data, time and place of the interview is highly controlled" (Nachmias and Nachmias, 1992; Sarantakos, 2005:286).
"The respondent controlled over their identity." (Nachmias and Nachmias, 1992; Sarantakos, 2005:286).
"Ability to handle complexity." (Sarantakos, 2005:286).
"The order of the questions can be controlled." (Nachmias and Nachmias, 1992; Sarantakos, 2005:285).
"Misunderstandings by respondents can be correcting easily." (Sarantakos, 2005:285).
"Non-verbal behaviour can be observed." (Sarantakos, 2005:285).
"Environment is under control." (Nachmias and Nachmias, 1992; Sarantakos, 2005:285).
No complex documents, so easy administration (Sarantakos, 2005).
"The response rate is extremely high." (Nachmias and Nachmias, 1992:228; Oppenheim, 1992 Sarantakos, 2005:285).
People in various different positions can be met in flexible way (King, 1994 and 2004; Nachmias and Nachmias, 1992; Sarantakos, 2005; Van der Velde *et al*., 2004).
Answers can be probed in more depth (Hussey and Hussey, 1997; Bell, 1999; Saunders *et al*., 2007).
Chances to investigate the meaning, so significance can be add to the data (Bell, 1999; Saunders *et al*., 2007).
Opportunity to collect rich and detailed set of data (Van der Velde *et al*., 2004; Saunders *et al*., 2007; King, 1994 and 2004; Nachmias and Nachmias, 1992).

In sum, as an advantage, the interview technique allows the researcher to gain a rich insight into people's experiences, opinions feelings and attitudes (May, 1997).

5.7.3.1. Interview format

As regards to interview format, there are three types, namely: the unstructured interview, semi-structured interview and structured interview. A broad distinction is made between these as depicted in Table 5.5. It should be taken into account that when the researcher intends to gather both structured information and information about beliefs and attitudes, the semi-structured interview is the best technique to use (Moore, 2000). It is widely employed as the sole method or in combination with other types of method (Robson, 2002), as in this study.

Table 5.5: Distinction between Interview Formats

	Focused / Unstandardized / Unstructured interview	**semi-standardised / Semi-structured interview**	**Standardised/ Structured interview**
Nature	Intensive - Informal	Format is less rigid	Formal **interview**
Tool			Schedule interview
Nature of questions	Questions not arranged formerly and entirely open-ended	Structure not essential Standardised Open-ended	-Responses are mostly comparable - Consistent order and systematic - Uniform structure is enforcing on the interview process -Instruction on how to respond to question or ask
Utilize	evaluation study at the beginning point	Mostly controlled over the research instrument allow for more information	Provide a good idea on what the relevant questions are
Interviewee(s)	Flexibility in giving definition of a situation		

According to Moore (2000), semi-structured interviews are used to reveal issue(s) outside the tight constraints of other types of interview such as the structured interview survey. In the semi-structured interview the questions to be asked and participants to be interviewed are determined beforehand (Ghauri and Gronhaug, 2002). It is worth mentioning that the most appropriate type of interview is one where the logic of the questions varies and the questions are either open-ended or complex (Saunders *et al*., 2007). Additionally, participants might be more willing to be involved in an interview than a structured questionnaire. In this vein, Saunders *et al.* (2007) report that, "We have found that managers are more likely to agree to be

interviewed, rather than complete a questionnaire". Hence, it should be noted that attention needs to be paid to how interviews are conducted.

This is further explained by Potter and Hepburn (2005:300) who state that, "Although qualitative interviews are treated as relatively easy to perform, they are very hard to do well". As in the semi-structured interview the interviewer is required to ask additional questions as they see fit, to examine related issue(s) that occur during the interview (Smith, 2003). It is obvious that the situation must be controlled by the researcher and also he/she should be able to ask the right questions, develop trust and adapt to unexpected situations while collecting data through semi-structured interviews (Ghauri and Grønhaug, 2002). Indeed, in business studies, semi-structured interviews are used widely and extensively as data collection methods. Using semi-structured interviews actually has various advantages from both the interviewer's and the interviewee's perspective; it allows the interviewees' facial expressions to be observed, as well as body language and additional information and details to be sought. Additionally, interviewers can discuss the interview in depth and answer any particular questions the interviewees might have (Adams and Schvaneveldt, 1991).

In addition, the semi-structured interview enables the interviewer to enter unpredicted areas, facilitates rapport, tends to produce richer data, and allows a great flexibility of coverage (Jonathan *et al.*, 1995). It should be noted that using semi-structured interviews, in the current research has provided many benefits, allowing the researcher to identify the purpose of the interview, to ask several open-ended questions, to modify the questions where it was thought to be necessary, to communicate effectively and build trust with the participants to make them comfortable and willing to provide truthful data, to explain to the participants how and why they were chosen and the importance of their participation, and ultimately to provide the in-depth data required.

Since the most common method of interview format used in the literature is the semi-structured interview, for this study the semi-structured interview method is considered to be the most suitable method to satisfy the aims and objectives of the current study, because its questions can be open ended and therefore it allows the interviewer to explore a set of issues with each respondent. The semi-structured interviews were

conducted during face-to-face meetings with company managers, members of management committee and heads of quality departments.

In addition to the questionnaires, 20 interviews were carried out in gathering the required data for this study with company managers (see Appendix 5.2b for the interview format), members of the management committee of the sample organisations, heads of quality departments[7], and heads of divisions of quality departments.

5.7.3.2. Administrating the interview

During the first visit to the organisation, letters[8] were presented to organisation management explaining the main purpose for conducting the interviews and advising that the information would be used for independent research only. It is worthwhile noting that the support and cooperation for this research was significant and considerable. This support took a variety of forms including the issue of permission and verbal orders (some organisations provided the researcher with an office in which to do the work) from different levels; from organisation managers to heads of departments of the organisation, from head managers to departmental managers and from departmental managers to heads of divisions and to office managers and so on. The fact is that it was extremely important to receive such support and crucial in order to address any possible obstacles and difficulties posed by management bureaucracy and routine. In fact, the process of conducting each interview in all the organisations began with a few minutes of introduction, followed by a discussion concerning the aims and objectives of the present study which helped to put the participants at ease about the purpose of the interview and also efforts were made to make interviewees talk informally on the one hand, and, on other hand to ensure that there was as little disturbance as possible. Finally, participants were thanked for agreeing to be interviewed and for giving their time and effort.

It is also worth mentioning that the researcher carefully avoided giving an opinion on the issues discussed and care was always taken to follow the sequence of questions

[7] Some organisations do not have a quality department, but a quality committee (with plans to become a department in the near future).
[8] The researcher obtained various letters in order to facilitate the process of conducting this study; these letters include supervisor letter, embassy letter, security affairs letter, manufacture security letter.

outlined in the interview guide with the objective of avoiding bias in the process of interviewing.

To ensure accuracy, extensive notes were taken during the interviews and immediately and carefully reviewed after each interview. It should be noted that taking notes detracts from the flow of the interview; however it does produce data for analysis in a simple form. In this respect, the researcher took extensive notes during each interview, therefore vital and critical points and issue(s) were not missed. In addition, all interviewees were informed before the interviews began that, if possible, the interview would be recorded. This is done according to Edwards, (1990:22) in order to "keep the language of the interviewees and to maintain a conversational atmosphere". With the participants' permission, all interviews fortunately were tape recorded; this is consistent with the view of Patton (1990) who states that a tape recorder is indispensable. In other words, tape recording ensures that all details and information imparted by the participants are reported accurately and allows more detailed study than written notes do. In this regard, Brown *et al*. (1981) state that taping offers a permanent verbatim recording of the account which allows the researcher to pay total attention to both the verbal and non-verbal behaviour of the participant/interviewee. Most interviews for this study took place in the interviewees' offices and the duration of the interviews ranged approximately from between one to two hours.

5.7.4. Data collection Process: Documentary Analysis

The researcher also accessed documentation (data collection secondary source) such as written materials. This technique provided the researcher with a good understanding of the issue(s) under investigation and overall research objectives to be achieved. Documentary source is not a substitute for other types of data; for instance, it is difficult or impossible to learn from written records alone how the operation of an organisation is carried out. According to Silverman, (2004) the work documentary could be the main undertaking of qualitative research. It should be noted that the information and data gained from the documents assisted the researcher to develop a general understanding of TQM implementation within the sample sector. As Yin (2003: 87) claims, "the most important use of documents is to corroborate and augment evidence from other sources."

The documentation used in the present research (secondary source) consists of official sources, such as published reports, leaflets, and certifications (e.g. ISO 9001; OHSAS 18001 and ISO 14001) of the organisations. Most of the documentation was collected from the oil companies, namely SOC, RASCO and AGOCO. The key reasons behind using documentary analysis are to assess and evaluate the quality and reliability of the data collected by several methods, to avoid repeating the process of data collection by using other methods due to time limitation, and lastly it provides a context that can be used to judge the appropriateness of data collected by several methods.

5.7.5. Pilot Study

The pilot study is a rehearsal of the main study and a small-scale replica (Sarantakos, 1993). The process of evaluating the questionnaire is called pretesting or pilot testing (de vaus, 2002). The use of a pilot study aims to ensure the clarity of the questions by obtaining feedback from a small number of the targeted population, which is considered as a small experiment designed to test logistics and to gather comments and information prior to a main study, in order to enhance the latter's quality, suitability and efficiency (Yates, 2004). It is the most important preliminary step before the actual distribution of the questionnaire and interview. In fact, the interview and questionnaire survey has to be checked in advance in order to ensure that it works as proposed (Oppenheim, 1992). According to Zikmund (2000) and Sekaran (1992), the main purpose of conducting a pilot test is to check whether the questions will be understood by the participants.

It is worth mentioning that the main purpose of the pilot study is relevant to both quantitative and qualitative research. In qualitative research, it aims to establish whether: the respondent is accessible; techniques/method of data collection generates enough information; the location is convenient; the plan of study is well constructed; and any amendments or adjustments are actually needed (Sarantakos, 1993). In addition, the pilot study can assist the researcher to address any difficulties/barriers in order to gain the participants' trust and cooperation, and also to achieve the purpose of the study. Moreover, the pilot study allows the researcher to understand the validity and reliability of instruments/tools used and accordingly improves the quality of the final data collected (Miles and Huberman, 1994).

As for the pilot study for this research, the outcome of the pilot study helped the researcher to find how clear the questions and structure were 18 English and Arabic version of the valid questionnaire along with three interview schedule were distributed to a small random sample of individuals (managers), who were very similar to the target population. All respondents completed their questionnaires and interviews and provided feedback to the researcher concerning the clarity and suitability of the questions in the questionnaire and semi-structured interview. However, the results from the pilot study resulted in no noticeable difference to the original questionnaire and interview.

5.7.6. Research Population and Sampling

Population refers to "the entire groups, events or things of interest that the researcher wishes to investigate" (Sekaran, 2000:266). For the purpose of this study, the researcher has identified managerial categories in all oil and gas organisations (top management, middle management, supervisors, controllers, heads of division, administrators and coordinators) as the research population.

The target population of this research consists of fully-owned and large oil and gas organizations primarily engaged in processing and producing oil and gas in Libya. In addition, the survey population size is five organisations. However, the actual population size was three organisations due to certain conditions, difficulties, and limitations (this will be discussed with regard to limitations).

Sampling involves any procedure that uses parts of the population or that uses a small number of items in order to draw a conclusion regarding the whole population. According to Easterby-Smith *et al*. (1991:122) "the main aim of sampling is to construct a sub-set of the population which is fully representative in the main areas of interest". Miles and Huberman (1994:27) report a similar approach, maintaining "you cannot study everyone everywhere doing everything".

It should be noted that utilising a small sample of a population saves the researcher time, effort and money that would otherwise be involved if they were to study the entire population (Borg and Gall, 1989).

Sampling should be both based on sound methodological principles and fully representative of the population. The selection sample units must be objectively, clearly, systematically and easily identified. The units chosen should be similarly sized, independent, uniform, and consistent for the duration of the survey. In this vein, Sarantakos, (1998) states that the selection process of the sample should contain no distortion and errors due to bias. According to Punch (1998) there are two types of sampling approach, probability and non-probability.

Within each approach there are various methods of sampling. The characteristics of the population and the resources available to the researcher are the key factor of choosing which technique to use. The main sampling method is probability sampling, but others are also considered to be efficient, such as non-probability techniques which include techniques such as snowball and convenience sampling (Smith, 2003 and Collis and Hussey, 2003). Furthermore, purposive sampling implies targeting the potential respondents who are considered to be the best individuals to provide the expected information, such as the people working in the identified organisations in this study. For this study, purposive sampling method is used.

As for justifying the selection of the oil and gas sector, there are various reasons for the researcher choosing oil and gas organisations including the fact that it is the single most important sector for Libya in terms of its contribution to GDP, "Oil and gas accounts for more than 60% of the national GDP" (Porter and Yergin, 2006:79) and income generated from this sector is used for economic and social development in Libya. The sector employs the biggest foreign investment and the most exports, "almost 80% of all foreign investment and over 95% of all Libyan exports" (Porter and Yergin, 2006:79).

It should be noted that there have been no previous studies regarding TQM implementation specifically in relation to the obstacles and barriers facing it and preventing these organisations from successfully and effectively applying it in the Libyan context, particularly in the energy sector. Given the importance of the oil and gas sector for the Libyan economy, the researcher considers it a good field in which to practise the implementation of TQM.

The oil and gas sector in Libya actually suffers from various problems such as migration of employees and other related issues. However, several factors justify the selection of AGOCO, RASCO, and SOC as they have particular characteristics namely; ISO certification such as ISO 14001:2004, ISO 9001:2000, OHSAS 18001:2007, *etc*, large, and public organisation (see Chapter Four).

5.8. DATA VALIDITY AND RELIABILITY

Various methods were used in order to examine the reliability and validity of the study including literature review, pilot testing, academic and practitioners' evaluation, and internal consistency analysis, etc.

5.8.1. Reliability

Reliability is considered as the most important factor in any empirical research. Reliability refers to the extent to which a technique or test functions accurately and consistently by yielding the same results (Kvale, 2007). In other words, it is concerned with the consistency of the outcomes reached in repeated situations. Newman and McNeil (1998:205) define reliability as "the extent to which a variable yields the same value on repeated measures". In other words, when the same research method/approach, data collection procedures, technique and analysis are utilized and then applied to a second research sample the researcher should arrive at the same findings as in the prior research.

It should be emphasised that ensuring reliability depends on certain criteria such as a good research design and accurately and clearly examining the research questions through an inclusive appropriate plan, to obtain full evidence and complete analysis (Ryan *et al*., 2002). For this research reliability was fulfilled in the pilot study as all the participants were subjected to the same sequence of questionnaire and interview questions (Fontana and Frey, 2005). In addition, the researcher employed Cronbach's alpha coefficient to gauge reliability, as is common and widely used in most researches in confirming reliability. Cronbach's alpha test ranges between zero (0) when the true score is not measured at all and there is only an error component and one (1) when all items measure only the true score and there is no error component. Indeed, the higher the Alpha Coefficient is, the more reliable the scale (De Vaus,

1990). It should be noted that Cronbach's alpha for this study is found to be 0.83, which is rather high indicating reliability in the questionnaire schedule.

5.8.2. Validity

Validity is another very important aspect in any research method. Consequently, it is essential to employ a valid tool for any research to be successful. Validity refers to the accuracy and trustworthiness of instruments and data findings in the research (Babbie, 2005).

According to Creswell (2007), validity is concerned with the correctness and accuracy of the scientific findings in a study; hence the researcher should establish the degree to which the findings effectively and successfully reflect the empirical reality of human experiences. It is worth mentioning that there are three basic ways in which to access validity, namely construct, internal and external validity (for further information see: Kvale, 2007); Spencer *et.al*, 2003). Black (1999:75) states that "to ensure validity, any instrument must measure what was intended". In other words 'validity' is the ability of the measurement tool to assess what it is supposed to measure (Aaker *et al*, 1998). Therefore, the validity of the questionnaire and interview in this study was obtained from different experienced researchers and practical professionals who participated in the pilot study.

In addition, Modell (2009), states that triangulation, can be seen as a useful means of validity. This is further illustrated by Scapens (1990) who states that triangulation tends to improve the validity of evidence. Rubin and Rubin (1995) state that designing and conducting an interview is the best way to achieve credibility of qualitative work. Consequently, the researcher in the present study is considered to be reached validity by checking and validating the data regarding the application of TQM in the organisations, obtained from the (managerial categories), by interviewing company managers, members of management committees, heads of quality departments and heads of divisions of quality departments as well as examining company documents. Therefore, triangulation (questionnaire, interview and documentation) was employed to ensure validity.

5.9. RESEARCH METHOD FOR DATA ANALYSIS: ANALYSES METHODS

One of the most difficult parts of the research process is data analysis. Consequently,

it is the stage where the researcher has to select an appropriate statistical technique, which can satisfy the research objectives and is consistent with the type of questions and hypotheses. There were two categories of primary data to analyse, questionnaires and semi-structured interviews and hence the data analysis methods were selected accordingly.

5.9.1. Analysing Questionnaire Data

For this research 120 questionnaires were transformed into numerical values/codified and entered into a spread sheet in SPSS version 19.0 in order to analyse the data. Consequently, most of the coding process was in the form of a Likert Scale.

Table 5.6: Coding through Likert Scale

Likert scale	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Coding number	1	2	3	4	5

In the present study, a variety of statistical techniques/tools were utilised for the purpose of primary data collected through the questionnaires. Accordingly, it is very important for a researcher to pay attention to the way of selecting the appropriate data analysis techniques, because appropriate data analysis will enable the researcher to obtain valuable interpretative results which will lead to a meaningful conclusion that meets the research aims. In this regard, the researcher undertook some techniques in order to reach the ultimate goal of the study. These statistical methods involve descriptive analysis (in the form of percentages, means and standard deviations) and analytical or inferential methods (in the form of Kruksal-Wallis) as described below:

Descriptive method: The key purpose of such analysis is to organize the participants' responses into the language of numbers such as frequencies and percentages by mainly calculating the mean, median, mode frequency distribution, percentage distribution, rank and standard deviation. Descriptive analysis enables the researcher to obtain a general overview of issues under investigation.

As this study involves people's perceptions/opinions or judgments on the application of TQM and its obstacles, it is appropriate to analyse the respondents' return in terms of the behaviour of different statistical methods. This study uses a form of descriptive analysis: percentages, mean and standard deviation. The results of the distributions have been analysed and described as presented in the descriptive analysis chapter (Chapter Six).

Analytical methods: These analysis methods help to establish correlations and relations between variables and then test them for further interference. In this study, mainly Kruksal-Wallis non-parametric tests were utilised, which compares the significance differences of more than two independent groups in relation to certain control groups.

The use of non-parametric test is due to the fact that the data collected for this study through the questionnaire was through purposive sampling which violated one of the assumptions of normality.

5.9.2. Analysing Interview Data

There are many ways to analyze information and data (Taylor & Bogdan, 1984; Mahrer, 1988 and Spradley, 1979) thematic analysis is one of such way.It should be noted that thematic analysis is one of the most common form of qualitative analysis used as a method for identifying, analysing, emphasizes pinpointing, examining and reporting patterns (themes) within data (Guest, 2012 and Braun and Clarke, 2006). It also often goes further to interpret various aspects of the research topic in the form of 'Themes', as themes are patterns across data sets which are critical to the description of a phenomenon and are related to a specific research question (Boyatzis, 1998) and Daly and Gliksman, 1997). In addition, themes develop into categories for analysis (Fereday and Cochrane, 2006).

As for the data collected through interviews, thematic analysis is performed through the process of coding generally in six stages in order to create established, meaningful patterns. These stages are: (i) familiarization with data; (ii) generating initial codes;(iii) searching for themes among codes; (iv) reviewing themes; (v) defining and naming themes; (vi) and producing the final report (Braun & Clarke, 2006 and Guest and Namey, 2012).

Indeed, there are many advantages of using thematic analysis as method of interview analysis, which are as fallowing; high flexibility, relatively quick and easy method to do, useful way for working within participatory research paradigm, with participants as collaborators, it is usefully in summarising key features of a large body of data, as well as offering a 'thick description' of the data set, it is highlighting similarities and differences across the data set and also it can be generated unanticipated insights.

5.10. ETHICAL CONSIDERATIONS

In order to facilitate access to the oil and gas sector for data collection purposes, a request letter with the Durham University letterhead was sent to AGOCO, RASCO, Waha Oil Company (WOC), Zawia Oil Refining Company (ZORC) and SOC (case study organisations), outlining the aims, scope and the nature of the research. In addition, based on this letter, the Libyan Embassy issued letters in Arabic to the above-mentioned organisation to confirm the identity of the researcher and their responsibility for the researcher. These letters asked for permission to enter the organisations and requested the companies to assist the researcher by providing the necessary and required data.

Formal written permission was gained from AGOCO, RASCO, WOC and SOC to undertake the research. In addition, during the data collection stage, the researcher followed the procedure and principles of research ethics outlined in the letter approved by the University Ethical Approval Committee of Durham University in October 2010 (see Appendix 5.1), which provides ethical clearance. In view of this, the researcher explained the objectives and nature of the research and how the data and information would be treated in terms of anonymity, full privacy, honesty, and confidentiality. Furthermore, consent from the interviewees was granted individually

5.11. RESEARCH LIMITATIONS AND DIFFICULTIES

No research can be carried out without certain limitations, obstacles and difficulties, especially, during the process of conducting the questionnaires and interviews. This is particularly so when the researcher intends to ask many questions of managerial categories or members of staff and this was one of the most critical and difficult stages in the research.

In this regard, the researcher, through the whole period and process of the research, faced various difficulties; some of these problems were considered routine, whereas others were very important and critical. These limitations and difficulties can be summarised as follows:

(i) During the questionnaire administration and data gathering process the researcher was faced with some restrictions due to the bureaucratic procedure, nature and culture

of Libyan society. For instance, some organisations refused to co-operate and others took longer (days or weeks) to provide permission to enter the organisation and to distribute the questionnaires and interviews. Consequently, the researcher used his personal relations to facilitate the process and obtained the required data.

(ii) As the focus of this research is only on fully-owned oil and gas organisations, the researcher found on the first visit that some organisations dealt with foreign organisations (production sharing agreements with foreign direct investment); therefore, these were excluded from the study.

(iii) The researcher in some cases had to arrange more than three visits to collect the completed questionnaires and also had to wait for a long time (sometimes three to four hours or more) to conduct the interview with the targeted participant.

(iv) The number of responsible employees (especially those controlling the process of providing access permission) and some participants in some Libyan oil and gas organisations are not as familiar with research as those in other organisations. In addition, some of them do not realise the importance and benefits of research and its influence on their lives (some managers). Once the researcher had managed to meet the right participants, the researcher noted that some of the participants were unaware of TQM techniques, terminology, and its importance; therefore, it was necessary to explain the meanings of various terms and techniques to them as well as the purpose of the research and the survey. On the other hand, many participants were happy and completely willing to answer the questions without any help since they were fully aware of the subject.

(v) As the oil and gas organisations are located in different geographical locations, it was necessary to spend a great deal of time, effort and money travelling between towns and cities, as well as within the organisations (since some organisations are designed like a small town it is very difficult to reach each building on foot).

CHAPTER 6

LOCATING PERCEPTIONS ON ASPECTS OF TQM PRACTICE IN LIBYAN OIL AND GAS ORGANISATIONS: DESCRIPTIVE ANALYSIS

6.1. INTRODUCTION

This chapter presents the results of empirical analyses conducted with the primary data collected through questionnaire survey as explained in Chapter 5. Descriptive analysis is used to identify and summarize variables were identified. The data was analysed utilizing SPSS (Statistical Package for Social Scientists 19) software by including frequency tables and central tendency, such as means, medians, and standard deviations. It should be noted that the presentation of the descriptive data closely follows the structure of the questionnaires survey.

The first part relates to the demographic characteristic of the respondents, while part two explores awareness and understanding related to TQM related concepts. Part three presents the findings related to obstacles and barriers to the implementation of TQM, and part four presents chapter conclusion.

6.2. THE DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

This part briefly describes and analyses demographic characteristics of the respondents and the related categories from the sample. The descriptive analysis in this part mainly utilises describe methods.

6.2.1. Distribution of the Respondents According to Companies

As can be seen in Table 6.1, 45.0% of the respondents are from Arabian Gulf Oil Company (AGOCO) which is located in Bengazi (in the east of Libya), 36.7% are from Ras Lanuf Oil and Gas Processing Company (RASCO) which is located in Ras Lanuf city (Eastern Tripoli 650 Km), the remaining respondents, namely 25.8% were from Sirte Oil Company (SOC) which is in Al Braga city (west of Bengazi about 210

km). The distribution of the respondents was quite equal across the sample companies, which provides the researcher with reliable and representative data.

Table 6.1: Respondents' Companies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Ras Lanuf Oil and Gas Processing Company (RASCO)	44	36.7	36.7	36.7
	Sirte Oil Company (SOC)	31	25.8	25.8	62.5
	Arabian Gulf Oil Company (AGOCO)	45	37.5	37.5	100.0
	Total	120	100.0	100.0	

(Data Analysis)

6.2.2. Position of the Respondents

As shown in Table 6.2, around 34.2% of the respondents are from the 'Head of Division' category and 24.2% from the 'Supervision' category. These two groups constitute more than half of all participants (58.4%) and represent first line management, policy participants and policy operators. The heads of division, as a position, should be considered as a bridge between the top management and employees of these companies.

Table 6.2: Position of the Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Top management	6	5.0	5.0	5.0
	Middle management	14	11.7	11.7	16.7
	Supervision	29	24.2	24.2	40.8
	Controller	9	7.5	7.5	48.3
	Heads of Divisions	41	34.2	34.2	82.5
	Administrative	15	12.5	12.5	95.0
	Coordinator	6	5.0	5.0	100.0
	Total	120	100.0	100.0	

(Data Analysis)

As depicted in Table 6.2, the participants from the 'Administrative and Middle Management' category constituted 12.5% and 11.7% respectively, followed by the 'Controller and Coordinator' group, which constituted 9.0% and 6.0% of the participants respectively. In fact, these two groups represent middle and junior managers and could lead the way in the successful and effective application of TQM in the selected sample. The decision makers or the top management is represented by 5.0% in the valid sample. They play a critical role in successful and effective TQM implementation and they are considered to be an extremely important factor in its

success. Overall, the diversity in the categories of managerial categories should provide reliable results.

6.2.3. Size of the Companies

As can be seen in Table 6.3, the majority of respondents (63.3%) are employed by companies which have more than 4001 employees (AGOCO and SOC), while 36.7% of the respondents are from companies with 3001-4000 employees (RASCO. These figures indicate that the oil and gas companies employ a significant number of citizens and therefore meeting their training needs and requirement could be a challenging task. However, in-house development and training is essential for the efficiency of the companies in question in order to prevent employee migration (especially professionals and specialists) by adapting a proper management philosophy such as TQM.

Table 6.3: Size of the Companies (Number of Employees)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3001 to 4000 Employees	44	36.7	36.7	36.7
	More than 4001 employees	76	63.3	63.3	100.0
	Total	120	100.0	100.0	

(Data Analysis)

Further, these figures reflect the fact that the three companies are considered as the biggest oil and gas companies in Libya and therefore they constitute the most important sector in the entire economy of the country.

6.2.4. Age of the Respondents

The questionnaire information indicates that the participants' ages range across the full spectrum from twenty to over sixty years of age.

Table 6.4, illustrates that the majority of respondents (35.8%) are from the 31-40 years old group, which implies that the youth category is highly represented among the present managerial categories level. This group would be expected to be more active and to possess the energy to drive the companies towards successful implementation, and to deal with management philosophy issues, including quality initiatives such as TQM. Also, as can be seen from Table 6.4, below, 33.3% of the

participants are aged between 41-50 years old, 25.0% are aged 51-60, only 4.2% are aged 20 -30, and lastly 1.7% are aged over sixty.

Table 6.4: Age of the Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20-30	5	4.2	4.2	4.2
	31- 40	43	35.8	35.8	40.0
	41- 50	40	33.3	33.3	73.3
	51-60	30	25.0	25.0	98.3
	More than 60	2	1.7	1.7	100.0
	Total	120	100.0	100.0	

(Data Analysis)

6.2.5. Qualification of Respondents

As can be seen from Table 6.5, the majority (45.8%) of respondents hold a minimum educational qualification of a bachelor's degree (undergraduate degree) in such areas as management, accounting, engineering, science, *etc*., followed by 32.5% with higher studies, such as master's degrees or PhDs. As the success of TQM implementation is very much dependent on education level, these findings are encouraging. In addition, better education level should be considered as an indication of peoples' responsiveness to TQM awareness and training.

Table 6.5: Qualification of Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Below secondary school	1	0.8	0.8	0.8
	Secondary certificate or equivalent	15	12.5	12.5	13.3
	Bachelor degree	55	45.8	45.8	59.2
	Higher studies	39	32.5	32.5	91.7
	High diploma	10	8.3	8.3	100.0
	Total	120	100.0	100.0	

(Data Analysis)

It should also be noted that the Secondary Certificate or equivalent and High Diploma holders are represented by 15.0% and 10.0%, respectively. These results may be explained by the fact that oil and gas companies employ well-educated staff to lead and also it reflects the fact that being a manager or achieving a high position still requires a good level of education and knowledge. It is also important to re-iterate that an educated overall workforce, especially first, middle and top management, is

necessary in order to adapt successful and effective application of TQM. The final category is the below secondary school group which represents the lowest group of respondents with a valid 0.8% of the total.

6.2.6. Duration of the Experience of the Respondents

As the results in Table 6.6 demonstrate, of the 120 respondents who completed the questionnaire, 24.2% of them have 5-10 years' experience in their job from, 20.0% have 11-15 years and 20% with 30 years or more of experience, the cumulative percent of the two categories (11-15years and 30 or more) represents around 40.0% of all respondents. This indicates that a longer period of experience might facilitate the process of quality transition and could also indicate wider knowledge of employees (at management level) about the actual situation in their company regarding quality, as well as ensuring accurate and sufficient answers to the questions being asked.

Table 6.6: Experience of the Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 5 years	1	0.8	0.8	0.8
	5-10	29	24.2	24.2	25.0
	11-15	24	20.0	20.0	45.0
	16-20	14	11.7	11.7	56.7
	21-25	17	14.2	14.2	70.8
	26-30	11	9.2	9.2	80.0
	30-more	24	20.0	20.0	100.0
	Total	120	100.0	100.0	

(Data Analysis)

It is also apparent from Table 6.6 that around 14.2% of the respondents have 21-25 years' experience; 11.7% have 16-20 years, and 9.2% have 26-30 years. A relatively low percentage of respondents (0.8%) have less than five years' experience, which indicates that Libyan oil and gas companies possess a high level of experienced management staff who are more likely to perform efficiently with an extensive understanding of their areas and departments. It is expected that with highly-experienced managers, the attitude would be positive and would help the researcher to collect valuable, accurate and relevant information.

6.3. EXPLORING AWARENESS AND UNDERSTANDING OF ASPECTS OF TQM

This part continues the discussion by providing a description and analysis of the findings regarding the participants' awareness and knowledge of quality and quality initiatives such as TQM; the main objective of this part is to explore and identify to what extent leaders and managers are aware of and understand the concept of TQM, the importance and necessity of the, and TQM philosophy. Therefore, five sections were designed in order to realise the objectives of this part.

6.3.1. Quality Awareness and Understanding

As regards to quality awareness and understanding, as shown in Table 6.7, the majority of respondents (31.7%) chose the category 'all of the above' which means they consider quality to include all the definitions mentioned in the awareness and understanding quality question.

Table 6.7: Quality Awareness and Understanding

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Quality is conformance to specification.	35	29.2	29.2	29.2
	Quality is performance at an acceptable price	33	27.5	27.5	56.7
	Quality is the level of fitness for function and purpose.	1	.8	.8	57.5
	Quality is strategic approach to survive for firms	7	5.8	5.8	63.3
	Quality is realized when customer satisfaction is maximized because the product/service fits its intended use.	4	3.3	3.3	66.7
	All of the above	38	31.7	31.7	98.3
	Other (please state):	2	1.7	1.7	100.0
	Total	120	100.0	100.0	

(Data Analysis)

A further 29.2% in Table 6.7 agreed with the statement that 'quality is conformance to specification'; almost a third (27.5%) answered that 'quality is performance at an acceptable price', while 5.8% supported the statement that 'quality is strategic approach to survival for firms'.

Of the 120 participants who completed the questionnaire, just 3.3% of them chose the statement that 'quality is realized when customer satisfaction is maximized because the product/service fits its intended use'. Only a small number (1.7%) chose 'other' as a definition of quality (their own definition of quality), and lastly 0.8% agreed with the statement that 'quality is the level of fitness for function and purpose'.

This result indicates that most of the respondents have a proper level of awareness and understanding of the term quality. However, different choices of definition can be attributed to the different background and area/department of the respondents along with their operation requirements.

6.3.2. Awareness and Understanding of Quality Management Techniques

From the results presented in Table 6.8, it can be seen that the majority of respondents, namely 60.0%, knew one of the quality management techniques, 'IS0 9001/2000-2008'; this could be because companies seek this certificate in order to respond to the internal and external requirements and pressures of competitiveness, market, clients and regulations, rather than for enhancement purposes. This was followed by 7.5% of the respondents who stated being aware of the quality techniques of 'Customer focus – Internal, External'. The results also show that quality management techniques '5 Ss or 5 Cs' and 'Management change strategies' are known by 4.2% and 3.3% of respondents respectively, and also a small percentage of respondents (2.5%) admitted that they were aware of 'Benchmarking' as a quality management technique.

Regarding the techniques of 'Supply chain' and 'Six Sigma', mere 1.7% of the respondents in each of these two groups answered that they were aware and knew such techniques. Furthermore, a minority of the respondents (0.8%) stated that they were aware of and fully understood SPC (Statistical Process Control) as a quality technique.

Table 6.8: Awareness and Understanding of Quality Management Techniques

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Supply chain	2	1.7	1.7	1.7
	5 Ss or 5 Cs	5	4.2	4.2	5.8
	SPC (Statistical Process Control)	1	0.8	0.8	6.7
	Six Sigma	2	1.7	1.7	8.3
	IS0 9001/2000-2008	72	60.0	60.0	68.3
	Customer focus – Internal -Extern	9	7.5	7.5	75.8
	Benchmarking	3	2.5	2.5	78.3
	Management change strategies	4	3.3	3.3	81.7
	None of these	22	18.3	18.3	100.0
	Total	120	100.0	100.0	

(Data Analysis)

It should be noted that there were still some gaps in terms of awareness and understanding of the quality techniques, which can be seen through the 'none of these' category which represents around 18.3% of the sample.

Accordingly, based on the results, it seems clear that there is lack of awareness and understanding of the quality management techniques to some extent among the leaders.

6.3.3. Awareness and Understanding of the Concept of TQM

As shown in Table 6.9, 40.8% of the respondents agreed with the statement that TQM is 'a system approach to management that aims to enhance value', the possible reason behind choosing this statement could be that participants perhaps understand the term 'value' to cover all aspects of the company including employees, operations, regulation, *etc*. In addition, around 22.5% of the respondents answered that TQM is 'an approach of managing to enhance the competitiveness'.

The results in Table 6.9 also show that around 18.3% of the respondents believe that TQM refers to 'Total: everyone in the organization is involved (suppliers and customers); Quality: meet the customer need and requirement; Management: top management are fully committed'. In addition, around 18.3% of the respondents opted for the definition that 'TQM is an approach or a philosophy to management'. Overall, almost two-thirds of the participants (63.3% compensation percentage) chose the statements which focus on the enhancement process, which could be seen as a positive indicator that they realise the benefits of successful TQM.

Table 6.9: Awareness and Understanding of the Concept of TQM

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A system approach to management that aims to enhance value	49	40.8	40.8	40.8
	Total: everyone in the organization is involved (suppliers and customers); Quality: meets the customers' needs and requirements; Management: top management are fully committed	22	18.3	18.3	59.2
	TQM is an approach or a philosophy of management	22	18.3	18.3	77.5
	An approach of managing to enhance the competitiveness	27	22.5	22.5	100.0
	Total	120	100.0	100.0	

(Data Analysis)

6.3.4. The Importance and Necessity of the TQM to the Companies

The results, as shown in Table 6.10, depicts that 75.0% of the respondents chose the statement 'improving the performance of organisation as a whole' as the key reason behind the importance and necessity of TQM to their company, whilst 13.3% of them stated that TQM is important and necessary due to the 'Competitive advantage' of it in reaching the global market.

Table 6.10: The Importance and Necessity of the TQM to the Companies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Improving the performance of organization as whole	90	75.0	75.0	75.0
	Competitive advantage	16	13.3	13.3	88.3
	Reducing waste and raising profit	6	5.0	5.0	93.3
	Enhancing company image	8	6.7	6.7	100.0
	Total	120	100.0	100.0	

(Data Analysis)

A relatively low percentage of the respondents, around 6.7%, agree with the statement that TQM is necessary and important due to its role in 'enhancing the company image'. Furthermore, 5.0% answered that 'reducing waste and raising profit' are the only reasons to adopt TQM initiatives. The results signify that the level of understanding of the reason behind adopting TQM among leaders could be considered as acceptable and satisfactory.

6.3.5. The Awareness and Understanding of TQM

Regarding the awareness and understanding of TQM, further questions were set out in order to understand the real situation in the oil and gas companies. Therefore, question 12 in Table 6.11, was designed to see whether Libyan oil and gas companies treated quality as a separate initiative or not. It is clear that approximately a third of the respondents, namely 32.5%, answered that they are 'neutral' regarding the statement, while 30.8% of the respondents answered that they 'agree' with the statement. It seems possible that these results are due to a lack of knowledge and awareness of quality culture and that quality should be the responsibility of everyone in the organisation. Meanwhile, 29.2% of the respondents 'disagree', and just 5.8% of them 'strongly disagree' with the statement. The results for question 12, also show that the 1.7% of the participants opted for 'strongly agree' position. This implies that real efforts should be made towards achieving clear vision regarding quality initiatives.

In relation to question 13, the question was asked in order to discover whether employees (all management levels) of Libyan oil and gas organisations have a full awareness and understanding of the concept of TQM. As can be seen in Table 6.11, 40% of the respondents answered that they 'disagree' with the statement. This result can be further substantiated with a mean-value of 3.16, which is close to the fourth category for the answer (*i.e*. 'disagree'). This result should be considered as a negative indicator regarding the full knowledge and awareness of the concept of TQM, in particular among the employees of the companies. Furthermore, around 25.8% of the respondents 'agree' with the statement; this percentage reflects the fact that some managers have full knowledge and awareness of the concept of TQM, which might facilitate the process of successful implementation. While 25% of them opted for 'neutral' regarding the statement, only 5.0% of the participants stated that they 'strongly disagree' with the statement, and 4.2% of them opted for 'strongly agree'.

Table 6.11: The Awareness and Understanding of TQM

		Frequency	Percent	Valid Percent	Cumulative Percent	**Mean value**	**Standard deviation**
Question 12: In your organisation quality is treated as a separate initiative.							
Valid	strongly agree	2	1.7	1.7	1.7	3.07	0.950
	agree	37	30.8	30.8	32.5		
	neutral	39	32.5	32.5	65.0		
	disagree	35	29.2	29.2	94.2		
	strongly disagree	7	5.8	5.8	100.0		
	Total	120	100.0	100.0			
Question 13: Most employees in Libyan oil and gas organisations have a full awareness and understanding of the concept of TQM.							
Valid	strongly agree	5	4.2	4.2	4.2	3.16	1.004
	agree	31	25.8	25.8	30.0		
	neutral	30	25.0	25.0	55.0		
	disagree	48	40.0	40.0	95.0		
	strongly disagree	6	5.0	5.0	100.0		
	Total	120	100.0	100.0			
Question 14: There is a lack of understanding of the purposes of TQM in Libyan oil and gas organisations.							
Valid	strongly agree	8	6.7	6.7	6.7	2.63	1.020
	agree	63	52.5	52.5	59.2		
	neutral	19	15.8	15.8	75.0		
	disagree	25	20.8	20.8	95.8		
	strongly disagree	5	4.2	4.2	100.0		
	Total	120	100.0	100.0			
Question 15: There are difficulties in learning and implementing TQM systems.							
Valid	strongly agree	9	7.5	7.5	7.5	2.91	1.069
	agree	42	35.0	35.0	42.5		
	neutral	25	20.8	20.8	63.3		
	disagree	39	32.5	32.5	95.8		
	strongly disagree	5	4.2	4.2	100.0		
	Total	120	100.0	100.0			
Question 16: The high costs of implementing total quality management outweigh the benefits.							
Valid	strongly agree	2	1.7	1.7	1.7	3.68	0.871
	agree	8	6.7	6.7	8.3		
	neutral	35	29.2	29.2	37.5		
	disagree	57	47.5	47.5	85.0		
	strongly disagree	18	15.0	15.0	100.0		
	Total	120	100.0	100.0			

(Data Analysis)

As for question 14, the respondents were further asked to provide an opinion on the statement that 'there is a lack of understanding of the purposes of TQM in Libyan oil and gas organisations'. The results in Table 6.11 show that 52.5% of the respondents 'agree' with the statement. It is worth noting that this finding is in line with the conclusion reached in Question 13 above. Further, the results indicate that a significant proportion at manager level of the companies do not understand the purposes and objectives of TQM. In addition, as can be seen, around 20.8% of the respondents 'disagree' with the statement, while 15.8% of the participants are 'neutral'. Furthermore, 6.7% and 4.2% respectively stated that they 'strongly agree' and 'strongly disagree' with the statement.

Question 15 was designed to investigate whether 'there are difficulties to learn and implement TQM systems'. As can be seen from Table 6.11, 35.0% of the respondents agree with the statement; this result can be substantiated with a mean-value of 2.91. This result may be explained by the fact that Libyan companies do not provide their best people with sufficient and clear vision towards achieving best practise. In addition, 32.5% of the respondents answered that they 'disagree' with the statement, whereas 20.8% of them are 'neutral' regarding the statement. Only around 7.5% and 4.2% of the respondents opted for 'strongly agree' and 'strongly disagree' with the statement.

The final question in this section (Question 16) was intended to further strengthen the assessment of the level of awareness and understanding of TQM. The respondents were presented with the statement 'the high costs of implementing TQM outweigh the benefits'. As depicted in Table 6.11, almost half of the respondents, namely 47.5%, 'disagree' with the statement which can be further substantiated with a mean-value of 3.68, which is very close to the fourth category for the answer (*i.e.* 'disagree'). This result suggests that applying such a philosophy would not affect the company's budget, rather it is vital and a critical method of creating benefits.

Additionally, 29.2% of the respondents reported that they were 'neutral' regarding the statement, while 15.0% of the participants answered that they 'strongly disagree' with it. It should also be noted that a small portion of the respondents (6.7 % and 1.7% respectively) answered that they 'agree' and 'strongly agree' with the statement. Overall, the majority of the respondents, namely 62.5% (in total), either 'disagree' or

‘strongly disagree’ with the statement, which can be considered as a positive indicator of TQM awareness.

6.4. EXPLORING THE OBSTACLES AND BARRIERS IN THE IMPLEMENTATION OF TQM

This part aims to explore and investigate possible obstacles and barriers that prevent the successful and effective application of TQM in oil and gas companies. Therefore, to achieve the objective of both the research and this part, fourteen possible obstacles and barriers were highlighted and coupled with seventy eight subsections questions which were asked in order to determine, explore and assess the existing barriers. In particular, each possible obstacle is consisted of a number of related questions to examine the aspects of that particular obstacle. Further, to reinforce the findings, respondents’ perceptions and opinions on some questions were required, the presentation of the descriptive analysis is shown according to the ranking based on the highest percentage along with highest mean-value.

6.4.1. Top Management and Leadership Commitment

In relation to the lack of commitment of management and leadership as a possible barrier to TQM implementation, eleven questions (questions 17 to 27) as depicted in Table 6.12a, Table6.12b and Table 6.12c were designed to test this variable.

In relation to question 17, the question was asked to discover whether ‘top management of Libyan oil and gas organisations is visibly and explicitly committed to quality’. Based on results of the analysis presented in Table 6.12a 50.8% of the respondents answered that they agree with the statement. This result can be further substantiated with a mean-value of 2.56, which is between the second category, ‘agree’, and the third, ‘neutral’. This is followed by 21.7% of the respondents opting for ‘neutral’ position regarding the statement, while 18.3% of the respondents answered that they ‘disagree’ with the statement. The results also show that 7.5% of the respondents opted for ‘strongly agree’ with the statement, and 1.7% of them expressed ‘strongly disagree’ position, while 58.3% (in total) of the respondents ‘agree’ with the statement which reflects that there is a level of commitment among the leaders towards quality.

Table 6.12a: Top Management and Leadership Commitment

		Frequency	Percent	Valid Percent	Cumulative Percent	**Mean value**	**Standard deviation**
Question 17: Top management of Libyan oil and gas organisations is visibly and explicitly committed to quality.							
Valid	strongly agree	9	7.5	7.5	7.5	2.56	0.933
	agree	61	50.8	50.8	58.3		
	neutral	26	21.7	21.7	80.0		
	disagree	22	18.3	18.3	98.3		
	strongly disagree	2	1.7	1.7	100.0		
	Total	120	100.0	100.0			
Question 18: There is frequent turnover of management.							
Valid	strongly agree	16	13.3	13.3	13.3	2.33	0.909
	agree	67	55.8	55.8	69.2		
	neutral	21	17.5	17.5	86.7		
	disagree	14	11.7	11.7	98.3		
	strongly disagree	2	1.7	1.7	100.0		
	Total	120	100.0	100.0			
Question 19: The top management and leaders of Libyan oil and gas organisations listen to the voice of employees when they raise matters related to quality improvement and show visible commitment and take ownership of improvement processes.							
Valid	strongl y agree	3	2.5	2.5	2.5	2.90	0.874
	agree	40	33.3	33.3	35.8		
	neutral	46	38.3	38.3	74.2		
	disagree	28	23.3	23.3	97.5		
	strongly disagree	3	2.5	2.5	100.0		
	Total	120	100.0	100.0			
Question 20: There is a lack of top management commitment to TQM generally within the Libyan oil and gas.							
Valid	strongly agree	3	2.5	2.5	2.5	3.12	1.006
	agree	39	32.5	32.5	35.0		
	neutral	25	20.8	20.8	55.8		
	disagree	47	39.2	39.2	95.0		
	strongly disagree	6	5.0	5.0	100.0		
	Total	120	100.0	100.0			

(Data Analysis)

For question 18, the respondents were asked to state the level of their agreement with the statement: 'There is frequent turnover of management'. With a mean value of 2.33, 55.8% of the respondents 'agree' with the statement and only 17.5% answered

that they are ‘neutral’ regarding the statement. On the other hand, 13.3% of the participants answered that they ‘strongly agree’ with it. Meanwhile, 11.7% answered that they ‘disagree’ with the statement, and only 1.7% of the respondents answered that they ‘strongly disagree’ with the statement. It should be noted that a total of 69.1% of the respondents stated that there is frequent turnover at leader and management level, which should be considered as alarming.

For Question 19, the respondents were presented with the statement that ‘top management and leaders listen to the voice of employees when they raise matters related to quality improvement and show visible commitment and take ownership of improvement processes’. As can be seen from Table 6.12a, 38.3% of the respondents answered that they are ‘neutral’ regarding the statement with a mean-value of 2.90. In addition, 33.3% of the participants answered that they ‘agree’ with the statement. However, around 23.3% and 2.5% (a total of 25.8%) answered that they ‘disagree’ and ‘strongly disagree’, respectively, with the statement. Lastly, 2.5% answered that they ‘strongly agree’ with the statement. It is worth noting that the results were rather mixed. It is also worthwhile noting that the results provide an indication that there is no clear vision regarding the attitude of managers towards quality.

As for question 20, the respondents were further asked to provide an opinion on the statement that ‘there is a lack of top management commitment to TQM generally within the company’. The findings in Table 6.12a indicate that 39.2% answered that they ‘disagree’ with the statement with a mean-value of 3.12. In addition, 32.5% of the respondents answered that they ‘agree’ with the statement, while 20.8% of the participants answered that they are ‘neutral’ regarding the statement. Furthermore, 5.0% and 2.5% of the participants respectively answered that they ‘strongly disagree’ and ‘strongly agree’, with this statement.

As can be seen that the distribution of the percentage of the answers strongly supports the previous question’s findings (question 19).

Table 6.12b: Top Management and Leadership Commitment

		Frequency	Percent	Valid Percent	Cumulative Percent	**Mean value**	**Standard deviation**
Question 21: Top management provides financial support to employees to apply and improve quality programs within the organisations.							
Valid	strongly agree	5	4.2	4.2	4.2	3.10	1.032
	agree	33	27.5	27.5	31.7		
	neutral	37	30.8	30.8	62.5		
	disagree	35	29.2	29.2	91.7		
	strongly disagree	10	8.3	8.3	100.0		
	Total	120	100.0	100.0			
Question 22: There is no leadership on quality issues in the oil and gas organisations.							
Valid	strongly agree	1	0.8	0.8	0.8	3.30	0.866
	agree	25	20.8	20.8	21.7		
	neutral	35	29.2	29.2	50.8		
	disagree	55	45.8	45.8	96.7		
	strongly disagree	4	3.3	3.3	100.0		
	Total	120	100.0	100.0			
Question 23 The top management of oil and gas organisations act on suggestions to improve the quality and services.							
Valid	strongly agree	5	4.2	4.2	4.2	2.50	0.778
	agree	65	54.2	54.2	58.3		
	neutral	36	30.0	30.0	88.3		
	disagree	13	10.8	10.8	99.2		
	strongly disagree	1	0.8	0.8	100.0		
	Total	120	100.0	100.0			
Question 24: Top management shows interest in quality improvement processes.							
Valid	strongly agree	8	6.7	6.7	6.7	2.37	0.721
	agree	69	57.5	57.5	64.2		
	neutral	34	28.3	28.3	92.5		
	disagree	9	7.5	7.5	100.0		
	strongly disagree	-	-	-	100.0		
	Total	120	100.0	100.0			

(Data Analysis)

As can be seen from Table 6.12b, in Question 21, the respondents were asked to state their opinion on the statement that 'top management provides financial support to employees to apply and improve quality programs within the company', where the mean value indicates the centrality of the distribution of the given answers. As can be

observed in Table 6.12b, 30.8% of the participants answered that they are 'neutral' regarding the statement, with a mean value of 3.10. In addition, only around 29.2% of the respondents answered that they 'disagree' with the statement. In addition, more 27.5% of the respondents answered that they 'agree' with the statement, while 8.3% of them answered that they 'strongly disagree' with the statement. Furthermore, an insignificant total percentage of 4.2% of participants answered that they 'strongly agree' with the statement. It is useful to note that the overall response to this question was mixed, which can be attributed to a lack of direct support for such activities.

Question 22 was designed to see whether Libyan companies have leaders on the quality issue with the statement that 'there is no leadership on quality issues in the oil and gas organisations'. As can be seen in Table 6.12b, 45.8% of the respondents answered that they 'disagree' with the statement. This finding can be further substantiated with a mean-value of 3.30. Only around 29.2% of the participants answered that they are 'neutral' regarding the statement. In addition, approximately 20.8% of the respondents answered that they 'agree' with the statement, while 3.3% expressed 'strongly disagree' position, and 0.8% of the sample opted for 'strongly agree'. Based on the results, it seems that the overall responses were mixed and surprising.

In relation to question 23, the respondents were presented with the statement that 'the top management of oil and gas organisations act on suggestions to improve quality and services'. The results in Table 6.12b shows that 54.2% of the respondents answered that they 'agree' with the statement, with a mean-value of 2.50. In addition, 30% of the respondents opted for 'neutral', 10.8% 'disagree', and 4.2% of the respondents answered that they 'strongly agree' with the statement. In addition, 0.8% of the participants answered that they 'strongly disagree'. In fact, this result may be explained by the fact that positive efforts are being made to shift towards improving the entire operation.

As for question 24, the respondents were further asked to provide an opinion on the statement that 'top management shows interest in quality improvement processes'. As can be observed in Table 6.12b, 57.5% of the respondents answered that they 'agree' with the statement, with a mean-value of 2.37, followed by 28.3% who answered 'neutral', while 7.5% opted for 'disagree' and around 6.7% 'strongly agree'. It should

be noted that a total of 64.2 % agree or strongly agree with the statement, which could be a desirable indicator. The results, hence, reflect the fact that the overall response to this question was very positive.

Table 6.12c: Top Management and Leadership Commitment

		Frequency	Percent	Valid Percent	Cumulative Percent	**Mean value**	**Standard deviation**
Question 25: Top management provides necessary resources to fulfil overall organizational objectives.							
Valid	strongly agree	3	2.5	2.5	2.5	2.50	0.710
	agree	66	55.0	55.0	57.5		
	neutral	39	32.5	32.5	90.0		
	disagree	12	10.0	10.0	100.0		
	strongly disagree	-	-	-	100.0		
	Total	120	100.0	100.0			
Question 26: leaders in the organisation are committed to quality and lead employees towards quality management.							
Valid	strongl y agree	3	2.5	2.5	2.5	2.73	0.877
	agree	54	45.0	45.0	47.5		
	neutral	38	31.7	31.7	79.2		
	disagree	22	18.3	18.3	97.5		
	strongly disagree	3	2.5	2.5	100.0		
	Total	120	100.0	100.0			
Question 27: Do you think there is a lack of management commitment towards TQM in your company.							
Valid	yes	27	22.5	22.5	22.5	1.78	0.419
	no	93	77.5	77.5	100.0		
	Total	120	100.0	100.0			

(Data Analysis)

In question 25, the participants were asked to state the level of their agreement to the statement that 'top management provides necessary resources to fulfil overall organizational objectives', where the mean value indicates the centrality of the distribution of the given answers. Based on the result as presented in Table 6.12c, 55.0% of the participants stated that they 'agree' with the statement. This result indicates that there is a certain amount of concern among the managers regarding achieving the company's goals, which could be considered as a positive indicator. In addition, 32.5% of the respondents answered that they were 'neutral' regarding the statement, while 10.0% answered that they 'disagree' and 2.5% stated that they 'strongly agree'. Thus, 57.5% of the respondents admitted that top management provides necessary resources for all objectives.

Question 26 was intended to further strengthen the assessment of existing obstacles and also to look at the level of leaders' commitment with the statement that 'leaders in the organisation are committed to quality and lead employees towards quality management'. The survey result in Table 6.12c depicts that 45.0% answered that they 'agree' with the statement, with the mean value of 2.73, while 31.7% were 'neutral', and just 18.3% and 2.5% respectively (a total of 20.8%) indicated that they 'disagree' and 'strongly disagree'. Lastly, 2.5% answered that they 'strongly agree' with the statement. As the results show, it is quite clear that the level of leaders' commitment is still deemed low.

The final question in this section (Question 27) was designed as an opening question with the objective of further strengthening the assessment of the management commitment towards TQM. Therefore, the respondents were asked to respond to the question 'Do you think that there is a lack of management commitment towards TQM in your company'. The results, as shown in Table 6.12c, indicate that 77.5% of the respondents answered 'no' to the question. In contrast, 22.5% of them answered 'yes'. Based on the survey outcome, the overall response to this question was very positive.

Further, those respondents who answered 'yes' to this question were required to state the reasons for their answers. The results show that 29.6% of those answered 'yes' stated that the 'lack of training programs', including courses and lectures clarifying the particular requirements of effective and successful application of TQM, could be considered as one of the reasons behind the lack of management commitment towards TQM. A further 25.9% of those who answered 'yes' mentioned that 'lack of management commitment is due to a lack of understanding of the nature, importance, criteria, objectives and benefits of TQM in the overall picture'. In addition, around 22.2% stated that the reason could stem from a 'lack of efficiency and experience in the company leaders and managers leadership'. Furthermore, 18.5% of respondents stated that 'management and leaders focused only on the level of production and reaching targets and were less concerned about management philosophy', while 3.7% indicated that 'some circumstances, such as budget limitation', could perhaps be the reason behind the lack of commitment from management.

6.4.2. Organisational Culture

In this section the aim is to further reinforce the findings regarding the barriers and obstacles facing Libyan oil and gas companies by examining the organisational culture as an existing possible obstacle and to look at and assess its influences on the application of TQM. Hence, Questions 28 to 31 were asked to fulfil these objectives. The findings are depicted in Table 6.13.

In Question 28, the participants were asked to state their level of agreement with the statement that 'The promotion of managers in departments within the oil and gas organisation is not based on qualifications and skills', where the mean value indicates the centrality of the distribution of the given answers. Based on the results, 40.0% of the respondents answered that they 'agree' with the statement. This result may be explained by the fact that the system of promotions in this company may be based on experience. In addition, 29.2% stated that they 'disagree' with the statement; 15.0% stated that they 'strongly agree' with it, 13.3% answered that they were 'neutral' with it, and 2.5% stated that they 'strongly disagree'. It is worth noting that most of those surveyed indicated that they agreed that the promotion system generally was not based on qualifications and skills.

With regard to Question 29, the respondents were presented with the statement that 'a bureaucratic culture is prevalent in the oil and gas organisation'. As the findings in Table 6.13 show that the result for this question was mixed: 37.5% of the respondents stated that they are 'neutral' regarding the statement, while 26.7% and 18.3% (a total of 45%) of the respondents respectively, answered that they 'agree' and 'strongly agree' with the statement. Thus, a significant percentage of participants admitted that bureaucratic culture could be seen in the organisation management system, which could be a barrier to TQM. It should be stated that 17.5% (combined) of the respondents stated that they 'disagree' and 'strongly disagree' with the statement.

Question 30 in this section focused on organisational culture, for which the respondents were asked to give an opinion on the statement that 'many people in the oil and gas organisations are appointed to positions without having the skills to undertake the role effectively'. As can be seen in Table 6.13, it seems that the result was quite similar to that of Question 29, which showed signs of a bureaucratic culture spreading through the oil and gas companies. The high percentage of managerial

categories (38.3%) agreeing with this statement could be due to the fact that they may feel or realise that Libyan oil and gas companies allow people to claim and reach positions without particular skills.

Table 6.13: Organisation Culture

		Frequency	Percent	Valid Percent	Cumulative Percent	**Mean value**	**Standard deviation**
Question 28: The promotion of managers in departments within the oil and gas organisation is not based on qualifications and skills.							
Valid	strongly agree	18	15.0	15.0	15.0	2.64	1.129
	agree	48	40.0	40.0	55.0		
	neutral	16	13.3	13.3	68.3		
	disagree	35	29.2	29.2	97.5		
	strongly disagree	3	2.5	2.5	100.0		
	Total	120	100.0	100.0			
Question 29: A bureaucratic culture is prevalent in the oil and gas organisation.							
Valid	strongly agree	22	18.3	18.3	18.3	2.55	1.003
	agree	32	26.7	26.7	45.0		
	neutral	45	37.5	37.5	82.5		
	disagree	20	16.7	16.7	99.2		
	strongly disagree	1	0.8	0.8	100.0		
	Total	120	100.0	100.0			
Question 30: Many people in the oil and gas organisations are appointed to positions without having the skills to undertake the role effectively.							
Valid	strongl y agree	16	13.3	13.3	13.3	2.62	1.039
	agree	46	38.3	38.3	51.7		
	neutral	28	23.3	23.3	75.0		
	disagree	28	23.3	23.3	98.3		
	strongly disagree	2	1.7	1.7	100.0		
	Total	120	100.0	100.0			
Question 31: The Libyan culture and traditions influence quality management, as paying attention to quality is not necessarily a traditional matter.							
Valid	strongly agree	15	12.5	12.5	12.5	2.49	1.004
	agree	58	48.3	48.3	60.8		
	neutral	23	19.2	19.2	80.0		
	disagree	21	17.5	17.5	97.5		
	strongly disagree	3	2.5	2.5	100.0		
	Total	120	100.0	100.0			

For Question 30, as can be seen in Table 6.13, 23.3% of the respondents answered that they 'disagree' with the statement; 23.3% stated that they are 'neutral', only around 13.3% reported that they 'strongly agree', followed by an insignificant percentage of 1.7% of those surveyed who 'strongly disagree' with the statement.

The last question in this section is question 31, which was designed to further reinforce the findings of the section and also to test the existing variable. Thus, the respondents were presented with the statement that 'The Libyan culture and traditions influence quality management, as paying attention to quality is not necessarily a traditional matter'. The participants were asked to declare their level of agreement to this statement. It can be seen from the data in Table 6.13, 48.3% of the participants agree with the statement. It seems possible that these results are due to significant influences of the culture upon employee attitudes, which would also affect their reactions towards adopting a new management approach. In addition, 19.2% of the respondents answered that they are 'neutral' regarding the statement. In contrast, 17.5% of those surveyed answered that they 'disagree' with it, while 12.5% indicated that they 'strongly agree', the remaining 2.5% of the participants 'strongly disagree' with the statement. It should, hence, be noted that a roughly similar pattern can be seen from most of the answers in this section.

6.4.3. Employee Involvement and Empowerment

This section focuses on employee involvement and empowerment as a possible obstacle to TQM. Therefore, five questions (questions 32 to 36) were designed to examine this variable. Table 6.14 provides a summary of the results.

In relation to Question 31, the participants were presented with the statement that 'within Libyan oil and gas organisations employees are empowered to implement quality improvement efforts'. The result demonstrate that 63.3% of the respondents replied that they 'agree' with the statement, while 20.8% are 'neutral' and 11.7% 'disagree'. In addition, 4.2% of the respondents strongly agree with the statement. It should be noted that the overall response to this question was very positive.

Table 6.14: Employee Involvement and Empowerment

		Frequency	Percent	Valid Percent	Cumulative Percent	**Mean value**	**Standard deviation**
Question 32: Within Libyan oil and gas organisations employees are empowered to implement quality improvement efforts.							
Valid	strongly agree	5	4.2	4.2	4.2	2.40	0.749
	agree	76	63.3	63.3	67.5		
	neutral	25	20.8	20.8	88.3		
	disagree	14	11.7	11.7	100.0		
	strongly disagree	-	-	-	100.0		
	Total	120	100.0	100.0			
Question 33: Within Libyan oil and gas organisations the employees are encouraged to play an important role in improving the TQM.							
Valid	strongly agree	4	3.3	3.3	3.3	2.63	0.821
	agree	58	48.3	48.3	51.7		
	neutral	38	31.7	31.7	83.3		
	disagree	19	15.8	15.8	99.2		
	strongly disagree	1	0.8	0.8	100.0		
	Total	120	100.0	100.0			
Question 34: There is no employee involvement in management decisions.							
Valid	strongly agree	23	19.2	19.2	19.2	2.48	1.077
	agree	45	37.5	37.5	56.7		
	neutral	27	22.5	22.5	79.2		
	disagree	22	18.3	18.3	97.5		
	strongly disagree	3	2.5	2.5	100.0		
	Total	120	100.0	100.0			
Question 35: Quality objectives within Libyan oil and gas organisations are clearly identified to employees.							
Valid	strongly agree	6	5.0	5.0	5.0	3.08	0.992
	agree	33	27.5	27.5	32.5		
	neutral	29	24.2	24.2	56.7		
	disagree	49	40.8	40.8	97.5		
	strongly disagree	3	2.5	2.5	100.0		
	Total	120	100.0	100.0			
Question 36: Work responsibilities in Libyan oil and gas organisations are delegated to the employees.							
Valid	strongly agree	2	1.7	1.7	1.7	3.06	0.901
	agree	35	29.2	29.2	30.8		
	neutral	41	34.2	34.2	65.0		
	disagree	38	31.7	31.7	96.7		
	strongly disagree	4	3.3	3.3	100.0		
	Total	120	100.0	100.0			

(Data Analysis)

Regarding Question 33, the respondents were asked to provide their opinion on the statement that 'Within Libyan oil and gas organisations employees are encouraged to play an important role in improving the TQM'. As the results in Table 6.14 depicts, 48.3% of the respondents agree with the statement, followed by 31.7% who answered that they are 'neutral'. In addition, 16.6 % (in aggregate) of the respondents answered that they 'disagree' and 'strongly disagree' respectively, with the statement; 3.3% stated that they 'strongly agree'. Hence, it seems that there is a sign of involvement and empowerment of the employees to be a part of the TQM improvement. However, a proportion of the respondents indicated that they totally reject the statement concerning TQM improvement.

As for Question 34, the participants were further asked to provide an opinion on the statement that 'There is no employee involvement in management decisions'. The results, as shown in Table 6.14, indicate that 37.5% of the respondents stated that they 'agree' with the statement, while around 22.5% of the participants stated that they are 'neutral'. The answer is further reinforced by 19.2% of the respondents stating that they 'strongly agree' with the statement. On the other hand, a total of 20.8% (18.3% and 2.5%, respectively) answered that they 'disagree' and 'strongly disagree' with the statement. It is useful to recognise that 56.7% of the respondents indicated that most of the employees in the sample companies are not involved in management decisions, which could be seen as negative attitude.

Concerning Question 35, the respondents were presented with the statement that 'Quality objectives within Libyan oil and gas organisations are clearly identified to employees'. As Table 6.14 depicts, 40.8% of those surveyed stated that they 'disagree' with the statement. In contrast, around 27.5% of the participants agreed with the statement. Meanwhile, 24.2% of the participants answered that they were 'neutral' regarding the statement. In addition, 5.0% of the participants stated that they 'strongly agree'. It is also worth noting that 2.5% of respondents, 'strongly disagreed' on this matter. The result signifies quite a strong level of disagreement through the participants' answers concerning the statement.

Question 36 is also intended to further strengthen the assessment and determine the possible and existing obstacles. The respondents were asked to state whether 'Work responsibilities in Libyan oil and gas organisations are delegated to employees'. As

depicted in Table 6.14, 34.2% of the participants stated that they are 'neutral' regarding the statement, which can be substantiated with a mean-value of 3.06, which is between the categories of 'neutral' and 'disagree'. In addition, 31.7% of the respondents stated that they 'disagree' with the statement, while 29.2% 'agree' with the statement. In contrast, 3.3% of the participants stated that they 'strongly disagree' with it. Furthermore, only 1.7% of the participants stated that they 'strongly agree' with the statement. Based on the results, there was a mixture of reactions to this statement. Nevertheless, it is also worth noting that over a third of the sample (35.0%) was clearly inclined to disagree with the statement.

6.4.4. Employee Resistance to Change

In this section, the aim is to further reinforce the findings concerning the obstacles facing the oil and gas companies, as well as to examine this variable (employee resistance to change) as a possible obstacle to the successful and effective application of TQM. Therefore, five questions (37-41) were designed in order to assess the existence and the influences of this variable, the results of which are displayed in Table 6.15.

With regard to Question 37, the participants were asked to state their level of agreement on the statement that 'Employees resist changes to total quality management in the Libyan oil and gas organisations'. Based on the survey outcome, the majority of the respondents, namely 55.0%, stated that they 'disagree' with the statement; this result can be further substantiated with a mean-value of 3.63, which is very close to the fourth category (*i.e.* 'disagree') while 30.0% of them answered that they are 'neutral' regarding the statement. As evidenced from the results presented in the Table 6.15, 7.5% of the respondents stated that they 'agree' with the statement. In addition, 7.5% 'strongly disagree'. Overall, based on the available descriptive data, a significant number of respondents (62.5%) was clearly inclined to 'disagree' with the statement, which suggested that employees were not resistant to change however they accept and support any improvement process.

Table 6.15: Employee Resistance to Change

		Frequency	Percent	Valid Percent	Cumulative Percent	**Mean value**	**Standard deviation**
Question 37: Employees resist changes to total quality management in the Libyan oil and gas organisations.							
Valid	strongly agree	-	-	-	-	3.63	0.734
	agree	9	7.5	7.5	7.5		
	neutral	36	30.0	30.0	37.5		
	disagree	66	55.0	55.0	92.5		
	strongly disagree	9	7.5	7.5	100.0		
	Total	120	100.0	100.0			
Question 38: Employees are not working to improve the future of the organisation.							
Valid	strongly agree	1	0.8	0.8	0.8	3.78	0.832
	agree	10	8.3	8.3	9.2		
	neutral	21	17.5	17.5	26.7		
	disagree	70	58.3	58.3	85.0		
	strongly disagree	18	15.0	15.0	100.0		
	Total	120	100.0	100.0			
Question 39: Employees are resistant to getting training to efficiently work towards the improvement of quality.							
Valid	strongl y agree	1	0.8	0.8	0.8	3.82	0.820
	agree	10	8.3	8.3	9.2		
	neutral	17	14.2	14.2	23.3		
	disagree	74	61.7	61.7	85.0		
	strongly disagree	18	15.0	15.0	100.0		
	Total	120	100.0	100.0			
Question 40: Employees are resistant to understand quality and its aspects.							
Valid	strongly agree	1	0.8	0.8	0.8	3.48	0.952
	agree	24	20.0	20.0	20.8		
	neutral	24	20.0	20.0	40.8		
	disagree	59	49.2	49.2	90.0		
	strongly disagree	12	10.0	10.0	100.0		
	Total	120	100.0	100.0			
Question 41: Do you agree that employees are resistant to change.							
Valid	yes	14	11.7	11.7	11.7	1.88	0.322
	no	106	88.3	88.3	100.0		
	Total	120	100.0	100.0			

(Data Analysis)

As regards to question 38, the respondents were presented with the statement that 'Employees are not working to improve the future of the organisation'. As the results presented in Table 6.15 demonstrate, 58.3% and 15.0% respectively (a total of 73.3%) of the respondents 'disagree' and 'strongly disagree' with the statement. With a mean-value of 3.78, this was between the category of 'disagree' and 'strongly disagree'. Meanwhile, 17.5% of the respondents answered that they are 'neutral' regarding the statement. However, 9.1% (in total) of those surveyed mentioned that they 'agree' and 'strongly agree' with the statement. It is interesting that the result was quite similar to that of question 37, which showed signs of a high level of disagreement concerning the employees' resistance to change in both questions.

Concerning question 39, the participants were further asked to provide an opinion on the statement that 'Employees are resistant to getting training to work efficiently towards the improvement of quality'. The result of this question showed roughly a similar pattern to question 38. The survey result in Table 6.15 shows that around 61.7% and 15.0% (a total of 76.7%) of the respondents respectively stated that they 'disagree' and 'strongly disagree' with the statement, which can also be seen in the mean value of 3.82. The results in Table 6.15 also show that around 14.2% of the sample claimed that they were 'neutral' with the statement. The remaining 9.1% (combined) of those surveyed stated that they 'agree' and 'strongly agree' with the statement. It can be safely stated that the respondents indicated a strong level of disagreement with the statement which can be seen as a positive indication.

Question 40 aims to develop a better understanding of the actual situation regarding the possibility of the existing variable the respondents were presented with the statement that 'Employees are resistant to understanding quality and its aspects'. More than half of the respondents (49.2% and 10.0% respectively; 59.2% combined), based on the result in Table 6.15, stated that they 'disagree' and 'strongly disagree' with the statement. On the other hand, around 20.8% (combined) of the respondents reported that they 'agree' and 'strongly agree' with the statement, while 20.0 % stated that they are 'neutral'. It should be noted that a similar pattern can be seen for Question 39, which also supports the findings in this section.

As regards to Question 41, it aims to significantly reinforce the part and section findings and to obtain further actual outcomes in line with the previous results.

Therefore, the participants were asked to comment clearly on the question **'**Do you agree that employees are resistant to change'. As can be seen in Table 6.15, the vast majority of the respondents (88.3%) answered 'no'; while 11.7% answered 'yes'. In the overall picture, the results suggest that the majority of respondents reject the perception that employees are resistant to change.

As part of a further query, those who answered 'yes' were required to state their reasons. Around 64.0% said the main reason for employees' resistance to change is that they think change might have a negative impact on their current position and cause unexpected problems. In addition, around 36.0% of those who also answered 'yes' stated that the reason for resistance to change was perhaps a lack of understanding and awareness of the real meaning of TQM.

6.4.5. Quality Strategic Plan

This section continues the discussion by providing an analysis of the results regarding poor quality strategic planning as a possible obstacle to the successful and effective application of TQM. Thus, in order to investigate this, five questions (Questions 42 to 46) were designed. Table 6.16 provides the findings related to this section.

In relation to question 42, the participants were asked to state their level of agreement to the statement that 'Libyan oil and gas organisations do not have strategic plans'. As can be seen in Table 6.16, 41.7% of the respondents reported that they 'disagree' with the statement. In addition, 22.5% of the respondents answered that they are 'neutral' regarding the statement. In contrast, 23.3% (combined) of those surveyed indicated that they 'agree' and 'strongly agree' with the statement. Furthermore, 12.5% answered that they 'strongly disagree' with the statement. Thus, a significant percentage of the sample stated that oil and gas companies apply strategic plans, as it is critical for each company to work according to present and future plans.

As regards to Question 43, the respondents were asked to state the level of their agreement to the statement that 'Strategic plans in Libyan oil and gas organisations do not include quality goals'. As depicted in Table 6.16, 50.8% (combined) of the respondents stated that they 'disagree' and 'strongly disagree' with the statement. In addition, 30% of the respondents mentioned that they were 'neutral' regarding the statement.

Table 6.16: Quality Strategic Plan

		Frequency	Percent	Valid Percent	Cumulative Percent	**Mean value**	**Standard deviation**
Question 42: Libyan oil and gas organisations do not have strategic plans.							
Valid	strongly agree	6	5.0	5.0	5.0	3.38	1.078
	agree	22	18.3	18.3	23.3		
	neutral	27	22.5	22.5	45.8		
	disagree	50	41.7	41.7	87.5		
	strongly disagree	15	12.5	12.5	100.0		
	Total	120	100.0	100.0			
Question 43: Strategic plans in Libyan oil and gas organisations do not include quality goals.							
Valid	strongly agree	4	3.3	3.3	3.3	3.38	0.980
	agree	19	15.8	15.8	19.2		
	neutral	36	30.0	30.0	49.2		
	disagree	49	40.8	40.8	90.0		
	strongly disagree	12	10.0	10.0	100.0		
	Total	120	100.0	100.0			
Question 44: Quality action plans in the strategic plans are often vague.							
Valid	strongly agree	3	2.5	2.5	2.5	3.07	1.019
	agree	41	34.2	34.2	36.7		
	neutral	29	24.2	24.2	60.8		
	disagree	39	32.5	32.5	93.3		
	strongly disagree	8	6.7	6.7	100.0		
	Total	120	100.0	100.0			
Question 45: The strategic plan should be customer and market driven to achieve expected quality.							
Valid	strongly agree	2	1.7	1.7	1.7	3.38	0. 908
	agree	19	15.8	15.8	17.5		
	neutral	41	34.2	34.2	51.7		
	disagree	48	40.0	40.0	91.7		
	strongly disagree	10	8.3	8.3	100.0		
	Total	120	100.0	100.0			
Question 46: Training targets to develop skills for better quality in the organisation are generally not achieved.							
Valid	strongly agree	6	5.0	5.0	5.0	2.73	0.995
	agree	59	49.2	49.2	54.2		
	neutral	20	16.7	16.7	70.8		
	disagree	32	26.7	26.7	97.5		
	strongly disagree	3	2.5	2.5	100.0		
	Total	120	100.0	100.0			

(Data Analysis)

In addition, 19.1% (combined) of the respondents reported that they 'agree' and 'strongly agree' with the statement. Nevertheless, the outcome of subsequent question, which was intended to test the existence and the influences of this variable, showed that most of those who responded to question 43 indicated that oil and gas companies considered quality goals as part of their strategic plans, which could be seen as a positive sign.

In question 44, the respondents were asked to state the level of their agreement to the statement that 'Quality action plans in the strategic plans are often vague'. As the findings in Table 6.16 depicts, a significant portion of the respondents (34.2% and 2.5%, respectively) answered that they 'agree' and 'strongly agree' with the statement, with the mean-value of 3.07. This is followed by 24.2% who answered 'neutral'. In addition, 39.2% (combined) of the respondents stated that they 'disagree' and 'strongly disagree' with the statement. It can be seen that the results were rather mixed which may be explained by the fact that there is quite unclear vision towards quality plans.

With regard to Question 45, the respondents were presented with the statement that 'The strategic plan should be customer and market driven to achieve expected quality'. The results presented in Table 6.16 show that 40% of the respondents stated that they 'disagree' with the statement, this result can be further substantiated with a mean-value of 3.38. In addition, 34.2% of those surveyed answered that they are 'neutral' regarding the statement. It is also worth noting that 15.8% of the respondents stated that they 'agree'. Another interesting outcome of the survey is that 8.3% of the respondents were 'strongly disagree'. In addition, 1.7% of them reported that they 'strongly agree' with the statement. This percentage reflects the fact that there is a gap between actual quality need and strategic quality plan, which needs to be addressed.

Lastly, in Question 46, the participants were further asked to provide an opinion on the statement that 'Training targets to develop skills for better quality in the organisation are generally not achieved'. As the result presented in Table 6.16, 49.2% of the respondents agree with the statement. In contrast, 26.7% of them stated that they 'disagree' with the statement. In addition, 16.7% of the participants stated that they are 'neutral'. In addition, only an insignificant percentage of 5.0% of the participants answered that they 'strongly agree'. Furthermore, 2.5% of the

respondents stated that they 'strongly disagree' with the statement. Hence, it can be stated that this finding is in line with that of the previous question, which revealed the lack of training plan. Thus, this problem could be overcome with a more proactive role and serious steps should be taken by the top management.

6.4.6. Employee Training, Development and Education

This section focuses on employee training, development and education as a possible obstacle to the successful and effective application of TQM as perceived by the participants. For this, eight questions (Questions: 47 to 54) were designed, and the results of the analysis are depicted in Table 6.17a and Table 6.17b.

Regarding question 47, the participants was presented with the statement that 'In your organisation employees are trained in problem identification and problem solving techniques'. As can be seen from the results in Table 6.17a, 42.5% of the participants stated that they 'disagree' and 'strongly disagree' with the statement**.** However, around 39.2% and 2.5% of the sample respectively (a total of 41.7%) answered that they 'agree' and 'strongly agree' with the statement. In addition, 15.8% of them opted for 'neutral' position. While the results indicate mixed findings, it should be noted that there is a real need to bridge the gap between trained and untrained employees by providing them with sufficient tools, techniques and appropriate training programs.

With regard to Question 48, the respondents were asked to state the level of their agreement regarding the statement that 'Employees are not trained in group discussion and communication techniques'. Based on the result as presented in Table 6.17a, 35% of the participants answered that they 'agree' with the statement. In contrast, 34.2% of the respondents opted for 'disagree' position. Meanwhile, 19.2% of the respondents stated that they are 'neutral', and 8.3% of them answered that they 'strongly disagree' with the statement. Furthermore, 3.3% of the respondents stated that they 'strongly agree' with the statement. In overall, the results follow the pattern established in Question 47.

As for question 49, the respondents were further asked to provide an opinion on the statement that 'Within Libyan oil and gas organisations employees are trained in quality improvement skills'. As the results in Table 6.17a show, 40.8% of the respondents reported that they 'disagree' with the statement. This is followed by

29.2% of the participants opting for 'neutral' position. In addition, 28.4% of the respondents reported that they 'agree' or 'strongly agree' with the statement. Furthermore, 1.7% of the respondents opted for 'strongly disagree' position with the statement. Nevertheless, 42.5% replied that they 'disagree' with the statement, which suggests that the sampled organisations suffer from lack of appropriate training programs concerning quality improvement skills.

Table 6.17a: Employee Training, Development and Education

		Frequency	Percent	Valid Percent	Cumulative Percent	**Mean value**	**Standard deviation**
Question 47: In your organisation employees are trained in problem identification and problem solving techniques.							
Valid	strongly agree	3	2.5	2.5	2.5	3.03	1.025
	agree	47	39.2	39.2	41.7		
	neutral	19	15.8	15.8	57.5		
	disagree	46	38.3	38.3	95.8		
	strongly disagree	5	4.2	4.2	100.0		
	Total	120	100.0	100.0			
Question 48: Employees are not trained in group discussion and communication techniques.							
Valid	strongly agree	4	3.3	3.3	3.3	3.09	1.007
	agree	42	35.0	35.0	38.3		
	neutral	23	19.2	19.2	57.5		
	disagree	41	34.2	34.2	91.7		
	strongly disagree	10	8.3	8.3	100.0		
	Total	120	100.0	100.0			
Question 49: Within Libyan oil and gas organisations employees are trained in quality improvement skills.							
Valid	strongl y agree	5	4.2	4.2	4.2	3.12	0.936
	agree	29	24.2	24.2	28.3		
	neutral	35	29.2	29.2	57.5		
	disagree	49	40.8	40.8	98.3		
	strongly disagree	2	1.7	1.7	100.0		
	Total	120	100.0	100.0			
Question 50: The organisation concentrates on ongoing development of personnel by establishing extensive training programs that cover all aspects of Total Quality Management (TQM).							
Valid	strongly agree	6	5.0	5.0	5.0	2.85	0.941
	agree	44	36.7	36.7	41.7		
	neutral	33	27.5	27.5	69.2		
	disagree	36	30.0	30.0	99.2		
	strongly	1	0.8	0.8	100.0		

	disagree						
	Total	120	100.0	100.0			

(Data Analysis)

For Question 50, the participants were asked to state their opinion on the statement that 'The organisation concentrates on on-going development of personnel by establishing extensive training programs that cover all aspects of Total Quality Management (TQM)'. As can be seen in Table 6.17a, around 36.7% and 5.0% respectively (a total of 41.7%) reported that they 'agree' and 'strongly agree' with the statement. In addition, almost a third of the sample stated that they 'disagree' with the statement and 27.5% of the respondents answered that they were 'neutral' regarding the statement. Furthermore, only 0.8% of the participants stated that they 'strongly disagree'. Compared with the previous question, the results showed a slightly different response, which reflects the fact that there is some concern regarding personal development in the sample organisations.

Moving on to the next question (Question 51), the participants were presented with the statement that 'Training in oil and gas organisations is determined according to actual needs that have to be covered by training'. The findings presented in Table 6.17b indicate that 59.2% of the participants stated that they agree with the statement. In addition, 20.8% of the respondents answered that they are 'neutral' regarding the statement. In contrast, 12.5% reported that they 'disagree' and the remaining 7.5% stated that they 'strongly agree' with the statement. The results indicate that a significant percentage of the sample (66.7%) admitted that training needs are determined based on actual requirements and needs.

In Question 52, the respondents were asked to state the level of their agreement regarding the statement that 'The employees have appropriate qualifications and experience required for improving their quality of work'. As can be seen in Table 6.17b, 44.2% of the respondents reported that they agree with the statement. In addition, 23.3% of the sample reported that they 'disagree' with the statement. Moreover, 19.2% of the respondents answered that they were 'neutral' regarding the statement. It is worth nothing that just 8.3% of the respondents stated that they 'strongly agree' with the statement and only 5.0% 'strongly disagree'. Overall, over half of the managerial categories (52.5%) said they 'agree' this figure suggests these organisations provide a suitable environment in which to improve quality skills.

Table 6.17b: Employee Training, Development and Education

		Frequency	Percent	Valid Percent	Cumulative Percent	**Mean value**	**Standard deviation**
Question 51: Training in oil and gas organisations is determined according to actual needs that have to be covered by training.							
Valid	strongly agree	9	7.5	7.5	7.5	2.38	0.801
	agree	71	59.2	59.2	66.7		
	neutral	25	20.8	20.8	87.5		
	disagree	15	12.5	12.5	100.0		
	strongly disagree	-	-	-	-		
	Total	120	100.0	100.0			
Question 52: The employees have appropriate qualifications and experience required to improve their quality of work.							
Valid	strongly agree	10	8.3	8.3	8.3	2.73	1.069
	agree	53	44.2	44.2	52.5		
	neutral	23	19.2	19.2	71.7		
	disagree	28	23.3	23.3	95.0		
	strongly disagree	6	5.0	5.0	100.0		
	Total	120	100.0	100.0			
Question 53 Employees have enough appropriate education and training in quality.							
Valid	strongly agree	4	3.3	3.3	3.3	3.46	0.978
	agree	17	14.2	14.2	17.5		
	neutral	32	26.7	26.7	44.2		
	disagree	54	45.0	45.0	89.2		
	strongly disagree	13	10.8	10.8	100.0		
	Total	120	100.0	100.0			
Question 54: There is lack of staff training in Libyan oil and gas organisations regarding TQM techniques.							
Valid	strongly agree	9	7.5	7.5	7.5	2.58	0.932
	agree	58	48.3	48.3	55.8		
	neutral	31	25.8	25.8	81.7		
	disagree	19	15.8	15.8	97.5		
	strongly disagree	3	2.5	2.5	100.0		
	Total	120	100.0	100.0			

(Data Analysis)

Concerning Question 53, the respondents were presented with the statement that 'Employees have enough appropriate educating and training on quality'. Based on the result depicted in Table 6.17b, almost half of the sample (45.0%) answered that they 'disagree' with the statement, while 10.8% of the respondents who stated that they

‘strongly disagree’ with the statement. Meanwhile, almost a third of the sample (26.7%) answered that they were ‘neutral’ regarding the statement. In contrast, around 14.2% and 3.3% (a combined percentage of 17.5%) respectively stated that they ‘agree’ and ‘strongly agree’ with the statement. It can, therefore, be stated that extensive quality training programs need to be held in order to address the current gap.

The statement that ‘There is lack of staff training in the Libyan oil and gas organisation regarding TQM techniques’ is explored in Question 54. As the results in Table 6.17b show, 48.3% of the respondents stated that they ‘agree’ with the statement, while 7.5% of the participants ‘strongly agree’ with the statement, and 25.8% were ‘neutral’. On the other hand, around 15.8% of the sample answered that they ‘disagree’. Furthermore, 2.5% stated that they ‘strongly disagree’. Overall, the results suggest that most of the sample (55.8%) agree with the statement**,** which suggests that serious action needs to be taken in order to solve this matter, by providing these organisations with sufficient training staff.

6.4.7. Information and Communication

This section presents the findings related information and communication as a possible obstacle to the successful and effective application of TQM, for which five questions (Questions: 55 to 59) were designed. The findings can be depicted in Table 6.18.

Regarding question 55, the respondents were presented with the statement that ‘Communication between departments in Libyan oil and gas organisations is ineffective’. As the results in Table 6.18 show, 42.5% of the respondents answered that they ‘disagree’ with the statement, while around 5.8% opted for ‘strongly disagree’. 37.5% of the respondents reported that they ‘agree’ and ‘strongly agree’ with the statement, while 14.2% of the respondents stated that they were ‘neutral’ regarding the statement. Moreover, 48.3% of the respondents opted for ‘disagree’ position. The results, hence, indicate that it is critical for the oil and gas organisations to have effective and flexible communication channels between departments.

Table 6.18: Information and Communication

		Frequency	Percent	Valid Percent	Cumulative Percent	**Mean value**	**Standard deviation**
Question 55: Communication between departments in the Libyan oil and gas organisations is ineffective.							
Valid	strongly agree	8	6.7	6.7	6.7	3.10	1.111
	agree	37	30.8	30.8	37.5		
	neutral	17	14.2	14.2	51.7		
	disagree	51	42.5	42.5	94.2		
	strongly disagree	7	5.8	5.8	100.0		
	Total	120	100.0	100.0			
Question 56: There is a lack of information on TQM in Libyan oil and gas organisations.							
Valid	strongly agree	6	5.0	5.0	5.0	2.71	0.965
	agree	58	48.3	48.3	53.3		
	neutral	23	19.2	19.2	72.5		
	disagree	31	25.8	25.8	98.3		
	strongly disagree	2	1.7	1.7	100.0		
	Total	120	100.0	100.0			
Question 57: There is a lack of communication from top management levels to employees.							
Valid	strongly agree	12	10.0	10.0	10.0	2.86	1.079
	agree	40	33.3	33.3	43.3		
	neutral	24	20.0	20.0	63.3		
	disagree	41	34.2	34.2	97.5		
	strongly disagree	3	2.5	2.5	100.0		
	Total	120	100.0	100.0			
Question 58: A very good communication process is established in the organisation for effective Quality Management (QM) and for clear and effective ways for people within the organisation to communicate.							
Valid	strongly agree	7	5.8	5.8	5.8	2.94	0.973
	agree	38	31.7	31.7	37.5		
	neutral	31	25.8	25.8	63.3		
	disagree	43	35.8	35.8	99.2		
	strongly disagree	1	.8	.8	100.0		
	Total	120	100.0	100.0			
Question 59: The communication channels providing information about customer and market expectations are not effective in delivering the required information to improve quality.							
Valid	strongly agree	6	5.0	5.0	5.0	2.81	0.882
	agree	42	35.0	35.0	40.0		
	neutral	41	34.2	34.2	74.2		
	disagree	31	25.8	25.8	100.0		
	strongly disagree	-	-	-	-		
	Total	120	100.0	100.0			

(Data Analysis)

Concerning Question 56 relating to the statement that 'There is a lack of information on TQM in the Libyan oil and gas organisation', the findings in Table 6.18 shows that approximately 48.3% of the respondents stated that they 'agree' with the statement. In addition, 5.0% of the participants stated that they 'strongly agree' with the statement, while 25.8% opted for 'disagree 'position. Moreover, 19.2% of those surveyed answered that they were 'neutral' regarding the statement. It should be noted that very small percentage of the respondents (1.7%) stated that they 'strongly disagree' with the statement. Overall, thus, the results show that over half of the participants (53.3%) 'agree' with the statement, which directly indicates that information is needed on the TQM issue.

In relation to Question 57 relating to the statement that 'There is a lack of communication from top management levels to employee' level', the results in Table 6.18 demonstrate that 34.2% of the respondents stated that they 'disagree' with the statement. On the other hand, 43.3% (combined) stated that they 'agree' and 'strongly agree' with the statement. Meanwhile, around 20% of the sample reported that they were 'neutral' regarding the statement. As the results indicate, only an insignificant percentage of those surveyed (2.5%) answered that they 'strongly disagree' with the statement. It can be seen from the results that the overall response was mixed. However, it is useful to recognise that almost half of the sample was inclined to agree with the statement. In fact this figure indicates that a negative indicator can be seen from the overall responses regarding communication matter.

As for the Question 58, the respondents were further asked their opinions on the statement that 'A very good communication process is established in the organisation for effective Quality Management (QM) and for clear and effective ways for people within the organisation to communicate'. Based on the result, more than a third of the respondents (35.8%) reported that they 'disagree' with the statement. with a mean-value of 2.94. In contrast, around 31.7% of them stated that they 'agree' with the statement. In addition, 25.8% of the sample answered that they were 'neutral' regarding the statement, while minority of participants (5.8%) indicated they 'agree' with the statement. Moreover, a very small percentage of respondents (0.8%) answered that they 'strongly disagree' with the statement. It can be seen that the findings are rather mixed. Nevertheless, it should be noted that more serious efforts

need to be made in order to activate the process of communication throughout oil and gas organisations as a critical element of success.

The final question in this section of the questionnaire, Question 59 presented the participants with the statement that 'The communication channels providing information about customer and market expectations are not effective in delivering the required information for improving quality'. Based on the result, 35.0% of those surveyed stated that they agree with the statement. This was reinforced by 5.0% of the respondents who stated that they strongly agree. Meanwhile, more than a third of the respondents reported that they were 'neutral'. On the other hand, just 25.8% of the sample reported that they 'disagree'. Overall, the results suggest that the communication channels are lacking in providing the necessary information regarding quality improvement needs.

6.4.8. Continuous Improvement and Innovation

This section aims to explore 'lack of continuous improvement and innovation as a possible obstacle to the successful and effective application of TQM', for which seven questions (Questions: 60 to 66) were designed in the questionnaire. The findings related to this section are depicted in Table 6.19a and 6.19b.

In Question 60, the participants were asked to state their level of agreement on the statement that 'The Libyan oil and gas organisations promote innovation'. The findings in Table 6.19a indicate that a high portion of the respondents (43.3%) answered that they agree with the statement. In addition, almost a third of the respondents (29.2%) stated that they were 'neutral' regarding the statement. In contrast, around 20.0% of them reported that they 'disagree' with the statement and the answer was reinforced by 4.2% of the respondents who stated that they' strongly disagree' with the statement. Moreover, only 3.3% of the respondents stated that they 'strongly agree' with the statement, while 46.6% of them declared that they 'agree'. Thus, the results suggest that Libyan oil and gas organisations push their employees to be innovative and significantly encourage them.

Table 6.19a: Continuous Improvement and Innovation

		Frequency	Percent	Valid Percent	Cumulative Percent	**Mean value**	**Standard deviation**
Question 60: The Libyan oil and gas organisations promote innovation.							
Valid	strongly agree	4	3.3	3.3	3.3	2.78	0.945
	agree	52	43.3	43.3	46.7		
	neutral	35	29.2	29.2	75.8		
	disagree	24	20.0	20.0	95.8		
	strongly disagree	5	4.2	4.2	100.0		
	Total	120	100.0	100.0			
Question 61: Libyan oil and gas companies do have R&D departments for innovative developments.							
Valid	strongly agree	8	6.7	6.7	6.7	3.01	1.025
	agree	32	26.7	26.7	33.3		
	neutral	37	30.8	30.8	64.2		
	disagree	37	30.8	30.8	95.0		
	strongly disagree	6	5.0	5.0	100.0		
	Total	120	100.0	100.0			
Question 62: Innovation strategies include improving quality in all its dimensions							
Valid	strongl y agree	7	5.8	5.8	5.8	2.65	0.876
	agree	51	42.5	42.5	48.3		
	neutral	41	34.2	34.2	82.5		
	disagree	19	15.8	15.8	98.3		
	strongly disagree	2	1.7	1.7	100.0		
	Total	120	100.0	100.0			
Question 63: Quality improvement culture is prevalent across the Libyan oil and gas organisations.							
Valid	strongly agree	2	1.7	1.7	1.7	2.85	0.847
	agree	47	39.2	39.2	40.8		
	neutral	38	31.7	31.7	72.5		
	disagree	33	27.5	27.5	100.0		
	strongly disagree	-	-	-	-		
	Total	120	100.0	100.0			

(Data Analysis)

As regards to Question 61, the respondents were presented with the statement that 'Libyan oil and gas companies do have research and development (R&D) departments for innovative developments'. The findings in Table 6.19a shows that 30.8% of the respondents answered that they 'disagree' with the statement, while only 5.0% of the participants further reinforced the answer by stating that they 'strongly disagree'. In

addition, 30.0% of those surveyed stated that they are 'neutral' regarding the statement. However, around 26.7% and 6.7% respectively (a total of 33.4%) reported that they 'agree' and 'strongly agree'. This result may be explained by the fact that research and development (R&D) departments in some organisations perhaps suffer from a lack of efficient staff.

In relation to Question 62, the respondents were further asked to comment on the statement: 'Innovation strategies include improving quality in all its dimensions'. As can be seen in Table 6.19a, 48.3% of the respondents answered that they 'agree' or 'strongly agree' with the statement, with a mean-value of 2.65. In addition, 34.2% of them stated that they were 'neutral' regarding the statement. On the other hand, 5.8% and 1.7% of the respondents respectively (a total of 17.5%) stated that they 'disagree' and 'strongly disagree' with the statement. Thus, a positive indication can be seen in some of the response positions, which reflect the fact that there is clear concern that quality needs to be improved in all organisation aspects including innovation strategies.

Concerning Question 63, the respondents were asked their level of agreement regarding the statement that 'Quality improvement culture is prevalent across Libyan oil and gas organisations'. The results in Table 6.19a shows that 39.2% and 1.7% (a total of 40.9%) of the respondents, respectively, reported that they 'agree' and 'strongly agree' with the statement.. In addition, almost a third of the respondents (31.7%) answered that they are 'neutral' regarding the statement. In contrast, less than a third of those surveyed (27.5%) reported that they 'disagree' with the statement. It should be noted that this result supports that of the previous question.

In relation to Question 64, the perceptions of the participants concerning the statement that 'Libyan oil and gas organisations identify gaps between their training strategies and the efficient running of TQM' were explored. As can be seen in Table 6.19b, 34.2% of the respondents stated that they 'disagree' with the statement; and 3.3% of the participants opted for 'strongly disagree' position. Thus, the findings indicate that there is a need for proper assessment of training strategy programs and a need for effective TQM application. However, around 32.5% of the sample answered that they 'agree' with the statement, while 27% of those surveyed stated that they are neutral

with the statement. Only a small number of respondents (2.5%) indicated that they 'strongly agree' with the statement.

Table 6.19b: Continuous Improvement and Innovation

Question 64: Libyan oil and gas organisations identify gaps between their training strategies and efficient running of TQM.							
		Frequency	Percent	Valid Percent	Cumulative Percent	**Mean value**	**Standard deviation**
Valid	strongl y agree	3	2.5	2.5	2.5	3.03	0 .952
	agree	39	32.5	32.5	35.0		
	neutral	33	27.5	27.5	62.5		
	disagree	41	34.2	34.2	96.7		
	strongly disagree	4	3.3	3.3	100.0		
	Total	120	100.0	100.0			
Question 65: There is lack of motivation and reward in the organisation system.							
		Frequency	Percent	Valid Percent	Cumulative Percent	**Mean value**	**Standard deviation**
Valid	strongly agree	17	14.2	14.2	14.2	2.59	1.111
	agree	52	43.3	43.3	57.5		
	neutral	19	15.8	15.8	73.3		
	disagree	27	22.5	22.5	95.8		
	strongly disagree	5	4.2	4.2	100.0		
	Total	120	100.0	100.0			
Question 66: Quality improvement efforts in the Libyan oil and gas organisations rarely meet expectations in terms of desired results.							
		Frequency	Percent	Valid Percent	Cumulative Percent	**Mean value**	**Standard deviation**
Valid	strongly agree	3	2.5	2.5	2.5	2.63	0.800
	agree	59	49.2	49.2	51.7		
	neutral	39	32.5	32.5	84.2		
	disagree	18	15.0	15.0	99.2		
	strongly disagree	1	0.8	0.8	100.0		
	Total	120	100.0	100.0			

(Data Analysis)

As regards to Question 65, the respondents were further asked to provide their opinion on the statement that 'There is a lack of motivation and reward in the organisation system'. The majority of those who responded, namely 43.3%, indicated that they 'agree' with the statement, while 14.2% of the respondents stated that they 'strongly agree' with the statement. Thus, 57.5% of the respondents showed their support for

the statement, which implies that the sample organisations suffer from lack of motivation and a reward system, which perhaps affects employees' desire to be innovative and their self-development. However, around 22.5% of the sample answered that they 'disagree' with the statement and 15.8% of those who responded stated that they are 'neutral'. In addition, only an insignificant percentage (4.2%) indicated that they strongly disagree with the statement. In either event, actual efforts should be taken in order to address the current gap.

The last question in this section, namely question 66, aims to gauge the perceptions of the participants on 'Quality improvement efforts in the Libyan oil and gas organisations rarely meet expectations in terms of desired results'. As the results indicate, 51.7 % of the participants answered that they 'agree' or 'strongly agree' with the statement. In addition, 32.5% of them reported that they are 'neutral' regarding the statement, while 15.0% and 0.8% respectively (a combined percentage of 15.8%) indicated that they 'disagree' or 'strongly disagree' with the statement. These results indicate that real efforts should be taken in order to drive entire improvement efforts towards the right approach.

6.4.9. Team Work

This section aims to present the findings concerning teamwork as a possible barrier to the successful and effective application of TQM. Hence, in order to investigate and assess the responses given to this statement, four questions (question 67 to 70) were designed and the findings are presented in Table 6.20.

Question 67 relates to the statement that 'Within Libyan oil and gas organisations cross-functional teams are not employed'. The results in Table 6.20 show that 33.3% of the respondents answered that they 'agree' with the statement. The answer was reinforced by 1.7% of the respondents stating that they 'strongly agree' with the statement. This was followed by almost a third of the sample (31.7%) who stated that they were 'neutral' regarding the statement. In contrast, around a total of 33.4% of respondents reported that they 'disagree' and 'strongly 'disagree'. The results, hence, indicates negative sign, which can be seen regarding the performance of the oil and gas organisations in terms of cross-functional teams, as a requirement for the successful implementation of TQM, not being effectively employed.

Table 6.20: Team Work

Question 67: Within Libyan oil and gas organisations cross-functional teams are not employed.							
		Frequency	Percent	Valid Percent	Cumulative Percent	**Mean value**	**Standard deviation**
Valid	strongly agree	2	1.7	1.7	1.7	3.01	0.930
	agree	40	33.3	33.3	35.0		
	neutral	38	31.7	31.7	66.7		
	disagree	35	29.2	29.2	95.8		
	strongly disagree	5	4.2	4.2	100.0		
	Total	120	100.0	100.0			
Question 68: In Libyan oil and gas organisations there are many cross-functional teams solving quality problems.							
Valid	strongly agree	1	0.8	0.8	0.8	2.85	0.785
	agree	43	35.8	35.8	36.7		
	neutral	50	41.7	41.7	78.3		
	disagree	25	20.8	20.8	99.2		
	strongly disagree	1	0.8	0.8	100.0		
	Total	120	100.0	100.0			
Question 69: Training sessions in Libyan oil and gas organisations force personnel to work in a team.							
Valid	strongl y agree	2	1.7	1.7	1.7	2.83	0.837
	agree	47	39.2	39.2	40.8		
	neutral	42	35.0	35.0	75.8		
	disagree	28	23.3	23.3	99.2		
	strongly disagree	1	0.8	0.8	100.0		
	Total	120	100.0	100.0			
Question 70: Top management of Libyan oil and gas organisations regards team spirit an important factors for improving and encouraging the employees to work in team.							
Valid	strongly agree	5	4.2	4.2	4.2	2.78	0.954
	agree	50	41.7	41.7	45.8		
	neutral	36	30.0	30.0	75.8		
	disagree	24	20.0	20.0	95.8		
	strongly disagree	5	4.2	4.2	100.0		
	Total	120	100.0	100.0			

(Data Analysis)

Question 68 aimed at gauging the perceptions of the respondents on the statement that 'In Libyan oil and gas organisations there are many cross-functional teams solving quality problems'. The result in Table 6.20 shows that 41.7% of the respondents opted for 'neutral', while a total of 36.6% indicated that they 'agree' and 'strongly agree'

with the statement. In addition, 20.8% of the respondents stated that they 'disagree 'with the statement. Furthermore, only 0.8% of the respondents answered that they 'strongly disagree' with the statement. Compared with the previous question, a fairly similar pattern can be seen in the answers given to Question 68, which indicates that there is no clear vision regarding cross-functional teams, in particular concerning solving quality problems.

With regard to Question 69, the respondents were asked to state their level of agreement with the statement that 'Training sessions in Libyan oil and gas organisations force personnel to work in a team'. Based on the survey outcome, 39.2% of the respondents indicated that they 'agree' with the statement. This was followed by 35.0% who stated that they were 'neutral'. However, 23.0% and 0.8% respectively, (a total of 23.8%) reported that they 'disagree' and 'strongly disagree' with the statement. Moreover, only a small number of respondents (1.7%) indicated that they 'strongly agree' with the statement. It can be safely stated that the highest percentage of the respondents was inclined to agree with the statement, which implies that a high proportion of training programs include teamwork techniques.

Lastly, Question 70 aims at exploring participants' opinion on the statement that 'Top management of Libyan oil and gas organisations regards team spirit as an important factor for improving and encouraging employees to work in team'. As the findings in Table 6.20 indicates, 45.9% of the participants 'agree' and 'strongly agree' with the statement. In addition, 30.0% of the respondents indicated that they were 'neutral' regarding the statement, while 20% and 4.2% (a total of 24.2%) respectively reported that they 'disagree' and 'strongly disagree' with the statement. Thus, the findings indicate that a fairly acceptable level of awareness regarding the importance of teamwork can be seen among managerial categories. However, a portion of those who responded suggests that further efforts and programs are needed in order to address the existing gap.

6.4.10. Internal and External Customer Satisfaction

In furthering the analysis, this section aims to investigate whether lack of internal and external customer satisfaction is a possible obstacle to the successful and effective application of TQM. For this, five questions (Questions: 71 to 75) were designed, and the findings are presented in Table 6.21.

In relation to Question 71, the participants were asked to state their level of agreement with the statement that 'Each employee in Libyan oil and gas organisations treats colleagues as customers'. As can be seen in Table 6.21, 40.8% of the respondents reported that they 'agree' with the statement, while 30.0% of them answered that they are 'neutral' regarding the statement. However, around 25.0% of the sample indicated that they 'disagree'. In addition, 4.2% of the respondents stated that they 'agree'. The results indicate that approximately half of those surveyed (45.0%) agree with the statement. The results suggest that employees are not treated as customers.

In Question 72, the respondents were asked to state their level of agreement regarding the statement that 'There is no customer feedback system'. It is obvious from the results that the majority of the sample (53.3%) reported that they were 'neutral' regarding the statement. In addition, 31.7% and 0.8% respectively, (a total of 32.5%) stated that they 'agree' and 'strongly agree'. On the other hand, around 14.2% claimed that they 'disagree' with the statement. The results, hence, indicates a negative indication regarding the customer feedback system through the oil and gas organisations, which necessitates urgent action to be taken in order to address this matter.

Concerning Question 73, an attempt was made to gauge the participants' perceptions on their level of agreement regarding the statement that 'In your organization there is an assessment system, which determines current and future customer requirements and expectations'. Table 6.21 show that a significant portion of the respondents (45.0%) indicated that they are 'neutral' regarding the statement, while 25.8% and 1.7% respectively, stated that they 'disagree' and 'strongly disagree'. In contrast, around 25.8% and 1.7% respectively answered that they 'agree' and 'strongly agree' with the statement. The results indicate that the sample organisations suffer from a lack of an assessment system which is considered a critical element of success.

Table 6.21: Internal and External Customer Satisfaction

		Frequency	Percent	Valid Percent	Cumulative Percent	**Mean value**	**Standard deviation**
Question 71: Each employee in Libyan oil and gas organisations treats colleagues as customers.							
Valid	strongly agree	5	4.2	4.2	4.2	2.76	0.879
	agree	49	40.8	40.8	45.0		
	neutral	36	30.0	30.0	75.0		
	disagree	30	25.0	25.0	100.0		
	strongly disagree	-	-	-	-		
	Total	120	100.0	100.0			
Question 72: There is no customer feedback system..							
Valid	strongly agree	1	0.8	0.8	0.8	2.81	0.677
	agree	38	31.7	31.7	32.5		
	neutral	64	53.3	53.3	85.8		
	disagree	17	14.2	14.2	100.0		
	strongly disagree	-	-	-	-		
	Total	120	100.0	100.0			
Question 73: In your organization there is an assessment system, which determines current and future customer requirements and expectation.							
Valid	strongly agree	2	1.7	1.7	1.7	3.00	0.810
	agree	31	25.8	25.8	27.5		
	neutral	54	45.0	45.0	72.5		
	disagree	31	25.8	25.8	98.3		
	strongly disagree	2	1.7	1.7	100.0		
	Total	120	100.0	100.0			
Question 74: The organization encourages employees to satisfy customers.							
Valid	strongly agree	4	3.3	3.3	3.3	2.62	0.832
	agree	59	49.2	49.2	52.5		
	neutral	38	31.7	31.7	84.2		
	disagree	17	14.2	14.2	98.3		
	strongly disagree	2	1.7	1.7	100.0		
	Total	120	100.0	100.0			
Question 75: The organization uses information from customer services to improve its processes and services.							
Valid	strongly agree	3	2.5	2.5	2.5	2.87	0.777
	agree	34	28.3	28.3	30.8		
	neutral	61	50.8	50.8	81.7		
	disagree	20	16.7	16.7	98.3		
	strongly disagree	2	1.7	1.7	100.0		
	Total	120	100.0	100.0			

(Data Analysis)

With regard to Question 74, the respondents were presented with the statement that 'The organization encourages employees to satisfy customers'. Based on the results presented in Table 6.21, almost half of the participants (49.2%) reported that they 'agree' with the statement. The answer was reinforced by 3.3% of the respondents stating that they 'strongly agree' with the statement. These two results represent a total of 52.5% of the sample. Meanwhile, almost a third of those who responded (31.7%) stated that they are 'neutral' regarding the statement. However, 14.2% and 1.7% (a total of 15.9%) of the respondents respectively indicated that they 'disagree' and 'strongly disagree' with the statement. As can be seen, these results were quite different from those of the previous question, which can be attributed to differentiation between organisations in terms of rules and procedures along with their operations.

Lastly, in Question 75, the participants were further asked to provide their opinion on the statement that 'The organization uses information from customer services to improve its processes and services'. As presented in Table 6.20, slightly above half of the participants (50.8%) answered that they were 'neutral', while, around 28.3% of those surveyed stated that they agree with the statement. Besides, 2.5% of the participants further reinforced the answer by stating that they 'strongly agree' with the statement. On the other hand, around 16.7% and 1.7% (a total of 18.4%) respectively indicated that they 'disagree' and 'strongly disagree' with the statement. The pattern for this question was similar to that of question 73. It is obvious that customer information systems are ineffectively employed.

6.4.11. Measurement and Evaluation

As part of exploring the potential obstacles for the efficient implementation of the TQM in Libyan oil and gas industry, this section aims to measure the perceptions of the participants in relation to measurement and evaluation as a possible obstacle to the successful and effective application of TQM. Thus, in order to investigate and assess this variable, four questions (Questions: 76 to 79) were designed and the findings are depicted in Table 6.22.

In relation to Question 76, the respondents were asked to state their level of agreement concerning the statement that 'In your organization quality is not effectively measured'. Based on the findings in Table 6.22, it is clear that less than half of the

respondents (49.2%) stated that they 'agree' with the statement, while 5.0% of the respondents opted for 'strongly agree' with the statement.

Table 6.22: Measurement and Evaluation

		Frequency	Percent	Valid Percent	Cumulative Percent	**Mean value**	**Standard deviation**
Question 76: In your organization quality is not effectively measured.							
Valid	strongly agree	6	5.0	5.0	5.0	2.64	0.906
	agree	59	49.2	49.2	54.2		
	neutral	28	23.3	23.3	77.5		
	disagree	26	21.7	21.7	99.2		
	strongly disagree	1	0.8	0.8	100.0		
	Total	120	100.0	100.0			
Question 77: Within Libyan oil and gas organisations product conformity is measured and monitored to guarantee that organisations actually meet all requirements.							
Valid	strongly agree	6	5.0	5.0	5.0	2.44	0 .719
	agree	65	54.2	54.2	59.2		
	neutral	39	32.5	32.5	91.7		
	disagree	10	8.3	8.3	100.0		
	strongly disagree	-	-	-	-		
	Total	120	100.0	100.0			
Question 78: The organisation promotes the use of statistical tools to monitor and measure products and processes for effectiveness and improvement.							
Valid	strongl y agree	5	4.2	4.2	4.2	2.63	0 .810
	agree	53	44.2	44.2	48.3		
	neutral	46	38.3	38.3	86.7		
	disagree	14	11.7	11.7	98.3		
	strongly disagree	2	1.7	1.7	100.0		
	Total	120	100.0	100.0			
Question 79: The oil and gas organisations have a sufficient measurement system for quality improvement							
Valid	strongly agree	3	2.5	2.5	2.5	2.71	0.824
	agree	53	44.2	44.2	46.7		
	neutral	41	34.2	34.2	80.8		
	disagree	22	18.3	18.3	99.2		
	strongly disagree	1	0.8	0.8	100.0		
	Total	120	100.0	100.0			

(Data Analysis)

In addition, 23.3% of those who responded stated that they are 'neutral' regarding the statement. In contrast, 21.7% and .8% (a total of 22.5%) respectively indicated that they 'disagree' and 'strongly disagree' with the statement. This percentage reflects the fact that over half of the sample (54.2%) answered that they 'agree' with the statement. It is useful to recognise that ineffective quality measurement systems are spreading across the oil and gas organisations, which could be considered as a negative indication.

Regarding Question 77, the respondents were presented with the statement that 'Within Libyan oil and gas organisations product conformity is measured and monitored to guarantee that organisation actually meets all requirements'. It can be seen from the results in Table 6.22 that 54.2% of the participants stated that they 'agree' with the statement. The answer was reinforced by 5.0% of the respondents who stated that they 'strongly disagree' with the statement. In addition, 32.5% of the respondents answered that they are 'neutral' regarding the statement, while 8.3% indicated that they 'disagree'. Accordingly, to the table, almost two-thirds (59.2%) of the participants were inclined to 'agree' with the statement. This suggests that product conformity is very important to both customers (especially the external) and organisations, owing to global market requirements and standardisation

Concerning Question 78, the respondents were asked to state their level of agreement regarding the statement that 'The organisation promotes the use of statistical tools to monitor and measure product and processes for effectiveness and improvement'. The findings presented in Table 6.22 indicate that around 44.2% and 4.2% (a total of 48.4%) respectively stated that they 'agree' and 'strongly agree' with the statement. This result can be further substantiated with a mean-value of 2.63, which was between 'agree' and 'neutral'. Meanwhile, more than a third of the respondents (38.3%) answered that they are 'neutral' regarding the statement. On the other hand, a total of 13.4% of those surveyed answered that they 'disagree' and 'strongly disagree' with the statement. It should be noted that this result supports the previous result, which suggests that there is some use of statistical tools as a way of improvement through monitoring and measuring products and processes. However, further efforts need to be made to increase the use of statistical tools and the awareness of statistical monitoring and measuring techniques.

The final question in this section is Question 79, which aims to measure the perceptions of the participants on the statement that 'The oil and gas organisations have a sufficient measurement system for quality improvement'. As the results in Table 6.22 depicts, 46.7% of the respondents stated that they 'agree' and 'strongly agree' with the statement. Meanwhile, 34.2% of the respondents answered that they are 'neutral' regarding the statement. However, 19.1% (in total) of the sample indicated that they 'disagree' and 'strongly disagree' with the statement. This last result differs from the response to Question 76, which is concerned, to some extent, with the same matter. However, this result may be explained by the fact that some of the sample organisations have achieved the ISO certificate, which they may consider to be a quality measurement tool.

6.4.12. Government Support

This section continues the discussion by providing an analysis concerning government support as a possible obstacle to the successful and effective application of TQM. Consequently, in order to investigate and assess this variable, four questions (Questions: 80 to 82) were designed and the findings are presented in Table 6.23.

Regarding question 80, the respondents were presented with the statement that 'There is no financial support from the government to help the organisation to implement a TQM system'. The findings in table 6.23 demonstrate that almost half of the respondents (47.5%) stated that they are 'neutral' regarding the statement. This was followed by 26.7% and 5.8% respectively, (a combined percentage of 32.5%) who answered that they 'disagree' and 'strongly disagree' with the statement. On the other hand, around 20.0% (in total) of the sample indicated that they 'agree' and 'strongly agree' with the statement. It seems that there is no direct and clear government support to assist oil and gas organisations to implement TQM effectively.

As for Question 81, the respondents were asked to identify the level of their agreement with the statement that 'There is no government pressure in terms of regulations and laws to force organisations to implement improvements in their quality management systems'. The results indicate that 42.5% of the participants reported that they were 'neutral' regarding the statement, with a mean-value of 3.00, which was around the third category for the answer (i.e. 'neutral'). In addition, 30.0% of them answered that they 'agree' and 'strongly agree' with the statement. However,

23.3% stated that they 'disagree' with the statement, while 4.2% indicated that they 'strongly disagree' with the statement. The result has roughly similar patterns compared to those of the previous question, which suggested that government is not willing to support organisations to in the implementation of such a philosophy.

Table 6.23: Government Support

		Frequency	Percent	Valid Percent	Cumulative Percent	**Mean value**	**Standard deviation**
Question 80: There is no financial support from the government to help the organisation to implement a TQM system.							
Valid	strongly agree	3	2.5	2.5	2.5	3.16	0.870
	agree	21	17.5	17.5	20.0		
	neutral	57	47.5	47.5	67.5		
	disagree	32	26.7	26.7	94.2		
	strongly disagree	7	5.8	5.8	100.0		
	Total	120	100.0	100.0			
Question 81: There is no pressure from the government in terms of regulations and laws to force the organisation to implement improvements in its quality management systems.							
Valid	strongly agree	2	1.7	1.7	1.7	3.00	0.870
	agree	34	28.3	28.3	30.0		
	neutral	51	42.5	42.5	72.5		
	disagree	28	23.3	23.3	95.8		
	strongly disagree	5	4.2	4.2	100.0		
	Total	120	100.0	100.0			
Question 82: There are inadequate studies from governmental departments to help guide the organisation in developing a TQM system.							
Valid	strongl y agree	4	3.3	3.3	3.3	2.58	0.740
	agree	54	45.0	45.0	48.3		
	neutral	52	43.3	43.3	91.7		
	disagree	8	6.7	6.7	98.3		
	strongly disagree	2	1.7	1.7	100.0		
	Total	120	100.0	100.0			

(Data Analysis)

Lastly, Question 82 focuses on the statement that 'There are inadequate studies from governmental departments to help guide the organisation in developing a TQM system'. Based on the results as presented in Table 6.23, a substantial portion of the respondents (45.0%) reported that they 'agree' with the statement. In addition, the answer was reinforced by 3.3% of the respondents who stated that they 'strongly agree' with the statement. Meanwhile, 43.3% of the sample stated that they are

‘neutral’ regarding the statement, and 8.4% stated that they ‘disagree’ and ‘strongly disagree’ with the statement. The result signifies that oil and gas organisations suffering from a lack of government support at all levels, which, hence, requires urgent and real efforts must be made to bridge the gap and address this obstacle.

6.4.13. Resources and Requirements of TQM

This section takes the analysis further by focusing on resources and requirements of TQM as a possible obstacle to the successful and effective application of TQM. In order to investigate and assess this variable, six questions (Questions: 83 to 88) were included in the questionnaire; and the findings are presented in Table 6.24a and Table 6.24b.

As regards to Question 83, the respondents were presented with the statement that ‘Time constraints prohibit effective total quality management implementation’. As can be seen in Table 6.24a, 50.8% of the respondents stated that they ‘disagree’ and ‘strongly disagree’ with the statement. Meanwhile, 30.8% of the respondents answered that they are ‘neutral’ regarding the statement. In contrast, around 18.4% (in total) of those surveyed stated that they ‘agree’ and ‘strongly agree’ with the statement. It is worth nothing that there is sufficient time, based on the question results, to implement TQM effectively. In other words there is no time constraint.

In relation to question 84, the participants identified their level of agreement regarding the statement that ‘There are adequate resources to effectively employ total quality management’. As the results in Table 6.24a shows, 40.8% of the respondents reported that they ‘disagree’ with the statement. Furthermore, 1.7% of the participants opted for ‘strongly disagree’ position and 21.7% of the participants answered that they are ‘neutral’. On the other hand, a total of 35.8% of the respondents indicated that they ‘agree’ and ‘strongly agree’ with the statement. It can be seen that the results are rather mixed, which can be attributed to the differences between the available resources in each organisation.

Table 6.24a: Resources and Requirements of TQM

Question 83: Time constraints prohibit effective TQM.							
		Frequency	Percent	Valid Percent	Cumulative Percent	**Mean value**	**Standard deviation**
Valid	strongly agree	2	1.7	1.7	1.7	3.34	0.855
	agree	20	16.7	16.7	18.3		
	neutral	37	30.8	30.8	49.2		
	disagree	57	47.5	47.5	96.7		
	strongly disagree	4	3.3	3.3	100.0		
	Total	120	100.0	100.0			
Question 84: There are adequate resources to effectively employ TQM.							
Valid	strongly agree	6	5.0	5.0	5.0	3.03	0.995
	agree	37	30.8	30.8	35.8		
	neutral	26	21.7	21.7	57.5		
	disagree	49	40.8	40.8	98.3		
	strongly disagree	2	1.7	1.7	100.0		
	Total	120	100.0	100.0			
Question 85: No proper organisational structure has been developed to implement TQM.							
		Frequency	Percent	Valid Percent	Cumulative Percent	**Mean value**	**Standard deviation**
Valid	strongl y agree	8	6.7	6.7	6.7	2.68	0.996
	agree	58	48.3	48.3	55.0		
	neutral	20	16.7	16.7	71.7		
	disagree	32	26.7	26.7	98.3		
	strongly disagree	2	1.7	1.7	100.0		
	Total	120	100.0	100.0			
Question 86: Insufficient technology and poor quality management practices currently exist in the oil and gas organisation.							
		Frequency	Percent	Valid Percent	Cumulative Percent	**Mean value**	**Standard deviation**
Valid	strongly agree	9	7.5	7.5	7.5	3.08	1.070
	agree	32	26.7	26.7	34.2		
	neutral	25	20.8	20.8	55.0		
	disagree	49	40.8	40.8	95.8		
	strongly disagree	5	4.2	4.2	100.0		
	Total	120	100.0	100.0			

(Data Analysis)

Concerning Question 85, the respondents were asked again to state the level of their agreement on the statement that 'No proper organisational structure has been

developed to implement TQM across the companies'. It is apparent from Table 6.24a, a significant portion of the respondents (48.3%) indicated that they 'agree' with the statement. In addition, 6.7% of the respondents stated that they 'strongly agree' with the statement. In fact, these two results represent a total of 55.0% of the total respondents, which, as a combined result, indicates that there were still some gaps in terms of appropriate organisation structure, as this is considered to be an essential aspect of TQM requirements. Thus, restructure is needed in order to address this matter urgently. Furthermore, 16.7% of those surveyed answered that they are 'neutral' regarding the statement. However, 26.7% and 1.7% (a total of 28.4%), respectively indicated that they 'disagree' and 'strongly disagree' with the statement.

As for question 86, those surveyed were further asked to illustrate their level of agreement on the statement that 'Insufficient technology and poor quality management practices currently exist in the oil and gas organisation'. The findings presented in Table 6.24a, indicate that a high proportion of the respondents (a total of 45.0%) answered that they 'disagree' and 'strongly disagree' with the statement. These results could be due to the importance and sensitivity of this sector, therefore sufficient technology and equipment are crucial for the entire organisation process. In addition, 20.8% of the respondents answered that they are 'neutral' regarding the statement. In contrast, around 26.7% of the sample indicated that they 'agree' with the statement. Moreover, 7.5% of the respondents answered that they 'strongly agree' on this statement.

Question 87 focused on the statement that 'There is a lack of properly qualified local consultants in TQM within the oil and gas sector'. As can be seen in Table 6.24b, 41.7% of the respondents reported that they 'agree' with the statement. This answer was reinforced by 10.0% of the respondents who stated that they 'strongly agree' with the statement. These two results represent 51.7% of the sample. Hence, the findings suggest that there are insufficient properly-qualified TQM consultants within the oil and gas organisations. Furthermore, almost a third (27.5%) of those who responded answered that they are 'neutral' regarding the statement, while 20.8% (in total) indicated that they 'disagree' and 'strongly disagree' with the statement. It is important, hence, to state that providing the oil and gas organisations with sufficient

qualified consultants are essential. Furthermore, the existing gap must be addressed as a matter of urgency.

Table 6.24b: Resources and Requirements of TQM

Question 87: There is a lack of local consultants properly qualified in TQM within the oil and gas sector.							
		Frequency	Percent	Valid Percent	Cumulative Percent	**Mean value**	**Standard deviation**
Valid	strongly agree	12	10.0	10.0	10.0	2.63	0.996
	agree	50	41.7	41.7	51.7		
	neutral	33	27.5	27.5	79.2		
	disagree	21	17.5	17.5	96.7		
	strongly disagree	4	3.3	3.3	100.0		
	Total	120	100.0	100.0			
Question 88: The Libyan oil and gas organisations do not generally allow time for TQM.							
		Frequency	Percent	Valid Percent	Cumulative Percent	**Mean value**	**Standard deviation**
Valid	strongly agree	6	5.0	5.0	5.0	2.99	1.017
	agree	38	31.7	31.7	36.7		
	neutral	33	27.5	27.5	64.2		
	disagree	37	30.8	30.8	95.0		
	strongly disagree	6	5.0	5.0	100.0		
	Total	120	100.0	100.0			

(Data Analysis)

The final question in this section is Question 88 which aims to analyse the responses given to the statement that 'Libyan oil and gas organisations do not generally allow time for TQM'. Based on the results in Table 6.24b, slightly over a third of the respondents (a total of 36.7%) reported that they 'agree' or 'strongly agree' with the statement; this outcome could be substantiated with a mean-value of 2.99, which is between the categories 'agree' and 'neutral'. On the other hand, slightly above a third of those who responded 35.8% (in total) indicated that they 'disagree' and 'strongly disagree' with the statement. In addition, the remaining 27.5% of the sample stated that they are 'neutral' regarding the statement. Indeed, this percentage reflects the fact that the overall responses to this question were mixed. This result may be explained by the fact that some of the sample organisations have a clear vision of TQM as a current target while the remaining do not.

6.4.14. Management attitude

As the final section, this part aims to explore participants' opinions on the management attitude a possible obstacle to the successful and effective application of TQM. For this, four questions (Questions: 89 to 92) were designed in line with two opening questions (Questions: 93 and 94). The findings are presented in Table 6.25.

Regarding Question 89, the respondents were presented with the statement that 'Within Libyan oil and gas organisations there are excessive layers of management'. Based on the findings presented in Table 6.25., it is obvious that slightly over a third of the respondents (38.3%) stated that they 'agree' with the statement. In addition, 5.8% of the respondents stated that they 'strongly agree' with the statement. On the other hand, 32.5% in total indicated that they 'disagree' and 'strongly disagree' with the statement. A high neutral position (23.3%) is also observed in this case. However, having 44.1% of the sample 'agreeing' with the statement indicates that there is deep concern regarding the excessive layers within these organisations.

As for Question 90, the participants were asked to determine their level of agreement regarding the statement that 'The organization uses tactical techniques for process analysis, control and improvement'. As in Table 6.25, 40.8% of the respondents answered that they are 'neutral' regarding the statement. This was followed by 33.3% (in total) of the sample who stated that they 'agree' and 'strongly agree'. In contrast, 25.9% (in total) indicated that they 'disagree' and 'strongly disagree' with the statement. The mixed perceptions can be explained by the fact that different levels, jobs and organisations perhaps generated different responses.

Concerning Question 91, the respondents were asked to give their opinions on the statement that 'There is frequent turnover of employees in Libyan oil and gas organisations'. Based on the results, 53.3% of the respondents claimed that they 'agree' with the statement, while 11.7% stated that they 'strongly agree' with the statement. These imply that migration of employees, particularly specialists and professionals, is prevalent across these organisations. Moreover, 19.2% (in total) of those who responded indicated that they 'disagree' and 'strongly disagree' with the statement. The remaining 15.8% were 'neutral'.

Table 6.25: Management Attitude

		Frequency	Percent	Valid Percent	Cumulative Percent	**Mean value**	**Standard deviation**
Question 89: Within Libyan oil and gas organisations there are excessive layers of management.							
Valid	strongly agree	7	5.8	5.8	5.8	2.85	1.001
	agree	46	38.3	38.3	44.2		
	neutral	28	23.3	23.3	67.5		
	disagree	36	30.0	30.0	97.5		
	strongly disagree	3	2.5	2.5	100.0		
	Total	120	100.0	100.0			
Question 90: The organization uses tactical techniques for process analysis, control and improvement.							
Valid	strongly agree	4	3.3	3.3	3.3	2.91	0.860
	agree	36	30.0	30.0	33.3		
	neutral	49	40.8	40.8	74.2		
	disagree	29	24.2	24.2	98.3		
	strongly disagree	2	1.7	1.7	100.0		
	Total	120	100.0	100.0			
Question 91: There is frequent turnover of employees in Libyan oil and gas organisations.							
Valid	strongly agree	14	11.7	11.7	11.7	2.44	0.968
	agree	64	53.3	53.3	65.0		
	neutral	19	15.8	15.8	80.8		
	disagree	21	17.5	17.5	98.3		
	strongly disagree	2	1.7	1.7	100.0		
	Total	120	100.0	100.0			
Question 92: Management style does not encourage and motivate individuals to be innovative and efficient.							
Valid	strongly agree	29	24.2	24.2	24.2	2.36	1.158
	agree	44	36.7	36.7	60.8		
	neutral	23	19.2	19.2	80.0		
	disagree	20	16.7	16.7	96.7		
	strongly disagree	4	3.3	3.3	100.0		
	Total	120	100.0	100.0			
Question 93: Do you think there are other barriers preventing the successful and effective implementation of TQM in the Libyan oil and gas organisations.							
Valid	yes	39	32.5	32.5	32.5	1.68	0.470
	no	81	67.5	67.5	100.0		
	Total	120	100.0	100.0			
Question 94: Do you have any other comments regarding the implementation of TQM in Libyan oil and gas organisations.							
Valid	yes	20	16.7	16.7	16.7	1.83	0.374
	no	100	83.3	83.3	100.0		
	Total	120	100.0	100.0			

(Data Analysis)

In relation to Question 92, the respondents were further presented with the statement that 'Management style does not encourage and motivate individuals to be innovative and efficient'. Based on the results in Table 6.25, 60.9% (in total) stated that they 'agree' and 'strongly agree' with the statement, this result can be further substantiated with a mean-value of 2.36. On the other hand, around 20.0% (in total) of those who responded claimed that they 'disagree' and 'strongly disagree' with the statement. Meanwhile, 19.2% of those surveyed answered that they are 'neutral'. The results indicate that there is a clear desire to enhance management style by establishing a system that can motivate and encourage the entire workforce to be creative and innovative, as having efficient and innovative staff is crucial to success.

As for Question 93, this question was designed as an opening question in order to reinforce the part and section findings and to provide actual outcomes in line with the previous results. Therefore, those surveyed were asked to provide their opinions and suggestions regarding the question 'Do you think there are other barriers preventing the successful and effective implementation of TQM in the Libyan oil and gas organisation'. Based on the survey outcome in Table 6.25, 67.5% answered 'no' to the question, while 32.5% answered 'yes'. Furthermore, those who answered 'yes' were required to state their suggestions and opinions. Around 43.5% of those who answered 'yes' mentioned that one of the leading barriers to successful and effective application is the lack of efficient awareness of the concept of TQM in some organisation areas. Around 30.7% of them suggested that 'lack of empowerment of employees and involvement in the process of continuous improvement' could also be a barrier. Moreover, around 23.0% of those who answered 'yes' indicated that 'inadequate and insufficient training programs concerning TQM across the sector' are other possible obstacles. Besides, around 25.6% of those who answered 'yes' stated that 'lack of management commitment is a possible obstacle' which exists in the organisations. Again, slightly over quarter (25.6%) reported that there was possibly 'a lack of expertise and qualified personnel regarding TQM' within the oil and gas sector. Furthermore, around 23.0% also stated that 'lack of clear awareness of TQM dimensions and lack of vision regarding the elements that assist the successful and effective implementation of TQM', are also considered as possible obstacles to introducing a successful form of TQM, while 23.0% mentioned the 'lack of team spirit and teamwork' as further possible barriers. In addition, 15.3% also referred to

the ‘lack of availability of the required resources’; and 12.8% considered ‘management style’ as a possible obstacle. Lastly, the remaining 12.8% of those who answered ‘yes’ stated that ‘lack of government support’ could be an existing obstacle to the successful and effective application of TQM within the oil and gas sector.

The final question in this section (Question 94) was also designed as an opening question in order to significantly reinforce findings and to obtain further actual results in line with those of the previous part. Thus, the respondents were further asked to provide opinions and suggestions regarding the question ‘Do you have any other comments regarding the implementation of TQM in Libyan oil and gas organisations’. Based on the survey results, the vast majority of respondents (83.3%) answered ‘no’ and 16.7% answered ‘yes’.

Consequently, those who answered ‘yes’ were required also to offer comments and proposals: 60.0% of those who answered ‘yes’ revealed that more attention needs to be paid to internal and external training programs regarding the concept of TQM and its importance as a matter of urgency. They also suggested that TQM has a significant effect on the entire workforce rather than just on production. In addition, they advised that the participating organisations should connect TQM philosophy with self-development programs and stressed that organisations must ensure training continuity in line with enhancing the technology within the sector. Moreover, they highlighted that more effort is needed from quality departments to establish a strong TQM culture throughout the sector. It is also worth noting that 20.0% of those who answered ‘yes’ commented that serious government support is needed to advise all Libyan oil and gas organisations to adopt the philosophy as a way of management. Moreover, around 15.0% mentioned that oil and gas organisations must provide their departments with the necessary resources, such as time and technology. Furthermore,15.0% of those who answered ‘yes’ claimed that manager at the oil and gas organisations must provide the sector with qualified consultants to deal with certain TQM matters. Lastly, around 10.0% of those who answered ‘yes’ stated that actual strong steps towards employees’ involvement and engagement need to be taken.

6.5. CONCLUSION

This chapter presents the empirical findings of the study with the primary data collected through questionnaire survey. As discussed so far, descriptive analysis was used in identifying and summarizing variables by utilizing SPSS v.19 software.

In the analysis, the demographic characteristic of the respondents' companies, respondents' position, size *etc.,* is discussed. Furthermore, quality awareness and understanding, awareness and understanding of quality management techniques, awareness and understanding of TQM concept, the importance and necessity of TQM to the companies, and the awareness and understanding of TQM are explored.

Although the findings suggests that management is willing to achieve the TQM philosophy in all companies, only a small segment of the managerial categories surveyed confirmed that TQM is the real business direction. In addition, the findings show that TQM philosophy is in its early stage in most of the companies studied.

Overall, the findings suggest that there are a set of barriers preventing the effective application of TQM within the surveyed companies. As each of the identified 'barriers and obstacles' is received a certain degree of support from the participants, some higher than the others. However, the relatively high nature percentage of 'neutral' position should require a careful attention as well. It seems that in each of the statements related to obstacles and barriers, sizeable percentage of the respondents opted for 'neutral' position. This could be either because they do not understand the issues or they do not like to reveal their true perceptions. Either of the position is, however, should be considered meaningful for initiating strategies to develop knowledge and understudying through training and also to develop a 'civil' environment in which opinions should be expressed openly to resolve the issues and problems. Considering that this questionnaire was conducted before the fall of the Gaddafi regime in Libya, and hope that the future can bring also 'democratic governance' in the oil and gas organisations.

The following chapter further presents and discusses the results of the actual application of TQM and the existing obstacles and barriers through the inferential data analysis.

Chapter 7

EXPLORING THE AWARENESS, KNOWLEDGE AND OBSTACLES OF TQM THROUGH THE PERCEPTIONS OF MANAGERIAL CATEGORIES OF LIBYAN OIL AND GAS ORGANISATIONS: INFERENTIAL STATISTICAL ANALYSIS

7.1. INTRODUCTION

Chapter 6 presented the descriptive primary data and initial analyses on the application of TQM and examining/identifying barriers to its effective implementation in the Libyan petro-chemical industry. This chapter is a continuation of Chapter 6 in providing inferential analysis on the primary data gathered through the fieldwork by carrying out a series of statistical methods in the form of Kruskal-Wallis test to provide a comparative analysis between several identified categories or control variables (*i.e.* organisation, age, qualification, position and experience). It should be mentioned that the statistical analysis used in this chapter aims to investigate the significance of the differences of the answers given to a particular statement in relation to the identified control variables including 'organisation', 'age', 'qualification', 'position' and 'experience'.

7.2. TESTING THE DIFFERENCES ON AWARENESS AND UNDERSTANDING OF QUALITY AMONG PARTICIPANTS

Initially, an attempt was made to measure the understanding of the participants in relation to 'quality' as a concept and its articulation. In doing so, answers given to relevant statements were analysed to demonstrate whether there are any statistically-significant differences in the given answers in relation to certain control variables using Kruskal-Wallis testing in terms of general awareness and understanding regarding the concept of quality, quality techniques, the concept of TQM and necessity of TQM within the study organisations according to the five control variables: 'organisation', 'age', 'qualification', 'position' and 'experience'.

In Question 8, the respondents were provided with a number of statements relating to their understanding of quality. The results from Table 7.1 show that there are no statically-significant differences in relation to ‘organisation’, ‘age’, ‘qualification’, ‘position’ and ‘experience’ related differences regarding the awareness and understanding of quality, as evidenced by the *p*-values of 0.397, 0.716, 0.247, 0.361 and 0.577 respectively, as the *p*-values are significantly higher than the significance level of 0.05. It seems that all the groups in each control variable have roughly similar perceptions regarding the concept of quality. However, in terms of ‘organisation’ it seems that AGACO staff has a higher mean score, indicating a better understanding. In addition, the findings also show that the ‘20-30 age group’ has a better understanding as evidenced from the higher mean group. Despite not being significant, the following groups have a higher mean as indicated in Table 7.1, and hence have a better understanding of the issues involved: ‘staff with higher qualifications’, top management’, and those with ‘5-10 years’ experience’.

The result from the Kruskal-Wallis test in Table 7.1 indicates that there is a statistically-significant difference regarding Question 9, namely awareness and understanding of quality management techniques, with regards to ‘organisation’, ‘position’ and ‘experience’, as indicated by their respective probability levels, p = 0.000, p = 0.056 and p = 0.013. In terms of mean ranking, the results in Table 7.1. show that staff from AGOCO have the statically highest mean score (80.68), followed by RASCO (50.40) and SOC (45.55) in terms of their awareness and understanding of quality techniques. As regards to ‘position’ variable, the results show that respondents in top management positions have the highest mean score (74.50), followed by middle management, then heads of division, administrators, coordinators, supervisors and lastly controllers. Referring to experience sub-categories, respondents with less than 5 years’ experience reflect among the highest differences of understanding with a mean score of 109.50, while the lowest mean score (44.16) comes from those with 5-10 years of experience.

Table 7.1: Measuring Awareness and Understanding

N0.	Questions	Organisation	Mean Rank	Asym p Sig. *(P)*	Age	Mean Rank	*(P)*	Qualification	Mean Rank	*(P)*	Position	Mean Rank	*(P)*	Experience	Mean Rank	*(P)*
8	Understanding and awareness of quality	RASCO SOC AGOCO	55.18 62.23 64.51	.397	20-30 31-40 41-50 51-60 > 60	71.80 58.59 57.25 66.25 52.00	.716	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	18.00 55.60 58.73 68.67 50.00	.247	Top management Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	75.75 56.82 54.29 49.67 66.85 53.37 74.50	.361	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	18.00 68.29 55.06 66.57 59.56 55.00 57.94	.577
9	Understanding and awareness of quality management techniques	RASCO SOC AGOCO	50.40 45.55 80.68	.000	20-30 31-40 41-50 51-60 > 60	71.70 51.66 67.11 62.07 66.75	.181	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	46.50 64.63 66.87 50.64 59.10	.141	Top management Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	74.50 72.32 48.81 41.50 65.24 64.67 61.08	.056	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	109.50 44.16 70.73 53.32 69.29 62.18 65.17	.013
10	Understanding and awareness of TQM concept	RASCO SOC AGOCO	56.26 59.23 65.52	.407	20-30 31-40 41-50 51-60 > 60	80.80 57.05 62.33 58.08 83.75	.462	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	107.0 50.87 65.27 59.36 48.50	.220	Top management Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	79.25 56.04 49.22 57.22 62.55 74.03 63.75	.215	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	107.00 63.19 60.08 58.21 56.53 71.73 54.73	.614
11	Understanding the necessity of TQM for the organisation	RASCO SOC AGOCO	53.64 59.34 68.01	.035	20-30 31-40 41-50 51-60 > 60	45.50 66.27 60.83 55.30 45.50	.241	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	45.50 67.50 56.19 63.76 62.50	.478	Top management Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	45.50 65.71 59.67 52.61 62.62 63.90 56.17	.677	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	45.50 59.67 72.96 67.79 52.79 50.32 55.54	.098

(Data Analysis)

In the next step, an attempt was made to demonstrate whether there are any statically-significant differences regarding the understanding and awareness of the concept of TQM (Question 10) across the control variables. The Kruskal-Wallis test results in Table 7.1 suggest that there is no statistically significant difference in understanding and awareness levels across the five control variables groups, as the probabilities for each control variable is higher that the critical value: 'organisation' (p = 0.407), 'age' (p = 0.462), 'qualification' (p = 0.220), 'position' (p = 0.215 and 'experience' (p = 0.614).

The results of the last question in this section, Question 11, are shown in Table 7.1 and indicate that there are no statically-significant differences in respect of the necessity of TQM with regards to 'age', 'qualification' and 'position', since the estimated statistics are higher than the significant level of 0.05. On the other hand, the estimates suggest that there is a significant difference in the case of 'organisation', as the p-value of 0.035 is lower than 0.05, and also 'experience' group with p=0.098, as the estimated statistics are lower than the critical level of 0.10. Based on the 'organisation' mean value score, AGOCO ranked the highest with a mean score of 68.01, SOC ranked second with a mean score of 59.34 and lastly RASCO (mean = 53.64). In addition, the findings also show that those with 11-15 years of experience have a better understanding of the necessity of TQM for their organisation as evidenced from the higher mean group.

7.3. TESTING THE DIFFERENCES ON AWARENESS AND UNDERSTANDING OF TQM AMONG THE PARTICIPANTS

The analysis of the following five questions was intended to determine whether there are any significant statistical differences in terms of levels of awareness and understanding of TQM according to the five control variables also by employing the Kruskal- Wallis test.

Regarding Statement 12 (In your organisation quality is treated as a separate initiative), the outcome from the Kruskal-Wallis test in Table 7.2 suggests that there is no statistically-significant difference among the control variables concerning the statement provided. This can be seen from statistical estimates (p-values) for 'age' (p = 0.845), 'qualification' (p = 0. 322), 'position' (p = 0. 464) and 'experience' (p = 0.

362), which are higher than tabular *p*-value of 0.05. However, the result suggests otherwise regarding 'organisation' (p = 0.094) with the extended critical value of p=0.10, indicating that coming from different organisations make a difference in the answers given to the statement that 'quality is treated as a separate initiative in the respective organisations.

The results in Table 7.2 indicate that, statistically, there is no significant difference in the answers given to Statement 13 (Most employees in Libyan oil and gas organisations have a full awareness and understanding of the concept of TQM) in relation to control variables: 'organisation', 'age', 'qualification', 'position' and 'experience' as evidenced in the *p*-values of 0.126, 0.162, 0.472, 0.814 and 0.342, respectively. Despite not being significant, the mean ranking as indicated in Table 7.2 show the differences in their responses on this issue: 'AGACO staff', 'over 60 years old age group', 'staff with higher studies', 'administrators', and those with 'less than 5 years' experience' as sub-categories for each control group scored the highest mean value compared to others.

Referring to Statement 14 (There is a lack of understanding of the purposes of TQM in Libyan oil and gas organisations), the results apparent from the Kruskal-Wallis tests reveal that there is no significant difference for 'qualification', 'position' and 'experience'. This is evidenced from the *p*-values of 0.853, 0.398, 0.330 and 0.154 respectively, which are clearly higher than critical *p*-value of 0.05. On the other hand, the observations also suggest that there is a significant difference in groups according to age p = 0.056, since the estimated statistics are lower than the significant level of p = 0.10.

The outcome in Table 7.2 also indicates that there is no statistically-significant difference regarding question 15 across four control variable groups in terms of their awareness and understanding level concerning TQM. Conversely, the 'experience' group p = 0.074 indicates statistical differences, since the respective *p*-values are significantly lower than the significant 0.10 confidence level.

Table 7.2: Measuring Awareness And Understanding Of TQM

N0.	Questions	Organisation	Mean Rank	Asymp Sig. *(P)*	Age	Mean Rank	*(P)*	Qualification	Mean Rank	*(P)*	Position	Mean Rank	*(P)*	Experience	Mean Rank	*(P)*
12	In your organisation quality is treated as a separate initiative	RASCO SOC AGOCO	68.59 59.39 53.36	.094	20-30 31-40 41-50 51-60 > 60	47.30 63.63 59.21 59.37 69.00	.845	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	96.00 46.20 64.30 60.22 58.60	.322	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	71.83 53.36 60.69 75.22 63.38 48.77 52.50	.464	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	1.50 62.17 64.29 62.61 51.00 72.18 57.29	.362
13	Most employees in Libyan oil and gas organisations have a full awareness and understanding of the concept of TQM	RASCO SOC AGOCO	57.86 53.24 68.08	.126	20-30 31-40 41-50 51-60 > 60	80.30 62.74 57.19 55.50 104.00	.162	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	51.50 53.70 62.71 64.13 45.30	.472	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	53.75 65.96 55.36 66.00 58.73 70.03 59.33	.814	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	117.50 59.98 62.83 53.00 71.88 53.82 55.79	.342
14	There is a lack of understanding of the purposes of TQM in Libyan oil and gas organisations	RASCO SOC AGOCO	59.80 63.26 59.29	.853	20-30 31-40 41-50 51-60 > 60	49.30 56.27 54.89 75.18 71.50	.056	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	103.0 69.30 58.17 57.47 67.65	.398	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	76.08 57.79 62.33 51.72 65.80 45.30 57.33	.330	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	81.00 56.19 56.77 54.96 52.32 61.41 77.19	.154
15	There are difficulties in learning and implement TQM systems	RASCO SOC AGOCO	66.17 61.55 54.23	.233	20-30 31-40 41-50 51-60 > 60	57.30 54.83 58.80 71.25 63.25	.336	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	64.00 72.83 59.53 58.42 55.10	.638	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	57.92 55.57 64.07 63.83 65.44 40.40 68.83	.274	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	30.50 55.50 50.00 77.14 58.94 52.86 73.19	.074
16	The high costs of implementing TQM management outweigh the benefits	RASCO SOC AGOCO	67.27 63.15 52.06	.074	20-30 31-40 41-50 51-60 > 60	46.40 58.17 57.28 67.08 111.50	.100	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	111.5 52.67 62.73 62.27 48.00	.264	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	80.25 54.68 65.71 60.83 57.40 54.47 64.92	.615	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	28.00 59.43 55.58 54.82 66.68 64.09 65.35	.767

(Data Analysis)

The last question in this section is Statement 16 (The high costs of implementing TQM management outweigh the benefits), for which the results in Table 7.2 indicate that there is no statically-significant difference concerning awareness and understanding of TQM regarding 'age', 'qualifications', 'position' and 'experience'. On the other hand, the 'organisation' group with p = 0.074 shows statistical differences with the extended confidence level of 0.010.

It is worth noting that based on the above results there is very little statistically-significant difference in relation to levels of awareness and understanding concerning TQM among the respondents. In other words, the respondents have almost similar views, awareness and understanding of the philosophy of TQM.

7.4. RANKING OF BARRIERS TO EFFECTIVE IMPLEMENTATION OF TQM IN THE LIBYAN PETRO-CHEMICAL INDUSTRY

The purpose of this section is to rank the observed obstacles and barriers in front of the implementation process of TQM through mean scores obtained from the analysis.

As depicted in Table 7.3, all fourteen TQM obstacles have a mean range from 2.684 to 2.246 on a 5-point Likert scale, where the mean value assists to rank the obstacles from strongest to weakest. The obstacle of 'information and communication' scored the highest overall mean of 2.684 which implies that lack of appropriate information and communication is considered to be the most significant obstacle to the successful and effective implementation of TQM in the organisations involved in the study, followed by 'employee resistance to change' (with mean=2.67) which is ranked second, then 'management style' (with mean=2.64) ranked third, followed by 'teamwork' (with mean=2.617) ranked fourth, 'internal and external customer satisfaction' (with mean=2.612) fifth, 'measurement and evaluation' (with mean=2.605) ranked sixth. These are the only obstacles that exceeded the middle level of 1-5 (2.5 mean value accordingly) on the Likert scale and were considered as the most commonly agreed obstacles group.

In addition, the obstacles that scored in the middle range of the Likert scale were 'organisational culture' (mean=2.575) and 'continuous improvement and innovation' (mean=2.505). Other obstacles that scored in the low range of the Likert scale and

were considered as the least commonly agreed obstacles, which are ‘resources and requirements of TQM’ (mean=2.458), ‘top management and leadership commitment’ (mean=2.441), ‘employee training, development and education’ (mean=2.405), ‘quality strategic planning’ (mean=2.388), ‘employee involvement and empowerment’ (mean=2.33) and ‘government support’ being the lowest at 2.246. The results, therefore, clearly indicate that all the obstacles are equally important and affect the implementation process regardless of the ranking.

Table 7.3: Ranking the Obstacles based on Mean Score

Ranking	Obstacles	Mean value
1	Information and Communication	2.684
2	Employee Resistance to Change	2.67
3	Management Style	2.64
4	Teamwork	2.617
5	Internal and External Customer Satisfaction	2.612
6	Measurement and Evaluation	2.605
7	Organisational Culture	2.575
8	Continuous Improvement and Innovation	2.505
9	Resources and Requirements of TQM	2.458
10	Top Management and Leadership Commitment	2.441
11	Employee Training, Development and Education	2.405
12	Quality Strategic Planning	2.388
13	Employee Involvement and Empowerment	2.33
14	Government Support	2.246

(Data Analysis)

7.5. TESTING THE DIFFERENCES ON THE OBSTACLES FACED IN THE IMPLEMENTATION OF TQM

This section is designed to investigate, using Kruskal- Wallis testing, whether there are any statistically-significant differences in the answers in relation to certain control variables regarding the obstacles and barriers faced in the implementation of TQM within the sampled petro-chemical organisations.

7.5.1. Top management and leadership

The results from Table 7.4 show that, statistically, there is no significant difference concerning Statement 17 (Top management of Libyan oil and gas organisations is visibly and explicitly committed to quality) in relation to ‘organisation’, ‘age’,

‘qualification’, ‘position’ and ‘experience’, as evidenced by the respective *p*-values of 0.881, 0.500, 0.449, 0.375 and 0.963, which are higher than critical *p*-value of 0.05. This implies that all respondents had similar opinions regarding whether top management of Libyan oil and gas organisations are visibly and explicitly committed to quality. On the other hand, in relation to ‘organisation’ it seems that SOC staff has a higher mean score indicating a high level of agreement. In addition, the findings also show that the 20-30 age group, those with baccalaureate level education, the administrators, and those with less than 5 years’ experience have the highest mean score.

Referring to Statement 18 (There is frequent turnover of management), the Kruskal-Wallis test results in Table 7.4 suggest that there is no significant difference in relation to the statement across ‘age’ (p = 0.306), ‘qualification’ (p = 0.371), ‘position’ (p = 0.464) and ‘experience’ (p = 0.146), as they all have *p*-score higher than critical *p*-value of 0.05. However, the result also suggests that there is a statistically-significant difference between ‘organisation’ variable, whose *p*-value value of 0.016 is significantly lower than the significance level of 0.05. Based on the mean-value score, SOC (with mean=68.81) ranked the highest, then RASCO (with mean=65.41) and lastly AGOCO (with mean=49.98).

In relation to Statement 19 (The top management and leaders of Libyan oil and gas organisations listen to the voice of employees when they raise matters related to quality improvement and show visible commitment and take ownership of improvement processes), from Table 7.4, it is clear that ‘organisation’ (p = 0.509), ‘age’ (p = 0.133), ‘qualification’ (p = 0. 803), ‘position’ (p = 0. 240) and ‘experience’ (p = 0. 973) are not statistically significant in terms of differences between their subgroups concerning their views regarding the statement.

As for the K-W test results for Statement 20 (There is a lack of top management commitment to TQM generally within the Libyan oil and gas), there is no statistically significant differences in relation to ‘organisation’ (p = 0. 251), ‘qualification’ (p = 0.895) and ‘experience’ (p = 0.984). However, the results suggest that there is significant difference foe ‘age’ (p = 0.043) and ‘position’ (p = 0. 028). Accordingly, respondents falling in the age sub-group of 51-60 years obtained the highest mean rank of 72.80. On the other hand, the lowest age sub-group relates to respondents of

over 60 years with a mean ranking value of 28.50. The highest position group is those who are in the top management position who have the highest mean score of 73.67, followed by supervisors, heads of division, middle management, coordinators, controllers and lastly administrators.

As indicated in Table 7.4, there is a statistically-significant difference regarding Statement 21 (Top management provides financial support to the employees to apply and improve quality programs within the organisations) across the 'age', 'position' and 'experience' variables who express different views with *p*-values of 0.010, 0.028 and 0.067 respectively with statistical *p*-value level of 0.10 and 0.05. In terms of mean ranking, the result suggests that the 20-30 years old group (the youngest) has the highest mean score (94.80). For highest position group, it is clear that the administrators sub-group has statistically the highest mean ranking (87.97) and, in contrast, the lowest mean ranking is with top management (42.50). However, it is also apparent from this table that there is no statistically-significant difference in the 'organisation group' ($p = 0.405$) or the 'qualification' group ($p = 0.806$).

Based on the outcome in Table 7.4, there is a significant difference concerning Statement 22 (There is no leadership on quality issues in the oil and gas organisations) in relation to the three control variables including 'organisation', 'age' and 'position' with the *p*-values; 0.000, 0.054 and 0.017 respectively. Accordingly, RASCO has the highest mean score for 'organisation' (mean=75.68), then SOC (mean=62.42) and lastly AGOCO (mean=44.33). The result also ranked the five 'age' groups from highest to lowest mean ranking regarding their different perceptions regarding the statement. The highest among the five is age group of over 60 years with a mean score of 103.75, then 51-60 (mean = 66.55), 31-40 (mean = 61.42), 41-50 (mean = 56.38), and lastly 20-30 (mean = 32.00). In relation to the highest position groups, it is clear that top management, with a mean rank of 81.50, ranked the highest. On the other hand, the administrators sub-group, with a mean rank of 43.00, ranked lowest among the sub-groups. The remaining two control variables 'qualification' and 'experience' based on the observations of the Kruskal-Wallis test show no significant difference regarding the statement, as the *p*-value of 0.750 and 0.358 respectively, are higher than 0.05.

Table 7.4: Top Management and Leadership Commitment

N0.	Questions	Organisation	Mean Rank	Asymp Sig. (P)	Age	Mean Rank	(P)	Qualification	Mean Rank	(P)	Position	Mean Rank	(P)	Experience	Mean Rank	(P)
17	Top management of Libyan oil and gas organisations is visibly and explicitly committed to quality	RASCO SOC AGOCO	59.14 62.87 60.20	.881	20-30 31-40 41-50 51-60 > 60	79.60 62.44 61.15 53.55 62.25	.500	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	40.00 47.40 63.69 62.42 57.15	449	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	41.42 71.18 56.02 63.44 57.66 71.47 63.92	.375	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	83.50 61.22 62.17 63.79 59.44 61.95 55.17	.963
18	There is frequent turnover of management	RASCO SOC AGOCO	65.41 68.81 49.98	.016	20-30 31-40 41-50 51-60 > 60	72.70 62.91 52.14 66.20 60.00	.306	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	94.00 64.40 60.57 62.28 43.95	.371	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	67.58 45.50 67.53 66.61 57.70 62.00 60.67	.464	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	119.50 67.84 57.17 59.71 48.00 52.05 65.69	.146
19	The top management and leaders of Libyan oil and gas organisations listen to the voice of employees when they raise matters related to quality improvement and show visible commitment and take ownership of improvement processes	RASCO SOC AGOCO	60.33 55.32 64.23	.509	20-30 31-40 41-50 51-60 > 60	84.40 59.83 62.01 58.65 12.75	.133	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	23.50 60.20 59.95 63.15 57.30	.803	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	41.42 53.36 54.67 69.28 62.12 66.97 84.00	.240	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	66.50 58.71 65.65 62.39 62.21 57.59 56.29	.973
20	There is a lack of top management commitment to TQM generally within the Libyan oil and gas	RASCO SOC AGOCO	66.51 60.08 54.91	.251	20-30 31-40 41-50 51-60 > 60	35.80 61.07 55.35 72.80 28.50	.043	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	91.00 57.73 59.78 62.12 59.25	.895	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	73.67 56.29 71.31 45.22 65.17 38.73 50.33	.028	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	55.00 60.69 56.67 65.75 57.29 64.00 61.94	.984
21	Top management provides financial support to the employees to apply and improve quality programs within the	RASCO SOC AGOCO	64.45 53.98 61.12	.405	20-30 31-40 41-50 51-60 > 60	94.80 68.33 58.74 46.00 59.25	.010	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	93.00 55.47 59.17 62.79 63.15	.806	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator	42.50 51.32 60.41 49.33 58.34 87.97	.028	<5 years 5-10 11-15 16-20 21-25 26-30	57.00 68.60 69.69 66.07 46.94 65.86	.067

	organisations										Coordinator	63.17		30-more	45.56	
22	There is no leadership on quality issues in the oil and gas organisations	RASCO SOC AGOCO	75.68 62.42 44.33	.000	20-30 31-40 41-50 51-60 > 60	32.00 61.42 56.38 66.55 103.75	.054	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	89.00 63.13 59.25 62.82 51.50	.750	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	81.50 72.89 72.41 50.67 54.60 43.00 51.83	.017	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	44.00 62.60 52.10 70.79 56.35 49.45 69.04	.358
23	The top management of oil and gas organisations act on suggestions to improve the quality and services	RASCO SOC AGOCO	56.65 57.50 66.33	.286	20-30 31-40 41-50 51-60 > 60	98.30 59.40 62.25 57.28 3.00	.006	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	38.00 56.47 61.05 59.26 70.60	.758	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	32.17 59.39 54.10 68.78 56.18 88.30 69.92	.003	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	88.50 61.38 67.98 57.79 58.59 60.00 53.96	.757
24	Top management shows interest in quality improvement processes	RASCO SOC AGOCO	53.93 58.79 68.10	.090	20-30 31-40 41-50 51-60 > 60	107.40 65.97 53.95 57.32 4.50	.000	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	43.00 59.90 59.95 61.94 60.60	.980	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	36.58 60.18 55.88 55.89 59.34 85.37 60.17	.027	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	94.50 70.24 64.65 62.32 52.85 48.86 52.85	.193
25	Top management provides necessary resources to fulfil overall organizational objectives	RASCO SOC AGOCO	54.13 68.58 61.17	.138	20-30 31-40 41-50 51-60 > 60	73.10 59.59 64.66 58.05 2.00	.065	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	36.50 55.10 59.52 66.04 54.80	.613	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	39.50 60.29 65.36 71.33 58.63 59.20 58.25	.576	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	89.00 55.43 69.19 66.39 70.38 50.82 50.75	.166
26	Leaders in the organisation are committed to quality and lead the employees towards quality management	RASCO SOC AGOCO	54.45 66.84 62.04	.245	20-30 31-40 41-50 51-60 > 60	91.00 61.97 63.70 49.47 54.25	.077	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	30.50 42.87 65.06 62.60 56.65	.154	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	38.42 70.54 55.26 72.94 53.70 75.90 73.83	054	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	106.50 64.53 60.27 52.46 73.56 59.77 49.71	.190

(Data Analysis)

The results from the test in Table 7.4 concerning the Statement 23 (The top management of oil and gas organisations act on suggestions to improve the quality and services) signify that there is no statistically-significant difference for the three control variables: ‘organisation’, ‘qualification’, and ‘experience’, while in the ‘age’ and ‘position’ groups the outcomes suggest otherwise. This is evident for the latter from the *p*-values of 0.006 and 0.003 respectively, which are lower than *p*-value of 0.05. As can be seen from the table, the highest mean score in the ‘age’ groups is in the sub-group of 20-30 years (mean=98.30), then 41-50 (mean=62.25), 31-40 (mean=59.40), followed by 5-60 (mean=57.28) and lastly over 60 years old (mean= 3.00). The highest position group, is the administrators with a mean rank of (88.30), followed by coordinators, controllers, middle management, heads of division, supervisors and surprisingly the lowest score is top management with a mean rank of 32.17.

As indicated in Table 7.4, the results for Statement 24 (Top management shows interest in quality improvement processes) suggests that there is no statistically-significant difference in two of the control variables: ‘qualification’ and ‘experience’.. However, there is significant statistical difference for ‘organisation’, ‘age’ and ‘position’ in terms of the opinions expressed, as evidenced in the *p*-values of 0.090, 0.000 and 0.027 respectively, which are lower than critical *p*-value of 0.10 and hence 0.05. Based on the mean value score, for ‘organisation’ highest mean score AGOCO ranked the highest (mean=68.10), and respondents aged between 20-30 years (mean=107.40) ranked as the highest group, then 31-40 (mean=65.97), followed by 51-60 (mean=57.32), 41-50 (mean=53.95), and lastly over 60 years old (4.50). For the highest position group, it is apparent from the result that the administrators group, with a mean rank of 85.37, ranked as highest subgroup, followed by middle management, coordinators, heads of division, controllers, supervisors and the lowest score is top management with a mean rank of 36.58.

It can be seen from the results in Table 7.4 that there is no statistically-significant difference concerning Statement 25 (Top management provides necessary resources to fulfil overall organizational objectives) across the control variables: ‘organisation’ (p = 0.138), ‘qualification’ (p = 0.613), ‘position’ (p = 0.576) and ‘experience’ (p = 0.166). However, the outcome suggests that for age (p = 0.065) the difference of

opinions should be considered significant with the extended critical value of *p*-value of 0.10. The result signifies that a high proportion of respondents have a similar view regarding the statement that 'top management provides necessary resources to fulfil overall organisational objectives'. In other words, it seems that there is not much difference between the groups in each control variable concerning the statement.

As can be seen from the results in Table 7.4, there is no statistically significant difference regarding the Statement 26 (Leaders in the organisation are committed to quality and lead the employees towards quality management) among the groups: 'organisation' (p = 0.245), 'qualification' (p = 0.154) and 'experience' (p = 0.190), since all the mentioned *p*-values are higher than significant *p*-value 0.05, while in the 'age' and 'position' groups the results suggest otherwise. This can be seen from *p*-values of 0.077 and 0.054, which are lower than critical *p*-value of 0.10. The results also show that the highest mean rank in the 'age' group is in the sub-group 20-30 years (mean=91.00); for 'position', the administrators has the highest mean ranking (mean=75.90), followed by coordinators (mean=73.83); controllers (mean=72.94), middle management (mean=70.54); supervisors (mean=55.26); heads of division (mean=53.70) and the lowest mean rank is with the top management (mean=38.42).

7.5.2. Organisational Culture

This section aims to identify any significant differences between the determined variables and the statements related to organisational culture being the obstacles for the implementation of TQM in Libyan oil and gas companies.

The statement in Question 28 refers to whether 'the promotion management style within the oil and gas organisations depends on qualifications or not'. As can be observed in Table 7.5, 'age' (*p*-value = 0.121), 'qualification' (*p*-value = 0.492), 'position' (*p*-value = 0.368) and 'experience' (*p*-value = 0.509) as control variables are not significant statistical difference indicating that their opinions regarding the statement are very close. However, there is a significant difference for 'organisation' groups (p = 0.011), since the *p*-value is lower than the critical *p*-value of 0.05. Referring to 'organisation' sub-category, hence, SOC obtained the highest mean ranking with 75.19, followed by RASCO with mean ranking of 58.60, and lastly AGOCO with mean ranking of 52.23.

Table 7.5: Organisational Culture

N0.	Questions	Organisation	Mean Rank	Asymp Sig. *(P)*	Age	Mean Rank	*(P)*	Qualification	Mean Rank	*(P)*	Position	Mean Rank	*(P)*	Experience	Mean Rank	*(P)*
28	The promotion of managers in departments within the oil and gas organisation is not based on qualifications and skills	RASCO SOC AGOCO	58.60 75.19 52.23	.011	20-30 31-40 41-50 51-60 > 60	53.80 56.20 63.30 67.45 9.50	.121	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	9.50 64.50 58.38 64.15 57.00	.492	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	65.75 66.07 56.24 47.83 64.63 50.03 79.75	.368	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	42.50 62.74 56.48 45.79 69.44 59.73 65.17	.509
29	A bureaucratic culture is prevalent in the oil and gas organisation	RASCO SOC AGOCO	60.48 63.32 58.58	.830	20-30 31-40 41-50 51-60 > 60	69.30 57.08 61.60 63.55 44.25	.814	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	11.50 53.60 62.69 58.94 69.80	.419	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	81.42 56.18 57.50 50.22 64.62 57.60 58.67	.616	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	77.00 62.95 61.65 43.00 63.03 49.14 69.33	.289
30	Many people in the oil and gas organisations are appointed to positions without having the skills to undertake the role effectively	RASCO SOC AGOCO	61.48 70.18 52.88	.081	20-30 31-40 41-50 51-60 > 60	40.70 60.48 57.88 67.60 56.50	.492	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	39.50 67.30 58.30 62.32 57.40	.832	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	72.00 47.43 67.40 58.72 65.11 42.37 62.67	.152	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	39.50 60.36 63.58 59.14 55.68 52.41 66.38	.881
31	The Libyan culture and traditions influence quality management, as paying attention to quality is not necessarily a traditional matter	RASCO SOC AGOCO	59.10 62.65 60.39	.897	20-30 31-40 41-50 51-60 > 60	73.20 57.80 57.00 65.90 75.75	.593	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	85.00 69.03 61.22 53.73 67.70	.432	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	54.92 52.68 58.40 61.50 64.83 58.50 68.42	.894	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	44.50 60.28 60.15 49.64 63.62 54.59 68.63	.700

(Data Analysis)

As for Statement 29 (A bureaucratic culture is prevalent in the oil and gas organisation), the findings shown in Table 7.5 indicates that there is no significant statistical difference across the control variables regarding the statement, since the *p*-values of 'organisation' (p = 0.830), 'age' (p = 0.814), 'qualification' (p = 0.419), 'position' (p = 0.616) and 'experience' (p = 0.289), are clearly higher than critical value of 0.05.

Regarding Statement 30 (Many people in the oil and gas organisations are appointed to positions without having the skills to undertake the role effectively), as can be seen from the data in Table 7.5, 'age', 'qualification', 'position' and 'experience' show no statistically significant differences regarding the statement. In contrast, there is a significant difference with regards to 'organisation' groups (*p*-value = 0.081) as the *p*-value is lower than the critical *p*-value of 0.10.

As for Statement 31 (The Libyan culture and traditions influence quality management, as paying attention to quality is not necessarily a traditional matter), the K-W test results in Table 7.5 suggest that there is no significant difference between the identified individual control variable and the statement - 'organisation' (p = 0.897), 'age' (p = 0.593), 'qualification' (p = 0.432), 'position' (p = 0.894) and 'experience' (p = 0.700), as their *p*-value is higher than the critical *p*-value of 0.05.

It is clear that in the last two statement (29 and 31) the sub-groups in the control variables did not seem to differ in their views and attitudes regarding the statements provided.

7.5.3. Employee Involvement and Empowerment

This section aims to locate if there are any significant differences between control variables and their sub-categories in the answers they provided to the aspects of employee involvement and empowerment as a barrier and obstacles to efficient implementation of TQM in Libyan oil and gas organisations.

The findings presented in Table 7.6 indicate that there is no statistical significant difference for the statement in Question 32 (Within Libyan oil and gas organisations employees are empowered to implement quality improvement efforts) concerning 'organisation' and 'qualification' since the estimated statistics exceed the critical

statistical level of 0.05. However, the findings suggest that there are statistically-significant differences as regards ‘age’, ‘position’ and ‘experience’ with estimated statistics being 0.043, 0.034 and 0.048 respectively. The mean result from ‘age’ shows that the youngest age group of 20-30 years has the statistically highest mean ranking with 91.70, followed by 51-60 years (mean=65.98), 41-50 (mean=61.34), 31-40 (mean=53.06), then over 60 with a mean rank of 43.50, while in the ‘position’ group, it specifies that the coordinators group (mean=80.42) has a statistically higher mean rank on this statement compared to top management with the lowest mean rank (mean=51.92). For the experience sub-group respondents with 21-25 years of experience obtained the highest mean rank (mean=76.65) and the lowest mean rank (mean=63.19) was scored by those of 30 years or above.

With regard to Statement 33 (Within Libyan oil and gas organisations employees are encouraged to play an important role in improving TQM), as can be seen in Table 7.6 ‘age’, ‘qualification’, ‘position’ and ‘experience’ as the control variables show no significant statistical difference in their views regards the statement. However, findings show that there is a statistically-significant difference as regards to ‘organisation’ (p=0.052), since their p-value is significantly lower than the significant 0.10 confidence level. This implies answers given by individuals coming from different organisation to this particular statement indicate differences in the opinions.

Concerning the Statement 34 (There is no employee involvement in management decisions), based on the results presented in Table 7.6, there is no statistically-significant difference across none of the control variables, as their probability level os higher than the critical value of 0.05. The results imply that all respondents have similar opinions in relation to the statement that ‘there is no employee involvement in management decisions’.

In relation to Question 35 (Quality objectives within Libyan oil and gas organisations are clearly identified to employees), it is apparent from Table 7.6 that only two groups of the control variables have no statistically-significant difference between their sub-groups: ‘qualification’ (p = 0.129) and ‘experience’ (p = 0.331), while the remaining three groups: ‘organisation’ (p-value = 0.008), ‘age’ (p-value = 0.017), and ‘position’ (p-value = 0.023) are proven to have statistically significant differences, as their p-values are lower than the critical p-value of 0.05.

Table7.6: Employee Involvement and Empowerment

N0.	Questions	Organisation	Mean Rank	Asymp Sig. *(P)*	Age	Mean Rank	*(P)*	Qualification	Mean Rank	*(P)*	Position	Mean Rank	*(P)*	Experience	Mean Rank	*(P)*
32	Within Libyan oil and gas organisations employees are empowered to implement quality improvement efforts	RASCO SOC AGOCO	56.09 62.32 63.56	.461	20-30 31-40 41-50 51-60 > 60	91.70 53.06 61.34 65.98 43.50	.043	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	94.00 56.20 60.65 61.55 58.65	.798	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	51.92 55.71 52.50 77.00 56.50 76.93 80.42	.034	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	113.50 61.86 51.85 50.64 76.65 52.68 63.19	.048
33	Within Libyan oil and gas organisations employees are encouraged to play an important role in improving TQM	RASCO SOC AGOCO	52.40 70.56 61.49	.052	20-30 31-40 41-50 51-60 > 60	83.30 60.41 59.31 60.22 33.50	.407	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	33.50 60.37 62.30 63.23 42.85	.381	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	49.50 60.18 53.98 65.22 58.12 75.00 76.67	.330	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	110.00 67.53 58.25 50.46 70.12 50.95 55.60	.216
34	There is no employee involvement in management decisions	RASCO SOC AGOCO	56.97 62.69 62.44	.678	20-30 31-40 41-50 51-60 > 60	63.40 55.70 62.36 64.50 59.25	.830	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies h High diploma	12.00 47.73 63.92 59.58 69.30	.231	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	66.17 68.00 51.43 49.61 67.68 57.10 56.92	.413	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	106.50 66.10 48.63 64.39 60.76 48.95 66.52	.236
35	Quality objectives within Libyan oil and gas organisations are clearly identified to employees	RASCO SOC AGOCO	54.50 51.65 72.47	.008	20-30 31-40 41-50 51-60 > 60	93.00 67.95 49.31 58.62 71.00	.017	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	23.00 61.33 67.82 54.37 46.65	.129	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	39.83 59.29 57.66 43.28 58.40 83.13 81.33	.023	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	93.00 61.69 72.67 57.68 56.15 47.00 56.46	.331
36	Work responsibilities in Libyan oil and gas organisations are delegated to employees	RASCO SOC AGOCO	64.27 60.24 56.99	.582	20-30 31-40 41-50 51-60 > 60	73.80 61.27 58.03 60.60 58.75	.900	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	97.50 62.53 58.56 65.46 45.05	.336	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	58.50 58.43 65.79 73.83 57.71 61.13 39.25	.536	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	58.00 61.09 62.60 72.50 59.85 61.86 50.63	.660

(Data Analysis)

The mean ranking result from the organisation shows that AGOCO has statistically the highest mean ranking (72.47), followed by RASCO (mean=54.50) and SOC (mean=51.65) in terms of their views regarding the statement. Referring to 'age' sub-categories, respondents from the 20-30 years age group are among the highest who reflect differences regarding the statement with a mean score of 93.00, meanwhile the lowest mean score (mean=49.31) comes from those in the 41-50 years age group. Respondents in the administrators group have the highest mean score (83.13) followed by coordinators, middle management, heads of divisions supervisors, controllers and lastly top management with the lowest mean rank of 39.83.

The results from the Kruskal-Wallis test in Table 7.6 depict that statistically there are no significant differences among the groups regarding Statement 36 (Work responsibilities in Libyan oil and gas organisations are delegated to employees) since the *p*-value of 'organisation' (p = 0582), 'age' (p = 0.900), 'qualification' (p = 0.336), 'position' (p = 0.536) and 'experience' (p = 0.660) exceed the significant level of 0.05.

7.5.4. Employee Resistance to Change

This section aims to develop an inferential understanding by using K-W Test in relation to considering employee resistance to change as a potential barrier in front of efficient implementation of TQM in Libyan oil and gas organisations.

With regard to Statement 37 (Employees resist changes to TQM in the Libyan oil and gas organisations), as the findings in Table 7.7 demonstrate 'organisation', 'qualification', 'position' and 'experience' as control variables show no significant statistical difference in their views regarding the statement that 'employees resist changes to total quality management in the Libyan oil and gas organisations', since the *p*-values of 0.185, 0.718, 0.130 and 0.500 respectively, are clearly higher than the critical *p*-value of 0.05. Instead, the outcomes suggest that there is a statistically-significant difference as regards 'age,' (p = 0.072) which is evidently lower than the critical value of 0.10 confidence level.

Table7.7: Employee Resistance to Change

N0.	Questions	Organisation	Mean Rank	Asymp Sig. *(P)*	Age	Mean Rank	*(P)*	Qualification	Mean Rank	*(P)*	Position	Mean Rank	*(P)*	Experience	Mean Rank	*(P)*
37	Employees resist changes to TQM in the Libyan oil and gas organisations	RASCO SOC AGOCO	66.98 54.06 58.60	.185	20-30 31-40 41-50 51-60 > 60	27.50 61.23 62.68 59.60 97.25	.072	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	78.50 55.70 59.74 60.00 72.05	.718	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	33.25 61.36 70.07 60.00 61.49 57.60 40.75	.130	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	27.50 58.43 61.19 56.64 54.06 57.91 71.69	.500
38	Employees are not working to improve the future of the organisation	RASCO SOC AGOCO	62.78 57.45 60.37	.763	20-30 31-40 41-50 51-60 > 60	15.80 54.15 64.97 69.15 89.50	.002	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	67.50 63.33 58.56 58.38 74.45	.626	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	57.33 62.82 64.55 62.28 68.54 37.10 39.58	.022	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	46.97 60.10 64.14 68.91 54.86 74.00	.021
39	Employees are resistant to get training to be efficiently working for the betterment of quality	RASCO SOC AGOCO	63.63 60.74 57.28	.613	20-30 31-40 41-50 51-60 > 60	47.30 58.70 63.29 59.70 88.50	.530	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	65.50 60.77 60.22 58.19 70.15	.866	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	55.67 49.29 70.34 65.56 59.80 54.63 55.75	.411	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	65.50 53.62 65.81 57.14 60.97 56.00 66.98	.707
40	Employees are resistant to understand quality and its aspects	RASCO SOC AGOCO	63.28 59.42 58.52	.768	20-30 31-40 41-50 51-60 > 60	32.70 56.30 61.30 71.45 40.00	.069	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	79.00 58.80 61.68 57.78 65.30	.919	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	57.17 48.79 70.16 59.83 65.22 45.70 50.25	.168	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	37.50 51.72 60.92 60.32 57.62 64.36 72.02	.425

(Data Analysis)

Based on the findings in Table 7.7, there is obviously significant difference concerning the Statement 38 (Employees are not working to improve the future of the organisation) in the three control variables, namely 'age', 'position' and 'experience' with *p*-values of 0.002, 0.0224, and 0.021 respectively, which are lower than *p*-value 0.05. The result also ranks the five 'age' groups from highest to lowest mean rank depicting their differences of perception regarding the statement. The highest among the five is age group of over 60 years with a mean score of 89.50, then 51-60 (mean=69.15), 41-50 (mean=64.97), 31-40 (mean=54.15), and lastly 20-30 (mean=15.80). In relation to the highest 'position' groups, it is clear that heads of division with a mean rank of 68.54 ranked the highest. On the other hand, the administrators group, with a mean rank of 37.10, ranked the lowest among the other groups. For 'experience', the highest group were those with 30 years or more with a mean rank of 74.00, and the lowest mean score group was those with less than 5 years of experience with a mean score of 6.50. The remaining two control variables, 'age' and 'qualification', based on the observations of the Kruskal-Wallis test, revealed no significant difference between them regarding the statement, as the *p*-values of 0.763 and 0.626 respectively are higher than 0.05.

As regards the Statement 39 (Employees are resistant to get training to be efficiently working for the betterment of quality), the results from the test in Table 7.7 suggest that there is no statistically-significant difference among the control variables concerning this statement.

As depicted in Table 7.7, again there is no statistically-significant difference concerning the statement that 'employees are resistant to understanding quality and its aspects' in Statement 40 across the control variables: 'organisation' (p = 0.768), 'qualification' (p = 0.919), 'position' (p = 0.168) and 'experience' (p = 0.425), whose estimated statistical probabilities are higher than the critical value of 0.05. However, there is a statistically-significant difference as regards 'age' with p = 0.069, since the *p*-value is significantly lower than the significant 0.10 confidence level. This result implies that all groups have, in general, similar views in terms of the level of agreement regards the statement.

7.5.5. Quality Strategic Planning

In this section, quality strategic planning and its aspects are analysed through the defined control variables with the objective of identifying whether there is any statistically significant differences in the answers given to the statements by the sub-categories of each of the variable.

As for Statement 42 (Libyan oil and gas organisations do not have strategic plans), the findings in Table 7.8 clearly suggest that there are no statistically significant differences across the control variables regarding the statement, since the *p*-value of 'organisation' ($p = 0.892$), 'age' ($p = 0.100$), 'qualification' ($p = 0.749$), 'position' ($p = 0.589$) and 'experience' ($p = 0.147$), is visibly higher than critical value of 0.05. By referring to the mean ranking, the results clearly indicate that RASCO staff, the over 60 age group, staff with high diplomas, top management, and, in terms of experience, those with 30 or more years of experience groups obtained the highest mean score.

As indicated in Table 7.8, there is no statistically-significant difference in the two control variables 'organisation' and 'position' regarding statement 43 (Strategic plans in Libyan oil and gas organisations do not include quality goals), as the estimated values are significantly higher than the *p*-value of 0.05 confidences level. The result demonstrate that there is a significant statistical difference in the remaining three control variables 'age', 'qualification' and 'experience' in terms of position taken in relation to the statement, as evidenced in the *p*-values of 0.049, 0.091 and 0.019, which are lower than the critical *p*-value of 0.10. In overall, based on the mean ranking, respondents aged over 60 (mean=114.50) ranked as the highest group, followed by 51-60 (mean=65.58), then 31-40 (mean=61.27), 41-50 (mean=56.23), and lastly between 20-30 years old (mean=36.00). In the qualification group, the high diploma group (mean=80.40) ranked the highest. For highest experience group, it is apparent from the result that the over 30 years of experience group with a mean rank of 79.35 ranked as the highest sub-group and the lowest mean score is less than 5 years with a mean score of 41.50.

Table 7.8: Quality Strategic Planning

N0.	Questions	Organisation	Mean Rank	Asymp Sig. *(P)*	Age	Mean Rank	*(P)*	Qualification	Mean Rank	*(P)*	Position	Mean Rank	*(P)*	Experience	Mean Rank	*(P)*
42	Libyan oil and gas organisations do not have strategic plans	RASCO SOC AGOCO	61.64 61.60 58.63	.892	20-30 31-40 41-50 51-60 > 60	44.80 61.77 55.14 64.95 113.00	.100	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	42.00 64.53 56.78 62.72 68.10	.749	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	68.00 61.07 59.36 62.72 65.96 46.27 52.08	.589	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	42.00 57.48 57.83 61.39 57.71 43.59 76.79	.147
43	Strategic plans in Libyan oil and gas organisations do not include quality goals	RASCO SOC AGOCO	63.08 54.34 62.22	.479	20-30 31-40 41-50 51-60 > 60	36.00 61.27 56.23 65.58 114.50	.049	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	41.50 69.43 61.20 51.46 80.40	.091	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	54.08 61.25 61.28 49.94 66.62 56.07 46.50	.686	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	41.50 57.91 57.19 69.29 49.00 41.73 79.35	.019
44	Quality action plans in the strategic plans are often vague	RASCO SOC AGOCO	 63.36 65.74 54.09	.249	20-30 31-40 41-50 51-60 > 60	 52.00 59.21 59.55 65.12 59.25	.909	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	24.00 56.33 63.50 59.32 58.50	.740	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	62.42 71.04 62.62 65.17 63.73 41.83 41.33	.182	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	59.00 60.28 59.67 51.46 59.97 42.82 75.42	.172
45	The strategic plan should be customer and market driven to achieve expected quality	RASCO SOC AGOCO	65.78 59.29 56.17	.375	20-30 31-40 41-50 51-60 > 60	 59.80 51.29 64.51 65.77 101.00	.100	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	86.50 70.50 58.78 55.59 71.50	.385	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	66.67 76.82 58.28 69.94 60.88 40.90 59.25	.129	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	42.00 53.31 46.23 75.71 68.97 47.27 75.42	.009
46	Training targets to develop skills for better quality in the organisation are generally not achieved	RASCO SOC AGOCO	 57.32 70.00 57.07	.162	20-30 31-40 41-50 51-60 > 60	 59.70 53.72 54.05 77.82 77.50	.013	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	75.50 52.90 56.71 67.77 62.90	.426	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	82.58 59.89 55.45 71.00 62.48 53.10 53.50	.455	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	36.00 58.43 56.77 48.68 58.00 68.23 72.88	.304

(Data Analysis)

In relation to Statement 44 (Quality action plans in the strategic plans are often vague) from Table 7.8 it is clear that 'organisation' (p=0.249), 'age' (p=0.909), 'qualification' (p=0.740), 'position' (p=0.182) and 'experience' (p=0.172) is not statistically significant in terms of having differences between their sub-groups concerning their views of the statement, since the estimated p-values are higher than the statistical p-value level of 0.05

As shown in Table 7.8, the results suggest that statistically there is no significant difference in terms of the answers given to the Statement 45 (The strategic plan should be customer and market driven to achieve expected quality) among control variables: 'organisation', 'age', 'qualification', and 'position' as evidenced in the p-values of 0.375, 0.100, 0.385 and 0.129, respectively, which are significantly higher than the critical limit p-value of 0.05. Conversely, the result suggests that there is statistically-significant difference between 'experience' sub-groups, as the estimated p-value of 0.009 is significantly lower than the significant level of 0.05. According to the mean-value score, the 16-20 years of experience group (mean=75.71) ranked the highest, then '30 or more' group, '21-25 years' group, followed by 5-10, then 26-30, 11-15 and lastly the less than 5 years of experience group (mean=42.00).

Regarding the Statement 46 (Training targets to develop skills for better quality in the organisation are generally not achieved). The findings in Table 7.8 shows that there are no statically-significant differences in the answers given to this statement by the sub-categories of the control variables 'organisation', 'qualification', 'position' and 'experience', since the estimated statistics are higher than the level of 0.05. In contrast, the findings of the Kruskal-Wallis test also suggest that there is a significant difference across 'age' groups as the p-value of 0.013 is lower than 0.05, referring to the mean ranking score, the 51-60 age group ranked the highest with a mean score 77.82 and the group of 31-40 years old ranked the lowest with a mean score of 53.72.

7.5.6. Employee Training, Development and Education

This section aims to present the Kruksal-Wallis test results regarding employee training, development and education in relation to the determined control variables with the objective of locating any significant differences in the opinions expressed by

the categories of the control variables on the statements provided under training, education and development.

In relation to Statement 47 (In your organisation employees are trained in problem identification and problem solving techniques), the results in Table 7.9 show that there is no statically- significant difference opinions expressed by any of the control variables (‘organisation’, ‘age’, ‘qualification’, ‘position’, ‘experience’) regarding the statement. It seems that all the groups in each control variable have roughly similar perceptions concerning the statement. However, the findings indicate that those in AGACO, aged 20-30 years, with below secondary school education, in the position of coordinator, and with experience of 5-10 years obtained the highest mean ranking compared to the other groups.

Referring to the Statement 48, the findings Table 7.9 depicts that there is no significant difference in relation to the statement that ‘Employees are not trained in group discussion and communication techniques’ across ‘age’ (p=0.346), ‘qualification’ (p=0.154), ‘position’ (p=0.307) and ‘experience’ (p=0.525). However, there is a statistically-significant difference as regards ‘organisation’ (p = 0.092), since the p-value is significantly lower than the critical value of 0.10.

Based on the findings in Table 7.9, there is a significant difference concerning Statement 49 (Within Libyan oil and gas organisations employees are trained in quality improvement skills) in the three control variables ‘age’, ‘position’ and ‘experience’ with the p-values of 0.003, 0.017, and 0.017 respectively which are lower than p-value 0.05. The highest mean score for ‘age’ was in the 20-30 years age group (mean=77.20), then 31-40 years, followed by 41-50, 51-60 and lastly over 60 (mean=11.50). As the findings depict, the highest mean ranking among the seven ‘position’ categories is the administrators sub-group with a mean score of 75.07, while that of top management (mean rank = 29.50) ranked lowest. Referring to experience sub-categories, respondents with between 11-15 years’ experience were among the highest mean ranking with a mean score of 0. 78.67, meanwhile the lowest mean score (41.92) is over 60 years of experience. As for ‘organisation’ and ‘qualification’, based on the results, there is no significant difference regarding the statement.

Table 7.9: Employee Training, Development and Education

N0.	Questions	Organisation	Mean Rank	Asymp Sig. *(P)*	Age	Mean Rank	*(P)*	Qualification	Mean Rank	*(P)*	Position	Mean Rank	*(P)*	Experience	Mean Rank	*(P)*
47	In your organisation employees are trained in problem identification and problem solving techniques	RASCO SOC AGOCO	66.17 52.66 60.36	.210	20-30 31-40 41-50 51-60 > 60	72.90 69.35 57.99 49.13 60.00	.101	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	92.50 55.43 64.45 58.77 49.95	.511	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	33.75 56.39 65.17 52.50 62.05 64.13 66.58	.437	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	60.00 73.10 60.83 64.46 59.38 50.86 47.85	.167
48	Employees are not trained in group discussion and communication techniques	RASCO SOC AGOCO	55.51 71.60 57.73	.092	20-30 31-40 41-50 51-60 > 60	50.00 56.20 58.51 71.17 59.00	.346	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	25.50 67.63 54.71 62.08 79.00	.154	Top management. Middleman. Supervisor Controller Heads of Divisions Administrator Coordinator	78.17 54.50 61.79 74.94 59.96 59.03 36.25	.307	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	25.50 57.67 60.19 60.75 51.85 60.73 71.56	.525
49	Within Libyan oil and gas organisations employees are trained in quality improvement skills	RASCO SOC AGOCO	62.77 53.39 63.18	.375	20-30 31-40 41-50 51-60 > 60	77.20 71.80 58.74 47.13 11.50	.003	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	20.00 57.47 64.14 62.58 41.00	.200	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	29.50 44.50 68.55 45.28 62.55 75.07 62.33	.017	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	52.00 65.09 78.67 66.14 56.62 48.91 41.92	.007
50	The organisation concentrates on ongoing development of personnel by establishing extensive training programs that cover all aspects of (TQM)	RASCO SOC AGOCO	68.06 57.16 55.41	.159	20-30 31-40 41-50 51-60 > 60	87.70 70.64 55.99 50.42 16.00	.006	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	101.5 60.80 60.08 64.04 44.45	.360	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	42.92 54.86 65.07 65.67 53.26 77.97 67.25	.158	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	67.00 65.53 67.50 68.04 59.82 48.77 48.60	.319
51	Training in the oil and gas organisations is determined according to actual needs that have to be covered by training	RASCO SOC AGOCO	63.36 56.35 60.56	.623	20-30 31-40 41-50 51-60 > 60	87.40 62.21 60.80 53.27 59.00	.229	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	45.00 62.87 59.62 60.79 62.20	.981	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	49.67 58.14 60.59 66.33 51.34 86.87 64.33	.014	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	93.00 63.21 66.67 62.71 57.47 53.73 53.67	.641

52	The employees have appropriate qualifications and experience required to improve their quality of work	RASCO SOC AGOCO	68.41 57.90 54.56	.122	20-30 31-40 41-50 51-60 > 60	77.60 66.38 59.24 49.78 77.25	.165	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	37.00 67.73 63.99 60.87 31.35	.045	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	58.17 70.86 71.28 58.89 48.80 68.60 48.67	.076	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	75.00 64.36 65.67 75.25 62.41 38.18 50.33	.076
53	Employees have enough appropriate education and training on quality	RASCO SOC AGOCO	68.82 50.77 59.07	.059	20-30 31-40 41-50 51-60 > 60	78.60 65.34 54.19 59.12 58.25	.404	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	80.50 70.20 59.85 62.51 39.65	.206	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	49.08 64.04 64.28 50.11 57.27 70.23 58.75	.687	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	37.50 60.16 68.65 63.36 61.82 43.82 58.77	.539
54	There is lack of staff training in Libyan oil and gas organisations regarding TQM techniques	RASCO SOC AGOCO	57.07 65.31 60.54	.555	20-30 31-40 41-50 51-60 > 60	61.30 51.09 56.29 79.73 56.50	.005	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	38.50 67.40 60.27 55.60 72.70	.484	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	61.67 50.00 63.14 58.56 68.06 47.00 56.08	.353	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	38.50 57.19 54.94 53.18 61.38 60.23 74.75	.334

(Data Analysis)

The results in Table 7.9 concerning the Statement 50 (The organisation concentrates on ongoing development of personnel by establishing extensive training programs that cover all aspects of (TQM)) demonstrate that there is no statistically-significant difference in four of the control variables: ‘organisation’, ‘qualification’, ‘position’ and ‘experience’, while in the ‘age’ groups the outcomes suggest otherwise. This can be evidenced from the *p*-value of 0.006, which is lower than the *p*-value of 0.05. As can be seen from the table the highest mean score in the age group is the 20-30 years sub-group (mean=87.70), then 31-40 (mean=70.64), 41-50 (mean=55.99), followed by 51-60 (mean=50.42), and lastly the over 60 years old group (mean=16.00).

As depicted in Table 7.9, the result suggests that statistically there is no significant difference regarding the Statement 51 (Training in the oil and gas organisations is determined according to actual needs that have to be covered by training) among four of the study control variables: ‘organisation’, ‘age’, ‘qualification’ and ‘experience’ as evidenced in the *p*-values of 0.623, 0.229, 0.981 and 0.641, respectively, which are significantly higher than the critical limit *p*-value of 0.05. However, the result indicate that there is statistically-significant difference between the position sub-groups, with an estimated *p*-value of 0.014 which is significantly lower than the critical value of 0.05: it is clear that the administrators group, with a mean rank of 86.87 ranked as the highest sub-group, followed by controllers (mean=66.33), coordinators (mean=64.33) supervisors (mean=60.59), middle management (mean=58.14), heads of division (mean=51.34), and surprisingly the lowest score is top management with a mean rank of 49.67.

The results in Table 7.9 suggest that statistically, there is no significant difference in terms of answers to the Statement 52 (The employees have appropriate qualifications and experience required to improve their quality of work) in the case of ‘organisation’ and ‘age’ as evidenced in the *p*-values of 0.122 and 0.165 respectively, which are significantly higher than critical limit *p*-value of 0.05. The results, however, suggest that there is a statistically-significant difference between the ‘position’, ‘experience’ and ‘qualification’ sub-groups, as the estimated *p*-values of 0.076, 0.076 and 0.045 are lower than the critical *p*-value of 0.10. In overall, based on the mean-value score, the supervisors group (mean=71.28) ranked the highest, followed by those with 16-20 years of experience (mean=75.25), those holding Secondary Certificate or equivalent

(mean=67.73), those with Baccalaureate, followed by those with higher studies, then those below secondary school and lastly those with a high diploma (mean=31.35).

As depicted in Table 7.9, the findings show that 'age' (p=0.404), 'qualification' (p=0.206), 'position' (p=0.687) and 'experience' (p=0.539) in relation to the Statement 53 (Employees have enough appropriate education and training on quality), are not statistically significant in terms of showing differences between their sub-groups concerning their view of the statement. In contrast, the results suggest that there is a statistically-significant difference as regards the 'organisation' group (p=0.059), since the p-value is significantly lower than the significant level of 0.10.

Table 7.9 illustrates that statistically there is no significant difference in terms of agreement level for the Statement 54 (There is lack of staff training in Libyan oil and gas organisations regarding TQM techniques) among four of the study control variables: 'organisation', 'qualification', 'position' and 'experience' as evidenced in the p-values of 0.555, 0. 484, 0.353 and 0.334 respectively, which are significantly higher than the critical limit p-value of 0.05. On the other hand, the result shows that there is statistically-significant difference between the 'age' sub-groups in the responsed they provided for the statement in question, as the significant value of 0.005 is significantly lower than the significant level of 0.05. In terms of mean ranking score, respondents aged between 51-60 years (mean=79.73) ranked as the highest group, then those in the 20-30 years group (mean=61.30), the over 60 years old group (mean=56.50), the 41-50 year old group (mean=56.29) and lastly the 31-40 year old group (mean=51.09).

7.5.7. Information and Communication

This section aims to locate if there is any differences in the responses of the participants through the determined variables towards information and communication as an obstacle for the efficient implementation of TQM in Libyan oil and gas companies.

With regard to the Statement 55, it is obvious from the data in Table 7.10 that the 'organisation', 'age', 'qualification', 'position' and 'experience' groups show no significant statistical difference in their views regarding the statement that 'Communication between departments in Libyan oil and gas organisations is

ineffective'. However, in terms of 'organisation' it seems that RASCO staff show a higher mean score indicating that there is a high level of agreement in this organisation regarding the statement. In addition, the findings also show that the over 60 years' age group also has a high level of agreement as evidenced from the higher mean group. Despite not being significant, staff with higher studies, top management, and, in terms of experience, the over 30 years group as sub-categories with high mean raking in their groups.

The results in Table 7.10 concerning the Statement 56 (There is a lack of information on TQM in Libyan oil and gas organisation) signify that there is no statistically-significant difference in three of the control variables: 'age', 'qualification' and 'experience', as the estimated *p*-values of 0.242, 0.740 and 0.270, respectively, are higher than the critical level of 0.05, while in the 'organisation' and 'position' groups the outcomes suggest otherwise. This can be evidenced from the *p*-value of 0.014 and 0.008 respectively, which is lower than the *p*-value of 0.05. Referring to organisation sub-category, SOC obtained the highest mean raking of 69.90, followed by RASCO (64.98) and lastly AGOCO (49.64). The highest position group is the top management group, with a mean rank of 76.00, then supervision, followed by middle management, controllers, heads of division, administrators, and surprisingly the lowest score is coordinator with a mean rank of 30.17.

Concerning the Statement 57 (There is a lack of communication from top management levels to employees), the result in Table 7.10 depicts that there is no statistically-significant difference across the control variables, 'organisation' (p = 0.612), 'qualification' (p = 0.641), 'position' (p = 0.780) and 'experience' (p = 0.396). This implies that all respondents have quite similar opinions in relation to the statement. However, the outcomes suggest that there is a statistical significant difference as regards to 'age' (p=0.084), since *p*-values are significantly lower than the significance level of 0.10.

Table 7.10: Information and Communication

N0.	Questions	Organisation	Mean Rank	Asymp Sig. *(P)*	Age	Mean Rank	*(P)*	Qualification	Mean Rank	*(P)*	Position	Mean Rank	*(P)*	Experience	Mean Rank	*(P)*
55	Communication between departments in Libyan oil and gas organisations is ineffective	RASCO SOC AGOCO	64.05 63.24 55.14	.382	20-30 31-40 41-50 51-60 > 60	45.00 62.00 53.41 68.55 88.00	.179	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	27.00 55.47 58.35 66.94 58.15	.528	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	82.33 55.89 64.21 52.83 61.67 51.50 57.50	.541	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	27.00 64.86 59.73 49.43 55.03 49.59 72.73	.225
56	There is a lack of information on TQM in Libyan oil and gas organisation	RASCO SOC AGOCO	64.98 69.90 49.64	.014	20-30 31-40 41-50 51-60 > 60	51.70 55.31 58.28 71.78 69.25	.242	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	35.50 63.97 58.45 60.10 70.60	.740	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	76.00 67.32 67.72 64.00 63.20 36.63 30.17.	.008	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	35.50 61.67 51.31 61.18 51.88 64.95 72.98	.270
57	There is a lack of communication from top management levels to employees	RASCO SOC AGOCO	57.34 65.06 60.44	.612	20-30 31-40 41-50 51-60 > 60	53.10 57.67 53.31 75.08 64.75	.084	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	32.50 65.53 58.15 64.65 52.45	.641	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	80.83 55.96 58.98 52.44 61.02 63.40 59.33	.780	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	32.50 63.66 56.98 49.93 58.24 53.55 72.33	.396
58	A very good communication process is established in the organisation for effective quality management and for clear and effective ways for people within the organisation to communicate	RASCO SOC AGOCO	56.51 62.97 62.70	.603	20-30 31-40 41-50 51-60 > 60	83.20 61.74 63.83 50.40 62.00	.230	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	98.00 47.70 65.25 56.50 65.45	.244	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	52.33 55.89 59.90 59.06 61.52 66.77 61.83	.974	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	98.00 65.16 64.19 55.36 60.56 68.18 49.06	.428
59	The communication channels providing information about customer and market expectations are not effective in delivering the required information to improve quality	RASCO SOC AGOCO	58.32 58.56 63.97	.672	20-30 31-40 41-50 51-60 > 60	55.90 55.56 56.79 71.53 87.00	.184	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	27.50 57.20 62.08 56.64 75.10	.438	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	60.25 64.46 53.78 59.89 61.13 70.67 55.17	.808	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	69.00 53.10 65.67 50.82 44.65 77.82 72.85	.034

In relation to the Statement 58 (A very good communication process is established in the organisation for effective quality management and for clear and effective ways for people within the organisation to communicate), Table 7.10 depicts that there is no statically-significant difference in any of the control variables (‘organisation’, ‘age’, ‘qualification’, ‘position’ and ‘experience’) regarding the statement. It seems that most of the groups in each control variable have roughly similar perceptions/views concerning the statement.

As observed in Table 7.10 the result suggest that statistically there is no significant difference in the answers given to the Statement 59 (The communication channels providing information about customer and market expectations are not effective in delivering the required information to improve quality) among four of the study control variables: ‘organisation’, ‘age’, ‘qualification’ and ‘position’ as evidenced in the *p*-values of 0.672, 0.184, 0.438 and 0.808, respectively, which are significantly higher than the critical limit *p*-value of 0.05. On the other hand, the results indicate that there is a statistically-significant difference between the ‘experience’ sub-groups, as the significant value of 0.034 is significantly lower than the significant level of 0.05. As the mean-value score, the 26-30 years of experience group (mean=77.82) ranked the highest, then the 30 or more group, then those with less than 5 years of experience, then 11-15, followed by 5-10, 21-25 years and lastly the 16-20 group (mean=50.82).

7.5.8. Continuous Improvement and Innovation

The previous chapter identified ‘continuous improvement and innovations’ as one of the obstacles in efficiently running TQM in Libyan oil and gas companies. This section takes the analysis further by searching any differences in opinions through the identified categories in relation to this particular issue.

The results from the Kruskal-Wallis test in Table 7.11 concerning the Statement 60 (Libyan oil and gas organisations promote innovation) reveal that there is no statistically-significant difference in two of the control variables: ‘qualification’ and ‘position’, while in the case of ‘organisation’, ‘age’ and ‘experience’ groups the findings suggest otherwise. This can be evidenced from the *p*-values of 0.066, 0.029 and 0.066 of the latter variables, which are lower than the *p*-value of 0.10. As can be

seen from the table, the highest mean score in the ‘organisation’ group is RASCO (mean=69.58), the ‘age’ group is the sub-group aged between 20-30 years (mean=68.50), then 31-40 (mean=66.40), 41-50 (mean=65.11), followed by 51-60 (mean=47.50) and lastly over 60 years old (mean=16.50). The highest for the experience group are those with less than 5 years (mean=74.00).

Based on the results shown in Table 7.11 there is obviously significant difference concerning the Statement 61 (Libyan oil and gas companies do have R&D departments for innovative developments) in the responses provided by the participants for four of the control variables: ‘organisation’, ‘age’, ‘qualification’ and ‘position’ with the *p*-values: 0.001, 0.025, 0.039 and 0.070, respectively, which are lower than *p*-value 0.10. RASCO rated the highest mean score for ‘organisation’ (mean=75.24), then SOC (mean=56.39) and lastly AGOCO (mean=48.92). As regards to the age groups, the highest among the five is the 20-30 years age group (mean=92.90), then 31-40 (mean rank=67.05), over 60 years (mean=61.00, 41-50 (mean=59.30) and lastly 51-60 (mean=47.28). Regarding mean ranking for qualification, the below secondary school group (mean=117.5) ranked the highest, then baccalaureate, higher studies, diploma and lastly secondary certificate or equivalent group (mean=42.87). The administrators group rated the highest mean score for position (mean=76.83)

As regards to the Statement 62 (Innovation strategies include improving quality in all its dimensions), the findings in Table 7.11 suggest that there is no statistically-significant difference in the responses provided for the control variables concerning the statement. However, the findings suggest that there is a statistically-significant difference as regards ‘position’ (*p*=0.087), since the *p*-value is significantly lower than the significant level of 0.10.

The results in Table 7.11 indicate that statistically there is no significant difference in terms of the answers to the Statement 63 (Quality improvement culture is prevalent across Libyan oil and gas organisations) among the control variables ‘organisation’, ‘age’, ‘qualification’, ‘position’ and ‘experience’ as evidenced in the *p*-values of 0.271, 0.225, 0.603, 0.404 and 0.541 respectively, since the estimated statistics exceed the significant level of 0.05 or even 0.10.

Table 7.11: Continues Improvement and Innovation

N0.	Questions	Organisation	Mean Rank	Asym p Sig. *(P)*	Age	Mean Rank	*(P)*	Qualification	Mean Rank	*(P)*	Position	Mean Rank	*(P)*	Experience	Mean Rank	*(P)*
60	Libyan oil and gas organisations promote innovation	RASCO SOC AGOCO	69.58 53.97 56.12	.066	20-30 31-40 41-50 51-60 > 60	68.50 66.40 65.11 47.50 16.50	.029	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	118.0 61.60 62.04 58.83 51.15	.387	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	25.83 60.57 68.66 70.94 57.56 64.53 49.92	.101	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	74.00 64.64 63.88 70.11 65.62 64.86 40.33	.066
61	Libyan oil and gas companies do have R&D departments for innovative developments	RASCO SOC AGOCO	75.24 56.39 48.92	.001	20-30 31-40 41-50 51-60 > 60	92.90 67.05 59.30 47.28 61.00	.025	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	117.5 42.87 65.88 61.59 47.40	.039	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	50.75 64.25 70.59 48.06 50.91 76.83 56.08	.070	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	96.00 66.64 65.21 58.57 67.26 53.55 46.42	.233
62	Innovation strategies include improving quality in all its dimensions	RASCO SOC AGOCO	60.61 62.13 59.27	.931	20-30 31-40 41-50 51-60 > 60	69.80 63.23 62.43 52.38 61.75	.608	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	119.5 56.53 63.25 59.69 48.60	.264	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	35.83 63.18 53.59 75.44 57.73 76.57 68.67	.087	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	79.00 67.21 58.54 57.14 66.18 59.14 52.15	.691
63	Quality improvement culture is prevalent across Libyan oil and gas organisations	RASCO SOC AGOCO	54.19 63.26 64.77	.271	20-30 31-40 41-50 51-60 > 60	88.40 62.59 61.09 52.58 52.75	.225	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	68.50 56.23 65.71 56.17 54.35	.603	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	34.92 54.86 58.26 66.94 61.88 68.07 72.08	.404	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	104.00 64.86 61.44 63.46 63.53 47.91 54.38	.541
64	Libyan oil and gas organisations identify gaps between their training strategies and efficient running of TQM	RASCO SOC AGOCO	67.31 55.45 57.32	.223	20-30 31-40 41-50 51-60 > 60	85.90 66.33 61.79 46.97 49.00	.048	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	59.00 59.33 64.21 60.35 42.60	.457	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	37.67 62.07 61.40 61.83 62.10 59.33 65.33	.788	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	96.00 67.21 60.88 69.89 65.09 49.27 46.96	.169
65	There is lack of motivation and	RASCO SOC	52.50 65.34	.130	20-30 31-40	36.60 53.93	.006	Below second. school Secondary Certificate	43.50	.512	Top management. Middle man.	78.67 62.00	.494	<5 years 5-10	43.50 54.31	.530

	reward in the organisation system	AGOCO	64.99		41-50 51-60 > 60	59.56 77.43 26.25		or equivalent Baccalaureate Higher Studies High diploma	69.70 58.80 56.83 72.05		Supervisor Controller Heads of Divisions Administrator Coordinator	56.69 43.83 62.85 65.67 53.25		11-15 16-20 21-25 26-30 30-more	59.58 54.93 57.38 72.36 69.63	
66	Quality improvement efforts in the Libyan oil and gas organisations rarely meet expectations in terms of desired results	RASCO SOC AGOCO	62.68 58.13 60.00	.824	20-30 31-40 41-50 51-60 > 60	52.60 61.01 59.84 61.22 71.75	.963	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	33.00 66.03 60.44 59.73 58.30	.868	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	41.17 63.61 61.48 65.67 59.79 66.73 49.33	.688	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	33.00 57.47 63.83 70.61 56.53 50.82 63.33	.660

(Data Analysis)

As regards to the Statement 64 (Libyan oil and gas organisations identify gaps between their training strategies and efficient running of TQM), the findings in Table 7.11 indicate that there are no statically significant differences in the responses given to the statement by the participants in terms of 'organisation', 'qualification', 'position' and 'experience' characteristics, since the estimated statistics are higher than the significant level of 0.05. On the other hand, the findings suggest that there is significant difference across the 'age' groups as the *p*-value of 0.048 is lower than 0.05. Based on the mean value score, respondents aged between 20-30 years (mean=85.90) ranked as the highest group, which is followed by 31-40 (mean=66.33), 41-50 (mean=61.79), over 60 years old (mean=49.00) and lastly 51-60 (mean=46.97),

As for the Statement 65 (There is lack of motivation and reward in the organisation system), the results in Table 7.11 indicate that there are no statically significant differences regarding the statement as regards in the case of 'organisation', 'qualification', 'position' and 'experience', since the estimated statistics are higher than the significant level of 0.05. On the other hand, the findings suggest that there is significant difference across the 'age' groups as the *p*-value of 0.006 is lower than 0.05. As can be seen from the table, the highest mean score in the 'age' group is the sub-group aged between 51-60 years old (mean=77.43) followed by 41-50 (mean =59.56), 31-40 (mean=53.93), 20-30 years (mean=36.60) and lastly over 60 years old (mean=26.25).

The results from Table 7.11 show that statistically there is no significant difference concerning the Statement 66 (Quality improvement efforts in the Libyan oil and gas organisations rarely meet expectations in terms of desired results) among the 'organisation', 'age, 'qualification' 'position' and 'experience' groups, as the *p*-values of 0.824, 0.963, 0.868, 0.688, and 0.660 respectively, are all higher than the significant *p*-value 0.05. This implies that all respondents had approximately similar opinions regarding the statement.

7.5.9. Teamwork

Since previous chapter identified 'teamwork' as one of the obstacles in efficiently running TQM in Libyan oil and gas companies, this section aims to investigate the

data further to locate if there are any differences in opinions of the respondents through the identified categories.

The results from the Kruskal-Wallis test in Table 7.12 concerning the Statement 67 (Within Libyan oil and gas organisations cross-functional teams are not employed) show that there is no statistically-significant difference in the four control variables: ‘organisation’, ‘age’, ‘qualification’ and ‘position’. In the ‘experience’ groups the findings suggest otherwise. This can be evidenced from the *p*-value of 0.0810, which is lower than *p*-value of 0.10.

As regards to the Statement 68 (In Libyan oil and gas organisations there are many cross-functional teams solving quality problems), the results in Table 7.12 suggest that there are no statistically-significant differences across all the control variables concerning the statement, as the *p*-values for ‘organisation’ (p=0.931), age (p=0.608), ‘qualification’ (p=0.264), ‘position’ (p=0.087) and ‘experience’ (p=0.691) are all higher than the critical *p*-value of 0.05, but the case of ‘position’ can be acceptable at 10% critical level.

In relation to the Statement 69 (The training session of Libyan oil and gas organisations force personnel to work in team), the results in Table 7.12 also depict that there is no statically significant difference in three control variables (‘age’, ‘position’ and ‘experience’) regarding the statement. However, the results suggest also that there is a statistically significant difference between the ‘organisation’ and ‘qualification’ sub-groups, which can be seen as the significant value of 0.058 and 0.052 is lower than the significant level of 0.10.

As regards to the statement 70 (Top management of Libyan oil and gas organisations regard team spirit as an important factor for improving and encouraging employees to work as a team), the results in Table 7.12 demonstrate that there are no statistically-significant differences regarding the statement according to ‘organisation’, ‘qualification’, position’ and ‘experience’. However, there is a significant difference across the ‘age’ groups as the *p*-value of 0.023 is lower than 0.05. As can be seen from the table the highest mean score shown is in the 20-30 years age group (mean=100.40), which is followed by 60 age group (mean=74.25).

Table 7.12: Teamwork

N0.	Questions	Organisation	Mean Rank	Asymp Sig. *(P)*	Age	Mean Rank	*(P)*	Qualification	Mean Rank	*(P)*	Position	Mean Rank	*(P)*	Experience	Mean Rank	*(P)*
67	Within Libyan oil and gas organisations cross-functional teams are not employed	RASCO SOC AGOCO	62.82 60.16 58.47	.823	20-30 31-40 41-50 51-60 > 60	45.90 55.80 57.41 70.62 108.00	.059	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	22.50 56.43 63.13 56.88 70.05	.527	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	72.83 72.82 59.33 48.22 62.95 44.17 67.58	.224	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	22.50 60.07 52.81 56.64 51.74 60.59 78.71	.081
68	In Libyan oil and gas organisations there are many cross-functional teams solving quality problems	RASCO SOC AGOCO	64.08 63.68 54.81	.331	20-30 31-40 41-50 51-60 > 60	69.50 59.48 64.70 57.37 23.00	.401	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	69.50 60.30 59.93 66.00 41.60	.331	Top management. Middle man Supervisor Controller Heads of Divisions Administrator Coordinator	44.75 69.61 58.02 76.83 61.41 54.00 52.50	.429	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	69.50 59.09 63.75 60.29 78.94 59.41 46.15	.104
69	The training session of Libyan oil and gas organisations force personnel to work in team	RASCO SOC AGOCO	69.50 58.31 53.21	.058	20-30 31-40 41-50 51-60 > 60	91.50 62.44 57.95 54.12 88.00	.114	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	105.5 46.83 68.02 57.38 47.30	.052	Top management. Middle man Supervisor Controller Heads of Divisions Administrator Coordinator	54.08 65.36 64.81 63.44 53.44 65.00 67.33	.734	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	105.50 67.91 58.00 67.79 58.35 61.55 48.96	.295
70	Top management of Libyan oil and gas organisations regard team spirit as an important factor for improving and encouraging employees to work as a team	RASCO SOC AGOCO	62.50 54.29 62.82	.474	20-30 31-40 41-50 51-60 > 60	100.40 60.79 62.85 49.38 74.25	.023	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	103.5 58.40 64.85 57.94 45.45	.280	Top management. Middle man Supervisor Controller Heads of Divisions Administrator Coordinator	42.67 56.39 62.91 70.61 59.33 66.30 54.58	.716	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	103.50 62.47 64.29 66.71 60.47 59.41 49.44	.498

(Data Analysis)

7.5.10. Internal and External Customer Satisfaction

The findings in the earlier chapter indicated that 'internal and external customer satisfaction' should be considered as an obstacle for the efficient implementation of TQM in Libyan oil and gas organisations. This study aims to further analyse this in relations to a number of control variables with the use of Kruksal-Wallis test.

As the findings in Table 7.13 show, statistically there is no significant difference in terms of agreement level for the Statement 71 (Each employee in Libyan oil and gas organisations treats colleagues as customers) in the case of 'organisation', 'position' and 'experience'. However, the results also show that there is a statistically-significant difference between the 'age' and 'qualification' sub-groups, which can be proved as the significant values of 0.097 and 0.027 are lower than the significant level of 0.10 and 0.05 level. Referring to the mean-value score, respondents aged between 20-30 years (mean=79.10) ranked as the highest group, and the baccalaureate group (mean=64.92) ranked the highest in their category.

The results in Table 7.13 indicate that there is a statistically-significant difference regarding the Statement 72 (There is no customer feedback system) across position and experience groups, as their *p*-values (p=0.026, and p=0.057, respectively) are significantly lower than the significance level of 0.05 and 0.10 respectively. The results clearly show that 'administrators' (70.10) and 'duration of experience' from 30 years or over (77.38) obtained the highest mean rank of each group. As regards the remaining three control variables, namely 'organisation' (p=0.422), 'age' (p=0.257) and 'qualification' (p=0.989), the findings suggest that there is no statistically-significant difference between their sub-groups concerning the statement.

As regards to the Statement 73 (In your organization there is an assessment system, which determines current and future customer requirements and expectations), the results in Table 7.13 suggest that there is no statistically significant difference among the control variables sub-groups concerning the statement. This can be seen from the 'organisation' (p=0.266), 'age' (p=0.382), 'qualification' (p=0.125), 'position' (p=0.234) and 'experience' (p=0.335), for all of which *p*-values are higher than the critical *p*-value of 0.05. The result indicates that respondents have, in general, similar views in terms of level of agreement regarding the statement.

Table 7.13: Internal and External Customer Satisfaction

N0.	Questions	Organisation	Mean Rank	Asymp Sig. *(P)*	Age	Mean Rank	*(P)*	Qualification	Mean Rank	*(P)*	Position	Mean Rank	*(P)*	Experience	Mean Rank	*(P)*
71	Each employee in Libyan oil and gas organisations treats colleagues as customers	RASCO SOC AGOCO	58.63 59.58 62.97	.810	20-30 31-40 41-50 51-60 > 60	79.10 63.29 63.66 52.12 16.50	.097	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	105.5 45.20 64.61 64.92 39.10	.027	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	74.83 51.00 59.02 68.28 58.88 67.13 58.33	.727	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	72.50 67.48 67.81 66.75 55.26 52.32 48.06	.260
72	There is no customer feedback system	RASCO SOC AGOCO	55.68 64.58 62.40	.422	20-30 31-40 41-50 51-60 > 60	71.50 58.91 53.61 69.40 71.50	.257	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	71.50 57.90 60.35 60.73 63.25	.989	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	54.50 72.89 44.40 69.17 65.24 70.10 46.00	.026	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	71.50 55.67 65.50 48.89 52.26 52.00 77.38	.057
73	In your organization there is an assessment system, which determines current and future customer requirements and expectations	RASCO SOC AGOCO	62.81 65.98 54.47	.266	20-30 31-40 41-50 51-60 > 60	69.00 66.21 60.09 52.87 39.25	.382	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	103.0 43.50 59.73 64.86 69.00	.125	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	46.33 54.43 64.00 53.94 59.87 77.50 43.58	.234	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	60.50 66.93 62.96 63.54 52.03 72.09 49.19	.335
74	The organization encourages employees to satisfy customers	RASCO SOC AGOCO	53.86 69.66 60.68	.109	20-30 31-40 41-50 51-60 > 60	88.00 57.05 58.90 63.15 58.25	.342	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	110.0 43.43 65.63 60.78 51.85	.066	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	50.17 61.71 58.67 67.06 60.00 65.37 58.25	.959	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	82.50 62.34 61.35 56.75 52.74 61.05 63.94	.914
75	The organization uses information from customer services in improving its processes and services	RASCO SOC AGOCO	64.66 59.08 57.41	.540	20-30 31-40 41-50 51-60 > 60	76.10 65.45 59.83 52.78 44.25	.340	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	68.00 54.40 61.75 66.74 37.65	.120	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	65.67 57.32 62.93 54.61 53.94 78.33 60.08	.303	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	68.00 60.14 68.69 67.00 68.74 58.73 43.63	.120

As the result in Table 7.13 shows, there is no statistically significant difference concerning the Statement 74 (Employees are resistant to understanding quality and its aspects) across the control variables: 'organisation' (p=0.109), 'age' (p=0.342), 'position' (p=0.959) and 'experience' (p=0.914), which is clearly higher than the critical value of 0.05. While in the qualification groups the outcomes suggest otherwise. This can be evidenced from the p-value of 0.066, which is lower than p-value of 0.10.

In relation to the Statement 75 (The organization uses information from customer services in improving its processes and services), the results from Table 7.13 shows that there is no statistically significant difference in any of the control variables ('organisation', 'age', 'qualification', 'position' and 'experience') regarding the statement. This can be seen as the p-values of 0.540, 0.340, 0.120, 0.303 and 0.120, respectively, are all higher than the critical level of 0.05. It seems that all groups in each control variable have roughly similar perceptions.

7.5.11. Measurement and Evaluation

In the implementation of TQM, measurement and evaluation issues are also considered to be essential, the shortcomings in which can hamper the effective implementation.

In relation to the Statement 76 (In your organization quality is not effectively measured), the result from Table 7.14 shows that there is no statically significant difference in the control variables of 'organisation', 'age' and 'qualification', regarding their views on the statement. However, the results suggest that there is a statistically significant difference between the 'position' and 'experience' sub-groups, which can be seen as the estimated p-values of 0.051 and 0.065 is lower than the 0.10 confidence level.

The results in Table 7.14 concerning the Statement 77 (Within Libyan oil and gas organisations product conformity is measured and monitored to guarantee that organisations actually meet all requirements) signify that there is no statistically-significant difference in the case of 'qualification' and 'experience', while in the case of 'organisation', 'age' and 'position' groups the findings suggest otherwise. This can

be seen from the *p*-values of 0.003, 0.067 and 0.027, respectively, which are lower than *p*-value of 0.10. Based on the mean value score, respondents aged between 20-30 years (mean=75.10) are ranked as the highest group. In the organisation sub-category, AGOCO obtained the highest mean score, which reflects their different of views regarding the statement (mean=69.28), second was SOC with a mean of 65.82, followed by RASCO with a mean ranking of 47.77. For the highest position group, it is clear from the result that the administrator sub-group (mean=75.30) reached the highest mean, followed by controllers, then heads of divisions, followed by middle management, coordinators, supervisors and surprisingly the lowest score is top management with a mean rank of 33.08.

It can be seen from the result in Table 7.14 that there is no statistically significant difference concerning the statement that 'employees are resistant to understanding quality and its aspects' in the Statement 78 across the control variables, 'age' (*p*=0.240), 'qualification' (*p*=0.139), 'position' (*p*=0.337) and 'experience' (*p*=0.605), which is clearly higher than the critical value of 0.05. Conversely, the result also suggests that there is a statistically significant difference between 'organisations', as the estimated *p*-value of 0.090 is lower than the critical level of 0.10.

The Statement 79 refers to whether 'The oil and gas organisations have a sufficient measurement system for quality improvement or not'. As depicted in Table 7.14, four of the control variables: 'age' (*p*=0.233), 'qualification' (*p*=0.600), 'position' (*p*=0.279), and 'experience' (*p*=0.204), conclusively have no significant statistical difference of opinions on the statement, since the *p*-values are higher than the critical *p*-value of 0.05. However, the result also suggests that there is significant difference as regards the 'organisation' group (*p*=0.011), as the *p*-value is lower than the critical *p*-value of 0.05. Referring to the 'organisation' sub-category, AGOCO (mean=71.90) obtained the highest mean ranking which reflects their different views, followed by RASCO second (mean=55.02), and lastly SOC with a mean of 51.73 The result implies that all groups have, in general, different views in terms of the level of agreement regarding the statement.

Table 7.14: Measurement and Evaluation

N0.	Questions	Organisation	Mean Rank	Asymp Sig. *(P)*	Age	Mean Rank	*(P)*	Qualification	Mean Rank	*(P)*	Position	Mean Rank	*(P)*	Experience	Mean Rank	*(P)*
76	In your organization quality is not effectively measured	RASCO SOC AGOCO	57.53 69.61 57.12	.188	20-30 31-40 41-50 51-60 > 60	67.50 53.06 58.26 72.27 71.25	.139	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	79.50 62.80 57.86 59.24 74.55	.600	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	79.83 55.00 54.55 80.00 66.06 52.30 36.00	.051	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	79.50 57.72 52.98 51.14 52.91 67.09 78.40	.065
77	Within Libyan oil and gas organisations product conformity is measured and monitored to guarantee that organisations actually meet all requirements	RASCO SOC AGOCO	47.77 65.82 69.28	.003	20-30 31-40 41-50 51-60 > 60	75.10 59.62 58.56 65.72 3.50	.067	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	91.00 64.90 57.55 62.64 58.70	.744	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	33.08 61.68 48.16 67.56 65.89 75.30 60.42	.027	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	91.00 56.17 67.04 57.57 62.65 62.64 57.13	.796
78	The organisation promotes the use of statistical tools to monitor and measure products and processes for effectiveness and improvement	RASCO SOC AGOCO	52.03 65.85 65.09	.090	20-30 31-40 41-50 51-60 > 60	73.70 67.66 53.84 58.13 42.25	.240	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	81.50 64.40 60.80 64.29 36.10	.139	Top management. Middle man. Supervision Controller Heads of Divisions Administrator Coordinator	51.92 58.96 61.02 54.00 60.52 76.30 40.25	.337	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	81.50 66.50 67.02 55.36 55.97 59.00 52.75	.605
79	The oil and gas organisations have a sufficient measurement system for quality improvement.	RASCO SOC AGOCO	55.02 51.73 71.90	.011	20-30 31-40 41-50 51-60 > 60	70.80 62.08 63.71 55.20 16.00	.233	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	30.00 64.50 63.98 56.54 53.85	.600	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	64.58 56.89 53.36 50.89 61.34 79.17 61.33	.279	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	77.00 56.48 73.13 54.64 65.06 67.05 49.23	.204

(Data Analysis)

7.5.12. Government Support

This section aims to discuss 'government support' as a potential barrier to the effective implementation of TQM in Libyan oil and gas organisations through examining the positions taken to various statements under this theme through a number of control variables.

As indicated in Table 7.15, the results suggest that statistically there is no significant difference in the answers given to the Statement 80 (There is no financial support from the government to help the organisation to implement a TQM system) among the four study control variables: 'organisation', 'age', 'qualification', and 'experience'. However, there is a statistically-significant difference between 'position' sub-groups, as the estimated *p*-value of 0.005 is significantly lower than the critical level of 0.05. Based on the mean-value score, it is clear that the top management group, with a mean rank of 100.7, ranked as the highest sub-group, followed by administrators, heads of divisions, controllers, middle management, then supervisor and surprisingly the lowest score is coordinator with a mean rank of 40.00.

As the results in Table 7.15 show, there is no significant difference in terms of agreement level for the Statement 81 (There are no government pressures in terms of regulations and laws to make the organisation implement improvements in its quality management systems) among the four study control variables 'organisation', 'age', 'qualification', and position', while there is a statistically significant difference between the 'experience' sub-groups, as the estimated *p*-value of 0.020 is significantly lower than the 0.05 confidence level. Based on the mean-value score, the 5-10 years of 'experience' group (mean = 73.40) ranked the highest, then the 11-15, the 30 or more, the less than 5 years of experience group, the 26-30, 21-25 years, and lastly the 16-20 group (mean = 37.50).

In relation to the Statement 82 (There are inadequate studies from governmental departments to help guide the organisation in developing a TQM system), the result from Table 7.15 shows that there is no statically significant difference in any of the control variables ('organisation', 'age', 'qualification', 'position', 'experience') regarding the position taken from the statement.

Table 7.15: Government Support

N0.	Questions	Organisation	Mean Rank	Asymp Sig. *(P)*	Age	Mean Rank	*(P)*	Qualification	Mean Rank	*(P)*	Position	Mean Rank	*(P)*	Experience	Mean Rank	*(P)*
80	There is no financial support from the government to help the organisation to implement a TQM system	RASCO SOC AGOCO	54.89 57.56 68.01	.136	20-30 31-40 41-50 51-60 > 60	74.70 55.66 65.79 58.08 59.50	.533	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	53.00 45.57 65.89 56.69 68.85	.202	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	100.7 50.93 49.09 61.94 64.87 70.80 40.00	.005	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	117.00 58.36 58.98 54.71 65.91 66.14 59.21	.608
81	There are no government pressures in terms of regulations and laws to make the organisation implement improvements in its quality management systems	RASCO SOC AGOCO	61.11 64.10 57.42	.675	20-30 31-40 41-50 51-60 > 60	73.20 67.55 52.98 58.92 51.50	.280	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	62.00 55.93 57.73 61.35 79.15	.413	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	57.50 43.36 61.17 44.28 62.93 76.27 68.58	.118	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	62.00 73.40 67.21 37.50 48.97 54.00 62.71	.020
82	There are inadequate studies from governmental departments to help guide the organisation in developing a TQM system	RASCO SOC AGOCO	63.02 61.76 57.17	.661	20-30 31-40 41-50 51-60 > 60	90.50 53.06 62.15 62.97 75.50	.107	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	84.50 52.77 61.23 59.45 69.80	.661	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	77.67 52.57 57.16 55.06 64.87 59.77 58.17	.669	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	84.50 61.02 55.83 55.93 55.09 65.23 67.88	.751

(Data Analysis)

7.5.13. Resources and Requirements of TQM

An efficient application of TQM requires adequate and necessary resources to be available, which may be a problematic issue; and therefore the findings in the previous chapter in the case of Libyan oil and gas organisations indicated that this can be a potential barrier. This section, therefore, takes the analysis further by identifying the positions and opinions of the individuals through various categories.

As regards to the Statement 83 (Time constraints prohibit effective total quality management implementation), the findings in Table 7.16 suggest that there is no statistically significant difference among the control variables' sub-groups concerning the statement, as all the estimated *p*-values are higher than the critical *p*-value of 0.05.

The findings in Table 7.16 also show that there is no statistically-significant difference concerning the Statement 84 that 'Employees are resistant to understanding quality and its aspects' across all the control variables, as their estimated *p*-values are higher than the critical value of 0.05. The result implies that all groups have, in general, similar views in terms of the level of agreement regarding the statement.

The results in Table 7.16 also show that there is statistically significant difference across 'organisation', 'position' and 'experience' groups in terms of agreement level with the Statement 85 that 'No proper organisational structure has been developed to implement TQM', as the estimated *p*-values in these cases are significantly lower than the 0.05 confidence level. The mean raking results in the case of 'organisation' show that RASCO (69.05) has the statistically highest mean score followed by SOC (63.82) and AGOCO (49.86). The highest mean ranked 'position' group is the middle management (72.57) followed by top management, supervisors, heads of divisions, controllers administrators, and lastly coordinators. Referring to 'experience' sub-categories, respondents with 30 years or more experience scored the highest mean of score 73.29, meanwhile the lowest mean score (mean=4.50) is the less than 5 years of experience group. However, the results indicate that there is no statistically-significant difference across the remaining two control variables, 'age' and 'qualification' since their estimated *p*-values of 0.102 and 0.322 respectively, are higher than the critical *p*-value of 0.05 (or even 0.10).

Table 7.16: Resources and Requirement of TQM

N0.	Questions	Organisation	Mean Rank	Asymp Sig. *(P)*	Age	Mean Rank	*(P)*	Qualification	Mean Rank	*(P)*	Position	Mean Rank	*(P)*	Experience	Mean Rank	*(P)*
83	Time constraints prohibit effective total quality management implementation	RASCO SOC AGOCO	67.30 58.26 55.40	.199	20-30 31-40 41-50 51-60 > 60	72.00 57.73 59.56 61.97 88.00	.644	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	88.00 50.30 62.58 62.23 54.85	.578	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	75.42 63.79 63.34 67.33 52.30 62.53 64.83	.560	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	118.50 51.98 58.56 60.43 69.85 65.73 61.33	.313
84	There are adequate resources to effectively employ TQM	RASCO SOC AGOCO	66.17 57.06 57.32	.355	20-30 31-40 41-50 51-60 > 60	62.80 59.62 56.10 64.17 106.75	.276	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	56.50 52.87 61.74 63.56 53.60	.794	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	67.42 70.75 62.45 56.11 56.35 59.17 58.50	.858	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	25.00 63.47 53.92 63.57 60.50 55.82 65.33	.779
85	No proper organisational structure has been developed to implement TQM	RASCO SOC AGOCO	69.05 63.82 49.86	.016	20-30 31-40 41-50 51-60 > 60	51.70 59.85 54.85 67.07 111.00	.102	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	37.50 56.57 58.88 59.78 80.40	.322	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	70.00 72.57 67.29 45.39 63.55 42.23 37.50	.031	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	4.50 65.74 56.96 61.57 42.03 58.77 73.29	.037
86	Insufficient technology and poor quality management practices currently exist in the oil and gas organisations	RASCO SOC AGOCO	65.17 59.32 56.74	.473	20-30 31-40 41-50 51-60 > 60	51.60 56.47 59.61 65.12 118.00	.105	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	54.00 54.67 59.33 62.73 67.65	.875	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	81.17 66.29 63.16 46.39 61.39 51.67 50.67	.398	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	5.00 58.76 65.50 52.68 48.00 60.45 73.35	.113
87	There is a lack of local consultants properly qualified in TQM within the oil and gas sector	RASCO SOC AGOCO	57.75 69.71 56.84	.195	20-30 31-40 41-50 51-60 > 60	47.90 57.12 56.81 70.23 92.50	.187	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	37.50 51.23 63.40 57.46 72.60	.439	Top management Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	78.67 58.86 60.41 58.94 63.54 54.00 44.42	.646	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	79.00 58.05 55.69 55.00 50.94 62.23 76.69	.197
88	Libyan oil and gas organisations do not generally allow time for TQM	RASCO SOC AGOCO	69.59 59.97 51.98	.045	20-30 31-40 41-50 51-60 > 60	53.90 57.85 59.71 63.37 106.75	.335	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies high diploma	25.50 56.03 63.52 58.79 60.75	.749	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	84.25 67.36 66.41 56.94 53.35 54.67 60.92	.321	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	61.00 53.55 64.29 61.75 60.82 51.18 68.40	.704

As regards the Statement 86 (Insufficient technology and poor quality management practices currently exist in the oil and gas organisations), the findings in Table 7.16 suggests that there is no statistically significant difference among the control variables' sub-groups concerning the statement. As the estimated *p*-values for 'organisation' (*p*=0.473), 'age' (*p*=0.105), 'qualification' (*p*=0.875), 'position' (*p*=0.398), and 'experience' (*p*=0.113) are all higher than the critical *p*-value of 0.05.

The results in Table 7.16 depict that there is no statistically-significant difference concerning the Statement 87 that 'Employees are resistant to understanding quality and its aspects' across the control variables, as the *p*-values for 'organisation' (*p*=0.195), 'age' (*p*=0.187), 'qualification' (*p*=0.439), 'position' (*p*=0.646) and 'experience' (*p*=0.197) are all clearly higher than the critical value of 0.05. The result implies that all groups have, in general, similar views in terms of the level of agreement regarding the statement.

The Statement 88 refers to whether 'Libyan oil and gas organisations generally allow time for TQM or not'. As can be seen in Table 7.16, 'age' (*p*=0.335), 'qualification' (*p*=0.749), 'position' (*p*=0.321), and 'experience' (*p*=0.704), conclusively have no significant statistical difference of opinions on the above statement, since the *p*-values are higher than the critical *p*-value of 0.05. However, the results also suggest that in the case of 'organisation' group ($p = 0.045$), there is a statistically significant result as the *p*-value is lower than the critical *p*-value of 0.05. Thus, referring to 'organisation' sub-category, RASCO (mean=69.59) obtained the highest mean ranking which reflects their different views, followed by SOC ranked second with a mean rank of 59.97 and lastly AGOCO (mean=51.98).

7.5.14. Management Attitude

Management attitude is considered to have impact on the effective implementation of TQM. This section further the initial analysis in the previous section by locating the impact of management attitude through control variables on the implementation of TQM in Libyan oil and gas organisations.

As regards to the Statement,89 (Within Libyan oil and gas organisations there are excessive layers of management), the results in Table 7.17 indicate that there are no

statistically significant differences in the opinions expressed for the statement by ‘organisation’, ‘qualification’ and ‘experience’, since the estimated statistics are higher than the critical level of 0.05. However, there is a significant difference across ‘age’ and ‘position’ groups; as the *p*-value of 0.030 and 0.078 is lower than 0.10. As can be seen from the table the highest mean score in the ‘age’ group is the 31-40 year old sub-group (mean=68.05), then 20-30 years (mean=66.50) followed by 51-60 years (mean=62.97), 41-50 (mean=52.61), then lastly the over 60 years group (mean=4.00). In relation to the highest ‘position’ groups, it is clear that controllers with a mean rank of 69.94 ranked the highest.

As indicated in Table 7.17, there is no statistically significant difference in two control variables, ‘organisation’ and position, regarding Statement 90 (The organization uses tactical techniques for process analysis, control and improvement). The results also reveal that there is a statistically significant difference in the remaining three control variables, ‘age’, ‘qualification’ and ‘experience’ in terms of position taken for the statements, as evidenced in the *p*-values of 0.000, 0.062 and 0.013, which are lower than the critical *p*-value of 0.10. Based on the mean ranking, the highest mean score was shown by those aged between 20-30 years (mean=88.40), then 31-40 years, followed by 41-50 years, 51-60 years and lastly over 60 years old (mean=2.50). For the qualification’ group, the higher studies sub-group, with a mean rank of 65.90, ranked as the highest subgroup. For highest experience group, the less than 5 years of experience group with a mean rank of 104.00 ranked as highest, and the lowest mean score is the 30 years or more group with a mean score of 42.58.

In relation to the Statement 91 (There is frequent turnover of employees in Libyan oil and gas organisations), Table 7.17 shows that there are no statistically-significant differences conclusively for ‘age’, ‘qualification’ and ‘experience’. However, the results also suggest that there is a significant difference as regards the ‘organisation’ group (*p*=0.000) and ‘position’ (*p*=0.053) as the *p*-value is significantly lower than the critical *p*-value of 0.10. Based on the table, referring to ‘organisation’ sub-category, AGOCO obtained the highest reflecting their differences of view with a mean rank of 75.17, followed by RASCO ranked second (mean=54.94), and lastly SOC with a mean value of 47.10. In relation to the highest ‘position’ groups, it is clear that administrators, with a mean rank of 69.93, ranked the highest.

Table 7.17: Management Attitude

N0.	Questions	Organisation	Mean Rank	Asymp Sig. *(P)*	Age	Mean Rank	*(P)*	Qualification	Mean Rank	*(P)*	Position	Mean Rank	*(P)*	Experience	Mean Rank	*(P)*
89	Within Libyan oil and gas organisations there are excessive layers of management	RASCO SOC AGOCO	61.15 65.34 56.53	.515	20-30 31-40 41-50 51-60 > 60	66.50 68.05 52.61 62.97 4.00	.030	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	30.50 66.80 58.42 59.05 71.15	610	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	66.75 35.04 60.07 69.94 66.54 64.33 50.75	.078	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	99.50 63.41 69.92 61.54 48.56 46.91	.264
90	The organization uses tactical techniques for process analysis, control and improvement	RASCO SOC AGOCO	64.02 60.06 57.36	.630	20-30 31-40 41-50 51-60 > 60	88.40 74.30 54.33 48.17 2.50	.000	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	65.00 47.77 64.25 65.90 37.50	.062	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	32.75 60.64 62.53 63.83 56.49 77.53 57.92	.164	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	104.00 70.43 73.19 55.14 57.59 53.09 42.58	.013
91	There is frequent turnover of employees in Libyan oil and gas organisations	RASCO SOC AGOCO	54.94 47.10 75.17	.000	20-30 31-40 41-50 51-60 > 60	87.70 61.63 59.68 57.68 27.00	.186	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	46.50 57.80 65.50 53.15 67.10	.384	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	46.92 52.86 59.19 34.06 68.93 69.93 56.75	.053	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	108.00 58.88 65.92 69.57 54.24 56.09 56.23	.489
92	Management style does not encourage and motivate individuals to be innovative and efficient	RASCO SOC AGOCO	59.78 65.68 57.63	.579	20-30 31-40 41-50 51-60 > 60	29.60 56.50 58.84 74.30 50.00	.036	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	51.50 53.37 56.41 64.74 78.05	.292	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	84.58 53.50 55.52 60.33 61.49 59.90 71.83	.532	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	51.50 50.38 62.33 43.04 63.18 69.27 75.54	.055

(Data Analysis)

The results in Table 7.17 demonstrate that there is no statically-significant difference regarding the Statement 92 (Management attitude does not encourage and motivate individuals to be innovative and efficient) as regards to 'organisation', 'qualification' and 'position', since the estimated statistics are higher than the critical level of 0.05. On the other hand, the findings suggest that there is a significant difference across the 'age' and 'experience' groups, as the *p*-values of 0.036 and 0.055 are lower than 0.10. As can be seen from the table the highest mean score in the 'age' group is the sub-group of 51-60 years old (mean=74.30), followed by 41-50 (mean=58.84), then 31-40 (mean=56.50), then the over 60 years old group (mean=50.00), and lastly the 20-30 years old group (mean=29.60). Based on the mean-value score, 60 years of experience and over group (mean=75.54) ranked the highest.

7.6. OVERALL ANALYSIS

The analysis so far provided detailed discussion on a number of statements under the main factors by locating the significance of differences of each of the control variables in relations to the sub-statements. This section, however, aims to provide the findings in relation to the main factors without discussing the sub-statements, as this has been analysed above. For this, the mean values of the factors through their sub-statements are estimated and tested in relation to control variables through Kruskal-Wallis Test. The overall results are provided in Table 7.18.

In relation to 'State of TQM' (1) the result from Table 7. 18, shows that there is no statically-significant difference in any of the control variables ('organisation', age, 'qualification', 'position' and 'experience') regarding the position taken by the respondents for the statement.

The results in Table 7. 18 concerning the 'Top management and leaders' commitment' (2) signify that there is no statistically significant difference in four control variables, 'organisation', 'position', 'qualification' and 'experience', while in the 'age' group the outcomes suggest otherwise. This can be seen from the *p*-value of 0.012, which is lower than the *p*-value of 0.05.

It can also be seen from the result that there is no statistically significant difference concerning the 'Organisation culture' (3) across all the control variables:

‘organisation’, ‘age’, ‘qualification’, ‘position’ and ‘experience’. The result implies that all groups have, in general, similar views in terms of the level of agreement regarding the section.

As can be observed in Table 7.18, four of the control variables, ‘organisation’, ‘qualification’, ‘position’ and ‘experience’, conclusively show no significant statistical difference of opinions on the main obstacle factor ‘Employee involvement and Empowerment’ (4), since the *p*-values are higher than the critical *p*-value of 0.05. However, the results suggest that there is a significant difference with regard to the ‘age’ group (*p*=0.093), as the *p*-value is lower than the critical *p*-value of 0.10.

As regards ‘Employee resistance to change’ (5), the results in the Kruskal- Wallis test in Table 7.18 suggests that there is no statistically significant difference among the control variables of ‘organisation’, ‘qualification, and ‘experience’ concerning this obstacle. However, it is different for: ‘age’ (*p*-value=0.020) and ‘position’ (*p*-value=0.059), which is lower than the critical *p*-value of 0.10.

The results in Table 7.18 indicate that statistically, there is no significant difference in terms of the responses to the obstacle of ‘Quality strategic plan’ (6) among the study control variables ‘organisation’, ‘qualification’ and ‘position’, while in ‘age’ and ‘experience’ the outcomes suggest otherwise, as evidenced in the *p*-value of 0.070, and 0.016, respectively, which is significantly lower than the critical limit *p*-value of 0.10.

Referring to the obstacle of ‘Employee Training, Development and Education’ (7) the results from the Kruskal-Wallis tests reveal that there is no significant difference in the ‘organisation’ and ‘qualification’ groups in relation to the responses given to the statement. On the other hand, there is statistically significant difference in the ‘age’, position’ and ‘experience’ groups, as proven from the *p*-values of 0.044, 0.093, 0.068, respectively, which are clearly lower than the critical *p*-value of 0.10.

The results in Table 7.18 also indicate that there is no statistically-significant difference regarding ‘Information and communication’ (8) across four of the control variables. However, the results also suggest that there is significant difference as regards the ‘age’ group (*p*=0.052), since the *p*-values are significantly lower than the 0.10 confidence level.

Table 7.18: Overall Results through Main Factors

No.	Statement	organisation	Mean Rank	Asymp Sig. *(P)*	Age	Mean Rank	*(P)*	Qualification	Mean Rank	*(P)*	Position	Mean Rank	*(P)*	Experience	Mean Rank	*(P)*
1	State of TQM	RASCO SOC AGOCO	68.78 58.84 53.54	.108	20-30 31-40 41-50 51-60 > 60	49.20 56.52 56.18 72.02 88.00	.174	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	112.00 56.70 62.65 60.56 48.95	.440	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	71.83 55.64 62.60 67.44 65.21 39.63 59.92	.264	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	35.50 56.43 52.63 64.93 61.18 62.45 70.38	.619
2	Top management and leaders' commitment	RASCO SOC AGOCO	63.58 62.52 56.10	.554	20-30 31-40 41-50 51-60 > 60	104.70 65.27 56.31 54.45 22.00	.012	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	60.00 48.10 62.17 64.85 53.00	.535	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	36.33 59.46 65.24 59.78 53.93 76.17 71.00	.198	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	113.00 67.67 64.83 65.64 55.82 51.55 49.73	.269
3	Organisation culture	RASCO SOC AGOCO	60.07 70.90 53.76	.105	20-30 31-40 41-50 51-60 > 60	57.10 56.50 59.76 68.85 44.50	.589	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	18.00 64.63 59.98 60.58 61.10	.784	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	76.33 55.04 59.67 54.44 65.78 46.70 68.92	.471	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	43.00 61.88 59.81 45.36 65.15 51.73 69.81	.453
4	Employee involvement and Empowerment	RASCO SOC AGOCO	53.36 60.56 67.43	.157	20-30 31-40 41-50 51-60 > 60	100.80 58.79 55.84 63.05 51.50	.093	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	31.50 54.87 65.49 60.45 44.60	.356	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	44.00 63.96 51.43 57.56 60.70 77.33 73.75	.234	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	118.00 66.71 58.08 57.50 69.26 39.91 58.00	.168
5	Employee resistance to change	RASCO SOC AGOCO	66.58 56.06 57.61	.328	20-30 31-40 41-50 51-60 > 60	17.50 55.40 65.76 66.30 85.50	.020	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	85.50 55.97 60.06 57.40 79.30	.387	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	47.08 50.71 72.98 63.33 65.20 44.30 40.58	.059	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	17.50 47.97 63.92 62.46 58.50 60.27 74.40	.135
6	Quality strategic planning	RASCO SOC	63.92 62.73	.484	20-30 31-40	45.40 56.95	.070	Below second. school Secondary Certificate or	49.50 64.57	.755	Top management. Middle man.	64.00 68.71	.207	<5 years 5-10	36.50 56.40	.016

		AGOCO	55.62		41-50 51-60 > 60	55.48 71.90 104.00		equivalent Baccalaureate Higher Studies High diploma	58.32 59.09 73.00		Supervisor Controller Heads of Divisions Administrator Coordinator	60.45 62.56 66.44 40.07 45.50		11-15 16-20 21-25 26-30 30-more	54.71 60.29 56.00 42.55 83.79	
7	Employee Training, Development and Education	RASCO SOC AGOCO	68.20 55.15 56.66	.176	20-30 31-40 41-50 51-60 > 60	86.20 70.16 53.96 52.33 41.75	.044	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	44.50 65.37 62.09 61.71 41.35	.444	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	38.42 52.54 71.02 57.94 54.22 77.20 55.33	.093	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	44.50 67.26 70.90 69.14 57.35 36.18 50.94	.068
8	Information and communication	RASCO SOC AGOCO	59.30 68.16 56.40	.331	20-30 31-40 41-50 51-60 > 60	52.10 55.97 53.91 75.20 90.25	.052	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	22.50 55.40 59.65 63.17 66.20	.722	Top management.5 Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	81.33 60.54 62.03 53.44 62.73 52.77 46.83	.612	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	35.50 63.05 56.96 46.71 50.26 61.86 76.67	.128
9	Continuous Improvement and Innovation	RASCO SOC AGOCO	66.33 56.66 57.44	.371	20-30 31-40 41-50 51-60 > 60	83.30 64.92 60.95 49.98 57.25	.225	Below secondary school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	113.50 54.73 67.39 55.85 44.10	.095	Top management. Middle man. Supervision Controller Heads of Divisions Administrator Coordinator	34.75 61.36 60.74 61.83 57.00 78.63 59.67	.246	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	96.00 65.79 61.27 66.61 66.15 51.59 48.38	.389
10	Teamwork	RASCO SOC AGOCO	69.45 54.89 55.61	.093	20-30 31-40 41-50 51-60 > 60	95.70 58.77 61.40 54.30 84.75	.117	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	96.00 48.27 67.95 58.03 43.95	.088	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	46.75 70.93 61.91 65.44 58.77 54.77 61.83	.805	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	96.00 63.33 60.60 63.18 64.35 59.50 51.67	.787
11	Internal and External Customer Satisfaction	RASCO SOC AGOCO	57.65 66.98 58.82	.470	20-30 31-40 41-50 51-60 > 60	92.70 63.52 60.23 53.52 25.25	.090	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	114.50 36.07 64.03 67.62 44.60	.006	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	57.92 54.61 57.43 65.06 58.29 80.20 50.67	.378	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	83.50 63.90 69.75 61.79 56.65 57.50 49.54	.516
12	Measurement and Evaluation	RASCO SOC AGOCO	47.84 65.34 69.54	.008	20-30 31-40 41-50	73.30 59.77 57.54	.162	Below second. school Secondary Certificate or equivalent	76.50 67.23	.796	Top management. Middle man. Supervisor	59.50 57.86 49.66	.137	<5 years 5-10 11-15	94.00 55.66 69.42	.508

					51-60 > 60	66.80 9.00		Baccalaureate Higher Studies High diploma	58.90 62.04 51.60		Controller Heads of Divisions Administrator Coordinator	67.83 65.06 76.20 38.67		16-20 21-25 26-30 30-more	48.43 59.88 66.86 60.60	
13	Government Support	RASCO SOC AGOCO	58.63 59.98 62.69	.847	20-30 31-40 41-50 51-60 > 60	86.00 58.53 61.29 57.68 65.50	.515	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	66.00 43.10 63.48 58.64 76.90	.142	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	93.08 41.07 53.34 50.72 65.82 74.87 50.25	.011	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	113.00 67.17 60.50 42.54 57.85 59.09 63.25	.255
14	Resources and Requirement of TQM	RASCO SOC AGOCO	68.55 60.52 52.62	.096	20-30 31-40 41-50 51-60 > 60	58.00 57.34 56.49 66.97 118.00	.113	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	43.50 51.93 61.64 61.08 66.55	.821	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	80.75 68.00 65.71 52.33 58.39 50.73 48.67	.435	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	32.00 58.78 59.73 59.14 51.76 55.41 73.85	.463
15	Management Style	RASCO SOC AGOCO	59.55 60.31 61.57	.962	20-30 31-40 41-50 51-60 > 60	69.60 68.70 51.55 63.00 3.00	.024	Below second. school Secondary Certificate or equivalent Baccalaureate Higher Studies High diploma	27.50 50.53 60.89 61.81 71.50	.514	Top management. Middle man. Supervisor Controller Heads of Divisions Administrator Coordinator	58.58 45.43 55.93 51.39 67.37 72.93 55.33	.270	<5 years 5-10 11-15 16-20 21-25 26-30 30-more	114.00 59.71 73.27 50.89 50.68 54.45 61.79	.197

(Data Analysis)

With regards to ‘Continuous Improvement and Innovation’ (9), the data in Table 7.18 shows that the ‘organisation’, ‘age’, ‘position’ and ‘experience’ groups show no significant statistical difference in their views, while in the ‘qualification’ groups the outcomes suggest otherwise, since each *p*-value of 0.095, is clearly lower than the critical *p*-value of 0.10.

The results in Table 7.18 concerning ‘Teamwork’ (10) signify that there is no statistically significant difference in three control variables, ‘age’, ‘position’ and ‘experience’, while in the ‘organisation’ and ‘qualification’ groups the results suggest otherwise. This can be seen from the *p*-value of 0.093 and 0.088, respectively, which is lower than the *p*-value of 0.10.

Concerning the ‘Internal and External Customer Satisfaction’ (11), based on the result as presented in Table 7.18, there is no statistically-significant difference across the ‘organisation’, ‘position’ and ‘experience’ control variables. However, the control variables of ‘age’ (p=0.090) and ‘qualification’ (p=0.006) are lower than the critical value of 0.10.

In relation to ‘Measurement and Evaluation’ (12) the results from Table 7.18, show that only the ‘organisation’ group shows statistically significant difference regarding this obstacle. This can be observed as the significant *p*-value is 0.008, which is significantly lower than the critical level of 0.05. However, the results suggest otherwise for the rest of the control variables (‘age’, ‘qualification’, ‘position’ and ‘experience’.

As observed in Table 7.18, the results suggest that statistically there is no significant difference concerning the obstacle ‘Government support’ (13) among four of the control variables, ‘organisation’, ‘age’, ‘qualification’ and ‘experience’. In contrast, the results also indicate that there is a statistically significant difference between the ‘position’ sub-groups, as the estimated *p*-value of 0.011 is significantly lower than the significant level of 0.05.

The results in Table 7.18, concerning the ‘Resources and Requirements of TQM’ (14) indicates that there is no statistically-significant difference in four of the control variables, ‘age’, ‘position’, ‘qualification’ and ‘experience’, while in the organisation,

groups the outcomes suggest otherwise. This can be seen from the *p*-value of 0.096, which is lower than the *p*-value of 0.10.

As regards to 'Management Style' (15), the findings indicate that there is no statistically significant difference in four of the control variables, 'organisation', 'position' 'qualification' and 'experience'. However, in the 'age' groups the outcomes suggest otherwise. This can be evidenced from the *p*-value of 0.024, which is lower than the *p*-value of 0.05.

7.7. OVERALL RESULTS FOR AND REFLECTION ON THE CONTROL VARIABLES

After presenting the overall results according to the main factors beyond the sub-statements, this section aims to summarise the results in relation to the identified control variables, namely 'organisation', 'position' 'qualification', 'experience' and 'age' of the participants. As the results in Table 7.19 show, against each of the main factors considered to be an obstacle or barrier against the efficient implementation of TQM, the frequency of each of control variable found to be significant for the sub-statements of the factor is listed. In other words, this section in Table 7.19 presents the significance frequency of control variables in relations to obstacle factors.

As can be seen from Table 7.19, the control variables of 'organisation' and 'experience' were twice found to be statistically significant regarding the awareness and understanding of quality concept, techniques, concept of TQM and necessity of TQM. This result for the control variable of 'organisation' may be explained by the fact that each organisation has its own unique definition and application of such concepts and techniques, and the control variable of 'experience' plays a critical role in realising and defining these elements. The 'position' control variable was significant once in the 'awareness and understanding of TQM'; 'organisation' was significant twice, whereas 'age' and 'experience' was found to be significant once. The result for the factor 'Top management and leadership commitment' shows that 'age' was significant seven times, position' six times, 'organisation' three times and 'experience' once. The result implies that, generally, the 'age' and 'position' groups have significantly different opinions and attitudes regarding the statements and questions as an actual obstacle.

With regard to ‘organisational culture’ as a possible obstacle, only the ‘organisation’ control variable indicated statistical difference. In relation to ‘Employee Involvement and Empowerment’ the ‘organisation’, ‘age’ and ‘position’ control variables are found to be significant twice, respectively. On the other hand, the ‘experience’ control variable was only considered to be significant once.

Concerning the ‘Employee Resistance to change’ only the control variable of ‘age’ was deemed to be significant three times. The next two control variables (*i.e.* ‘position’ and ‘experience’) were significant once. There is a statistically significant difference across the ‘age’ and ‘experience’ groups twice regarding the obstacle named as quality strategic planning. In addition, the ‘qualification’ control variable was also found to be significant regarding possible obstacles.

As for the obstacle of ‘Employee Training, Development and Education’, the ‘age’ and ‘position’ control variables are found to be significant three times, while ‘organisation’ and ‘experience’ are found to be significant twice and ‘qualification’ only once. With regard to ‘Information and Communication’ as a possible obstacle to the successful and effective application of TQM, the control variables of ‘organisation’, ‘age’, ‘position’, and ‘experience’ showed significant statistical difference once in all its elements.

For the possible obstacle of ‘Continuous Improvement and Innovation’, the results show that ‘age’ is found to be significant four times, followed by ‘organisation’ and ‘position’ twice, then ‘experience’ once. In relation to ’Lack of teamwork as an obstacle’ only ‘age’ was considered to be significant twice, while the rest, ‘organisation’, ‘qualification’ and ‘experience’ are found to be significant once. The results signify that the differences are mostly in the ‘age’ group regarding lack of teamwork as an actual obstacle.

There is a statistically-significant difference across the ‘qualification’ group which is found to be indicating differences views twice in the obstacle section of ‘Internal and External Customer Satisfaction’, meanwhile ‘age’, ‘position’ and ‘experience’ were significant once for this statement or factor.

Table 7.19: Significance Frequency of Control Variables in Relations to Obstacle Factors

No	variables	Control variables	frequency
1	Exploring Awareness and Understanding	Organisation Position Experience	2 1 2
2	Exploring Awareness and Understanding of TQM	Organisation Age Experience	2 1 1
3	Top Management and Leadership	Organisation Position Age Experience	3 6 7 1
4	Organisational Culture	Organisation	2
5	Employee Involvement and Empowerment	Organisation Age Position Experience	2 2 2 1
6	Employee Resistance to Change	Age Position Experience	3 1 1
7	Quality Strategic Plan	Age Qualification Experience	2 1 2
8	Employee Training, Development and Education	Organisation Age Qualification Position Experience	2 3 1 3 2
9	Information and Communication	Organisation Age Position Experience	1 1 1 1
10	Continuous Improvement and Innovation	Organisation Age Qualification Position Experience	2 4 1 2 1
11	Teamwork	Organisation Age Qualification Experience	1 2 1 1
12	Internal and External Customer Satisfaction	Age Qualification Position Experience	1 2 1 1
13	Measurement and Evaluation	Organisation Age Position	3 1 2
14	Government Support	Position Experience	1 1
15	Resources and Requirements of TQM	Organisation Position Experience	2 1 1
16	Management Style	Organisation Age Position Experience	1 3 2 2

The results in Table 7.19 also show that only the ‘organisation’ control variable was seen as significant three times concerning the obstacle ‘Measurement and Evaluation’, followed by ‘position’ twice and ‘age’ once.

For the main obstacle factor of ‘Government Support’ the ‘position’ and ‘experience’ ‘control’ variables are found to be significant only once. In relation to ‘Resources and Requirements of TQM’ as a possible obstacle, the ‘organisation’ group is found to be significant twice in this section, followed by ‘position’ and ‘experience’ which appeared as significant only once. Concerning ‘Management Style’ the ‘age’ is found to be significant three times in this section, which is followed by ‘position’ and ‘experience’ twice and ‘organisation’ once. These results reflect the fact that most statistical differences of the opinions and attitudes for the main factors are mostly related to ‘age’ and ‘organisation’.

Table 7.20: Ranking the contribution of the control variables

Rank	**1**	**2**	**3**	**4**	**5**
Control variables	Age	Organisation	Position	Experience	Qualification
Frequency of Significance	30	23	23	18	6

(Data Analysis)

In summary, as evidenced by the summary of findings in Table 7.20, ‘age’ as the control variable is found to be more frequently significant variable regarding the group of obstacles examined in this study, appearing 30 times significant throughout the obstacles sections. This implies that each age group perhaps has different opinions and attitudes regarding each possible obstacle. Secondly, the ‘organisation’ and ‘position’ control variables are found to be significant 23 times respectively, in all sections. Thirdly, the ‘experience’ control variable appeared significant 18 times. Fourthly, the ‘qualification’ control variable surprisingly was significant only 6 times in all obstacles sections.

7.8. CONCLUSION

The aim of this chapter was to measure the levels of awareness and understanding of respondents regarding the concept of quality, techniques, the concept of TQM, the necessity of TQM for oil and gas organisations and awareness and understanding of

TQM. Furthermore, effects of the barriers of the effective implementation of TQM were ranked from the highest to the lowest. In addition, this chapter aimed to find out whether there is significant statistical difference across the identified control variables regarding the obstacles and barriers to the effective implementation in TQM in the Libyan oil and gas organisations by employing several statistical techniques such as the Kruskal -Wallis test.

The findings from the analysis suggest that most of respondent groups show no significant statistical differences regarding their concept of quality and of TQM implying that there are similarities in the opinions and responses. However, there is statistically significant difference among the respondents concerning quality techniques, necessity of TQM and awareness and understanding of TQM. The process of ranking the obstacles showed that 'Information and communication' ranked as the greatest obstacle to the application of TQM and 'government support' ranked lowest according to the lowest mean value. In addition, the research was further extended in order to determine the major contributors to the statistical differences in opinions and attitudes regarding the possible obstacles. The findings revealed that the 'age' control variable was the most frequent in all obstacle sections and the lowest contributor was the 'qualification' control variable. In addition, the findings from the analysis also indicated that there is no statistically significant difference among the control variables regarding 'awareness and understanding of TQM' and 'organisation culture' by testing them as one variable (section analysis). However, the results suggests otherwise for the rest of the obstacles.

The following chapters further discuss and present further results on the actual application of TQM and the existing obstacles and barriers through the interview data analysis.

Chapter 8

EXPLORING PERCEPTIONS ON THE IMPLEMENTATION OF TQM IN LIBYAN OIL AND GAS ORGANISATIONS: INTERVIEW ANALYSIS

8.1 INTRODUCTION

While the preceding chapters presented the empirical analysis based on the questionnaire survey involving various management levels in Libyan petrochemical companies, this chapter presents and discusses the results of the coding analysis based on the interviews held with twenty participants, as explained in Chapter 5 (see section 5.7.6.) which included members of management committees of oil and gas companies, general managers, heads of quality departments, members of quality committees and other related managers.

It is important to note that the analysis is based on semi-structured interviews which allow interviewees additional flexibility when responding whereby it adds greater depth by helping to consolidate the findings gathered from the questionnaires presented in the previous chapters. It should also be mentioned that the primary data collected from the interview survey is analysed through the coding method to explore the patterns and establish generalisations.

The interview analysis presented in this research supplements the findings established through questionnaire findings by providing complementary evidence. In fact, it is expected findings established in this chapter render further qualitative meaning to the results established in Chapters 6 and Chapter 7.

The main aim of this chapter is:

(i) To further explore the issues around the implementation of TQM through the perceptions and opinions of managers;

(ii) To discuss the obstacles and barriers identified in the interviews;

(iii) To analyse the key themes of the interviewees in relation to TQM and its meaning;

Responding to these help to achieve the research objectives and answer some of the research questions set in Chapter 1.

To achieve these aims, it is necessary to consider the views of the various stakeholders and in particular the managers who are in charge of adopting and implementing TQM successfully and effectively in the sampled oil and gas companies. This exercise will facilitate and assist in building a model for the successful adoption and implementation of TQM in the oil sector, as there seems to be a clear need for this at the moment.

This chapter is divided into two main sections; following this brief introduction and a section on participants' backgrounds, section 8.3 presents the results and discussion of interview findings, followed by a summary of the chapter provided in the final section, 8.4.

8.2. BACKGROUND INFORMATION

Chapter 5 provides detailed explanation on the qualitative data collection process through interview method. As shown in Table 8.1, 20 managers from the three sampled oil and gas including heads of company management committees, heads of quality management departments, members of management committees, *etc.* participated in the primary data collection process through interview method; 6 of them were from RASCO, 7 from SOC and another 7 from AGOCO.

It should be noted that the respondents had varied length of professional experience, ranging from a minimum of eleven years to a maximum of forty years, working in petro-chemical organisations. The age distribution of the participants also showed a good mixture, with 31 years old being the youngest and 68 being the oldest. Their number of years in their present occupation ranged from a minimum of six months to a maximum of thirteen years. In relation to educational background a high proportion of the participants hold Masters Degrees in different subjects and the rest hold undergraduate degrees, BSc, also in different subjects.

Table 8.1: Background Information of the Interviewees

no.	Occupation	Organisation name	Department/management name	Experience	Age	Years at the present occupation	Qualification	Previous occupation	Interview Duration	Date of interview
1	Head of Company Management Committee	RASCO	Company Chairman	28	51	2	MSc Engineering	Head of Division, Controller, Director of Department, General Manager of Technical Affairs, Member of Management Committee.	1:15	1/12/2010
2	Head of Quality Management Department	RASCO	Quality Management Department	24	50	2	MSc Environmental Management	Head of Environmental Division, Controller of Civil Maintenance	1:45	5/12/2010
3	Head of Quality Division	RASCO	Quality Management Department	13	42	2	MSc	Employee	2:00	2/12/2010
4	Member of Management Committee & General Manager of Operations	RASCO	Operations Department	25	50	6	BSc Chemical Engineering	Controller of Operation of the Refinery, Production Department Manager	1:25	5/12/2010
5	Head of Environmental Division	RASCO	Quality Management Department	15	40	3	MSc Environmental Science	Employee	1:45	30/11/2010
6	General Manager of workforce	RASCO	General Management of Workforce	38	58	6	Higher Diploma in Management	Manager of Technical and Managerial Affairs Department, Manager of Service Department	1:20	5/12/2010
7	Head of Quality System Committee	SOC	Quality Committee	24	43	5	MSc	-	1:45	7/12/2010
8	Manager of Regulations and Procedures	SOC	Management of Loss Prevention and Environmental Protection	20	45	6 month	BSc Business Administration	Supervisor of Managerial and Financial Procedures Group	1:10	7/12/2010
9	Member of Quality System Committee	SOC	Quality Committee	11	36	4	MSc Project Management	Second Specialist Engineering, Planning and Follow-up Specialist	1:15	7/12/2010
10	General Manager of Materials department	SOC	Materials Department	28	55	3	BSc Accounting	Accounting, Head of Appropriations Division, Financial Controller of the Company	1:20	8/12/2010

11	General Manager of Management of Loss Prevention	SOC	Management of Loss Prevention	28	51	13	MSc Risk Management and Safety Techniques	Environmental Engineering, Group Supervisor, Safety Coordinator	1:25	8/12/2010
12	Member of Quality System Committee	SOC	Quality Committee	12	31	1, 1/2	Higher Diploma in Computing	-	1:20	8/12/2010
13	General Manager of Technical and Managerial Affairs Department	SOC	Technical and Managerial Affairs Department	25	48	6	BSc Finance Accounting	Head of Unit, Head of Division, Controller	1:15	9/12/2010
14	Head of Company Management Committee	AGOCO	Company Chairman	35	68	3	BSc Petroleum Engineering	Products Observer, Controller of AGOCO Field, Engineering and Maintenance Manager, General Manager of Operations	1:20	21/11/2010
15	Member of Management Committee	AGOCO	Management of Exploration and Productions	35	56	4	BSc Geology, MSc Management Administration	Manager of Geophysics Department	1:40	21/11/2010
16	Member of Management Committee	AGOCO	Management of Managerial and Financial Affairs	23	45	1	MSc Accounting	Coordinator Financial Trusts, Head of Financial Trusts Division, Manager of Financial Affairs	1:30	22/11/2010
17	Planning Consultant	AGOCO	Management of Planning	40	64	5	MSc Management Administration, BSc Science	Training Manager, Operations Manager, Port Manager, Head of Oil Movement, Operations Supervisor, Supervisor of Bags Lab	1:50	22/11/2010
18	General Manager of Employees' Affairs	AGOCO	Management of Employees Affairs	25	48	4	BSc English	Controller of Employment, Head of Employment Division, Head of Managerial Affairs Division	1:15	23/11/2010
19	General Manager of Training and Development	AGOCO	Training and Development Department	25	50	10	BSc Engineering	Field Controller, Maintenance Coordinator, Maintenance Supervisor	1:25	24/11/2010
20	General Manager of Finance Department	AGOCO	Finance Department	26	52	8	MSc Accounting	Head of Financial Affairs Division, of Financial Affairs Coordinator, Controller of Finance	1:20	24/11/2010

(Data Analysis)

In addition, over a third of the respondents have qualifications in management-related fields, which gives a good indication of their knowledge on this matter, whereas the rest of the interviewees come from accounting, chemical science, engineering, *etc*. backgrounds, which gives an indication of their familiarity with other related issues with which they deal with. It should be noted that educational background and experience can be an important determinant in respondents' opinions and perceptions of TQM and related matters. There was also diversity in participants' previous occupations, which ranged from employee to head of company management committee; which should help to overcome any potential bias.

It is clear from the table that the duration of the interviews ranged from a minimum of one hour and ten minutes to a maximum of two hours, giving sufficient time to cover all the necessary issues and aspects. Furthermore, all the interviews were carried out within two months (November and December) in 2010 just before the Libyan revolution broke out. Thus, the findings of this study should be located and considered within the political economy of the former regime, which, in the end, was toppled in later months of 2011.

The following section presents the analysis of the primary data collected through interview questions using the coding method.

8.3. PARTICIPANTS' DEFINITION OF QUALITY MANAGEMENT

In order to obtain an understanding of participants' perceptions, they were asked to define 'quality management' in their individual organisations. The results for the first question are depicted in Table 8.2.

Table 8.2: Q1: Overview of Participants' Definition of Quality Management

Question 1	**How would you define quality management in your organisation?**
Focused Coding	
1	High quality of process and outputs
2	Customer and employees satisfaction
3	Conformity to specifications
4	Cost and time reduction
5	Developing the organisation and human resources
Theme	**Quality management ensures high quality of process and outputs, focusing on customer and employee satisfaction, conformity to specifications, cost and time reduction and developing the organisation and human resources.**

It is clear from Table 8.2 that participants are in the opinion that quality management in petro-chemical organisations implies that the entire process - operations and production - must demonstrate high standards of quality. In addition, clients and workforce requirements and needs have to be met and satisfied. Furthermore, it is necessary to take into account the fact that, through the process of productions and services, specified standards/criteria need to be applied and followed due to the fact that crude oil and its products have particular specifications and limitations (international standards) which need to be taken into account and that all tasks and targeted works should not exceed a certain time and limited budget. It is also necessary for both the external and internal environment of the organisation to be considered in terms of safety and security conditions. Moreover, it is essential to carry out continuous improvements in human resources through the process of education and training programs (*e.g.*lectures, seminars) and other related matters.

After identifying the general theme from the definitions provided by the participants, tables 8.2.1-8.2.5 provides focused coding for the individual sub-theme.

Table 8.2.1: Focused Coding No. 1 for Q. 1: Quality management ensures a high quality level of overall organisation operations and results

High quality of process and outputs	
Interviewee 1	High quality of productions
Interviewee 3	Quality of operations and activities
Interviewee 5	Services, performance and productions with high quality
Interviewees 6 & 16	Quality of productions High performance
Interviewee 7	Quality of everyday operations Quality of management system
Interviewee 9	Quality of products and services
Interviewees 11 & 16	Quality of procedures
Interviewee 13	Quality of materials
Interviewee 14	Includes entire organisation activities such as accounting, security and manufacturing process

(Data Analysis)

As can be seen in the focus coding 1 of question 1 in Table 8.2.1, the interviewees articulated a number of ways in which the high quality of process and outputs can be defined. These include: high quality of productions as mentioned by interviewees 1, 5, 6, 9 11 and 16 and is due to the fact that these organisations generally produce crude oil which should contain limited impurities[9] and an acceptable rate of salt and water[10].

[9] There is a specific standard which must be reached when producing any oil products, especially crude oil (see Chapter Five for additional information).

Interviewees 3 and 7 commented that the definition of quality management involves all operations of manufacturing and production across the oil and gas sector, which must be of a high quality. In addition, interviewees 5, 6 and 16 believe that the essence of quality management is quality of performance; thus, quality management can be seen to affect high quality of performance of every single job.

Furthermore, interviewees 3 and 14 stated that the everyday procedures of the organisation, including accounting, security and manufacturing activities have to be carried out according to high standards. Moreover, interviewee 13 stressed that all types of materials used in conducting the business in every aspect must pass a quality test and also be fit for purpose. Interviewee 7 added that establishing a good management system is another crucial aspect of success therefore the definition of quality management can be taken from the quality of the management system. In addition, interviewee 9 commented that quality management might be represented by the high quality of services provided. In relation to 'quality of procedures' interviewees 11 and 16 highlighted that the most important factor in terms of quality is the quality of the procedures used within and outside the organisation; hence, as long as the procedures are usable and effective the results will be satisfactory.

Table 8.2.2: Focused Coding No. 2 for Q 1: Quality management means gaining client and workforce satisfaction

Customer and employees satisfaction	
Interviewee 2	Customer satisfaction
Interviewee5	Customer satisfaction Employee involvement
Interviewee 8	Employee satisfaction

(Data Analysis)

Table 8.2.2 provides the responses of the interviewees for the definition of quality management, which means gaining client and workforce satisfaction. There were only three interviewees in this focus coding: 2, 5 and 8. The details gathered allow to summarise the information into three main criteria: customer satisfaction, employee involvement and employee satisfaction. Each of these criteria is further discussed as follows:

Customer satisfaction: It was identified by the interviewees 2 and 5 that quality

[10] There is also an acceptable international limit level of water and salt amount per barrel of crude oil which should not be exceeded

management could be measured according to the satisfaction of the organisation's customers.

Employee satisfaction: Interviewee 8 commented that internal clients are one of the most important elements in any type of organisation; thus, satisfying them is vital. He stated that "employee satisfaction is the pillar of quality management".

Employee involvement: Interviewee 8 also indicated that through engaging the personnel in decision making and other organisation activities their performance will be higher and they will correct any deviations/nonconformity; this is considered as an essential quality management matter.

Table 8.2.3: Focused Coding No. 3 for Q. 1: Quality management simply is conformity to specific standards

Conformity to specifications	
Interviewee 4	Commitment to requested standards
Interviewee 5	Conformity to management and environment specification Jobs coordination
Interviewee10	Reaching accurate and safe results
Interviewee11	Doing all the work in a correct and accurate way
Interviewee 12	Quality is conformity to specifications
Interviewee 13	Conformity to requested specifications Punctual delivery
Interviewee 16	Conformity to specification Security and safety
Interviewees 17 & 19	Meeting production standards

(Data Analysis)

Table 8.2.3 shows the responses of the interviewees who mentioned that quality management ensures that products and services meet certain specific standards. The information gathered, is summarised into two main criteria: conformity to standards and quality of security and safety. Each of these criteria is further discussed as follows:

Conformity to standards: Interviewees 4, 5, 11, 12, 16, 17 and 19 stated that as oil and gas organisations utilise certain procedures and specifications for particular tasks, following specific standards and structures are priorities. For instance, most oil and gas organisation productions are transported to global customers hence a particular level of quality is requested and also the productions must meet international standards. For this reason products and services should be characterised by high quality.

Quality of security and safety: Interviewees 10 and 16 asserted that due to the fact that all operations take place in different environments which have their own limitations, dangers and risks, it is extremely important to ensure high degrees of security and safety in carrying out and reaching targets.

Table 8.2.4: Focused Coding No: 4 for Q. 1: The general meaning of quality management is cost and time saving

Cost and time reduction	
Interviewee 1	Less cost with continues improvement
Interviewee 5	Reducing costs
Interviewee 6	Working to full capacity
Interviewee 10	Reducing the errors on the technical and management side
Interviewee 14	Reaching the required level of productions with budget and on time
Interviewee 16	Carrying out procedures within budget
Interviewee 18	Producing the barrels of oil at the least possible cost
Interviewee 20	Undertaking the work within a specific time

(Data Analysis)

Table 8.2.4 highlights the statement of the interviewees who are of the opinion that getting the work done on time and within budget is the ultimate aim of quality management. The information gathered from the participating managers for this was:

Reducing costs: Interviewees 1, 5, 6, 10, 16 and 18 stated that keeping the process within budget is crucial for the organisation due to the fact that each job has its expected budget for a year/month, thus performing all the necessary work without exceeding the limit is a sign of a department's success and also allows the rest of the planning work which is in the similar period of time to be carried out without delay.

Doing the work within a specific time: Interviewees 14 and 20 indicated that, as all operations within the organisation work as chain, delay in any phase/part, in turn results in a delay at the end of the process and influences the results by accruing additional cost.

Table 8.2.5: Focused Coding No. 5 for Q. 1: The essence of quality management is to enhance the entire organisation along with the development process of human resources

Developing the organisation and human resource	
Interviewee 3	Providing a safe environment + developing human resources
Interviewee 4	Meeting the organisation's objectives within limited time frame + organisation development
Interviewee 6	Training + organisation development Developing human resources

Table 8.2.5 outlines the definition of quality management as developing the organisation and ensuring continuous enhancement of human resources. The details given by the participants could be summarised as follows:

Organisational development: Interviewees 4 and 6 stressed that taking into account the development process that includes all aspects of the organisation such as providing a safe work environment, offering effective training programmes and maintaining organisational objectives as an important and tangible quality management target.

Developing human resources: Interviewees 3 and 6 pointed out that as success is a crucial factor, thus, high quality human resources reflect the quality of the organisation's performance. Interviewee 6 added that "quality management in any organisation simply means quality of its human resource management".

8.4. PERCEPTIONS ON QUALITY RELATED POLICY AND REGULATIONS

Question 2 (quality policy) examines the existence and availability of the policy and regulation regarding quality. In this section, the aim is to determine whether there is an obvious declared/stated policy across the oil and gas sector. The results obtained are given in Table 8.3.

Table 8.3: Results for Q. 2: Overview of Quality Policy

Question 2	**Does your organisation have a quality policy?**
Focused Coding	
1	Quality management system ISO
2	Published regulation and rules
3	Specified standardisation
Theme	**There is quality policy represented through quality management system ISO, published work regulations and rules and through following specific standards/ criteria regarding each single job.**

(Data Analysis)

According to Table 8.3 showing the responses gathered from the interviewees, the findings can be generalised into three main themes: (i) "Quality management system ISO"; (ii) "Published rules and regulations"; and (iii) "Specified standardisation". These three sub-themes constitute the frame through which the actual quality policy is formed. After establishing the general theme for Question 2, each focused coding is explored further to seek additional information, for which the results are presented in

Tables 8.3.1 to 8.3.3. The supporting information for each theme is shown after each respective table.

Table 8.3.1: Focused Coding No. 1 for Q. 2: Policy can be represented by quality management system

Quality management system	
Interviewee 1	Clear mission and vision
Interviewee2	Quality manual(structure) ISO 9001/2008 Documents that secure the quality management process
Interviewees 3&12	Announced policy (published)
Interviewees 4, 5, 6, 8, 9 &10	The policy is clear for everyone + there is a specific rule of work
Interviewee 7	Now there is ISO 9001/2008
Interviewees 13, 16, 18 &19	All the organisation's policies cover quality standards

(Data Analysis)

Table 8.3.1 provides the responses of the interviews for the quality policy. The information gathered allows summarising the data into two main topics: quality management system and special standards of work. Each of these topics are further discussed as follows:

Quality management system: Interviewees 2 and 7 commented that there is a quality manual guide (ISO 9001/2008) which sets out a clear policy for the organisation. They added that the unified documentation and procedures also help to do so. However, this could be the case for those who obtain ISO certificates. Interviewee 1 mentioned that all missions and visions of the organisation are clear from the instructions and regulations of each department. This statement was supported by interviewees 3 and 12 who expressed that a set policy regarding quality can be found in many places in the organisation[11] (see appendixes 000 for quality policy). In addition, this was also supported by interviewees 4, 5, 6, 8, 9 and 10. Therefore, it is clear that a number of oil and gas organisations utilise a quality manual (ISO) as quality policy.

Special standards of work: It was also identified by interviewees 13, 16, 18 and 19 that there are procedures and standards that should be met when carrying out the work which are considered as a quality policy.

[11] There are posters/ wall advertisements concerning quality policy in some offices, corridors and other general places within certain oil and gas organisations.

Table 8.3.2: Focused Coding No. 2 for Q. 2: Specific rules and regulations are our quality policy

Regulation and rules	
Interviewees 14&15	There are rules and regulations that organise correct working procedures
Interviewees 16, 17, 18, 19 & 20	All regulations and policies of the organisation cover the quality concept

(Data Analysis)

As can be seen, only one theme can be derived from Table 8.3.2, which is described as follows.

Rules and Regulations: Interviewees 14 to 20 agreed that there are rules and regulations that govern correct working procedures and that these rules also cover quality aspects. This is due to the fact that most of the process is determined and approximately fixed/integrated; therefore, specific rules must be followed. For instance, when drilling oil wells particular rules must be applied. Based on the interviewees' opinions, it can be concluded that most such jobs and tasks take into account the quality issues.

Table 8.3.3: Focused Coding No. 3 for Q. 2: Working according to particular standards

Standardisation	
Interviewee 11	There are standards, for instance, in the safety department and we also follow international safety standards in this department
Interviewee 4	All the processes are known + organisational objectives are known and reviewed regularly
Interviewee 5	There are certain limits for environmental pollution + continuous improvement and limiting of the negative impact during work time
Interviewee 14	There is standardisation in producing crude oil
Interviewees 15 & 17	There is standardisation in producing crude oil and also in terms of safety
Interviewee 19	There are standards of production and procurement.

(Data Analysis)

The respondents' answers in Table 8.3.3 show that there are particular standards for each job/task which need to be attained. For instance, there is a standardisation in producing crude oil, in the safety process, in the oil production and procurement and in other aspects of the organisation. In other words, most of the activities are governed by particular standards. Hence, quality policy could be represented by these standards.

8.5. PERCEPTIONS ON THE WILLIGNESS OF TOP MANAGEMENT TOWARDS ADOPTING TQM

To investigate further the actual application of TQM, a question regarding the willingness of managers to adopt TQM was forwarded to the targeted oil and gas managers, for which the findings are depicted in Table 8.3.

Table 8.4 indicates the findings regarding whether top management is willing to adopt the TQM concept. As the general theme and the coded answers show, some interviewees believe that top management is working upon quality and TQM in different ways, while some interviewees believe that there are obstacles hindering its effective application.

Table 8.4: Results for Question 3: Overview of Top Management's Willingness to Adopt TQM

Question 3	**Do you think that top management is willing to adopt the TOM concept?**
Focused Coding	
1	There is clear willingness and desire to achieve TQM
2	There is enthusiasm towards it at all levels
3	Established procedures, regulations and policies help to carry it out
4	Adoption of ISO chain and other management techniques
5	There are obstacles and difficulties in implementing it effectively
Theme	**There is clear willingness and a desire to achieve TQM from top management through encouragement from all levels by establishing procedures, regulations and policies, as well as adopting ISO chain and other management techniques. However, there are obstacles and difficulties which prevent its effective implementation.**

(Data Analysis)

The sub-themes generated in Table 8.4 were individually analysed through coding methods and the findings are depicted from Table 8.4.1 to 8.4.5:

Table 8.4.1: Focused Coding No. 1 for Q. 3: Top management shows an obvious desire to attain TQM

There is a clear willingness and desire to attain TQM	
Interviewee 1	Yes, we have made a huge effort to achieve even some quality management requirements.
Interviewee 2	There is no doubt of it
Interviewee 3	Yes, there is commitment and willingness to attain TQM
Interviewee 4	Of course
Interviewee 5	Yes, top management is the key guidance + they offer all requirements without delay such as appropriate budget and so on
Interviewee 6	There is a complete willingness to attain TQM from top management
Interviewee 7	There is a clear willingness and desire to attain TQM from upper management levels and future vision towards it
Interviewee 8	There is a need and orientation towards it
Interviewee 9	Yes, there is a real desire, willingness and earnest orientation from the new management staff

	towards it
Interviewee 10	Yes, there is the desire to attain it and the current upper management level is working towards it
Interviewee 11	Yes, there is the desire and willing to attain it
Interviewee 12	Of course, there is the desire and willingness to attain it from new management + there is a strong orientation towards quality management
Interviewee 13	Yes, I think there is orientation towards it
Interviewees 14, 15, 16 & 19	Yes, there is willingness
Interviewee 17	There is acceptance and approval from top and middle management of the concept of quality in general
Interviewee 20	Yes, there is clear and straightforward willingness from middle and top management levels towards quality

(Data Analysis)

It is clear from Table 8.4.1 that most of the respondents (with the exception of interviewee 18) stated that top management has an obvious willingness and clear desire to adopt TQM by various methods ranging from encouragement to offering necessary resources. Therefore, based on these statements, it can be summarised that top management of the oil sector are willing to adopt the TQM philosophy.

Table 8.4.2: Focused Coding No. 2 for Q.3: Encouragement efforts can be translated into clear willingness

There is encouragement towards it in all levels	
Interviewee 1	We need excellent performance
Interviewee 3	There is guidance, advice and encouragement from top management to go further
Interviewee 9	They are looking to fully adopt it
Interviewee 11	Upper management encourages the employees to enhance the level of their performance continuously
Interviewee 19	There is encouragement towards it at all levels

(Data Analysis)

Table 8.4.2 shows that the encouragement process could be divided into two categories: the need for excellent performance and the guidance and advice to raise the level of quality in all processes. Each of these criteria is further discussed as follows:

The need for excellent performance: Interviewees 1 and 11 stated that efforts have been made regarding the enhancement of the whole organisation through training and awareness programmes regarding various issues including quality; these efforts were deemed to be a good indication that management is showing positive intentions towards quality and its related aspects.

The guidance and advice to raise the level of quality in all processes: According to interviewees 3, 9 and 19, top management have advised, guided and encouraged

managers towards attaining higher quality, which in turn has been passed on to all departments. In addition, they were looking towards fully adopting TQM. According to interviewee 3, "our managers repeated that we need to implement TQM in our organisation".

Looking at the statements of the sub theme in Table 8.4.3, we can see that the general meaning of these statements is that established procedures, regulations and policies which support quality programmes are considered to be a firm step towards quality management and also the process of renewing the related procedures shows their willingness; this was supported by interviewees 1, 2, 4, 13, 14, 16 and 18. Interviewee 2 stated that "top management provides and establishes the necessary rules and regulations to do so".

Table 8.4.3: Focused Coding No. 3 for Q. 3: The existence of procedures and regulations are the best proof of their intentions

Established procedures, regulations and policies to help carry on	
Interviewee 1	We have established procedures, regulations and policies to help carry on
Interviewee 2	It is clear through the general policy of the organisation and the role of the Quality Department
Interviewee 4	There is awareness of the process among employees + following up of organisational objectives and policies and the motivation to apply it
Interviewee 13	There is always orientation regarding this matter from top management through certain regulations and models
Interviewee 14	TQM is a chain of procedures and policies that ensure continuous communication between departments and units + it involves teamwork + it the philosophy is to restore life to the organisation
Interviewee 16	There is a continuous endeavour to renew the procedures and policies to help attain quality requirements
Interviewee 18	Generally, the management looks to do things according to specific standards

(Data Analysis)

Table 8.4.4: Focused Coding No. 4 for Q. 3: The adoption of ISO chain and other management techniques shows their desire for quality management

Adoption of ISO chain and other management techniques	
Interviewee 1	Quality system ISO started three years ago + quality is a culture + we do not need qualifications as the need is for action
Interviewee 3	The proof is in having three ISO certifications
Interviewee 9	The organisation attained TQM pillars ISO 9001/2000 and 9001/2008 as a sign of that
Interviewee 19	There has been an attempt to use various techniques such as ARB internal system for editing

(Data Analysis)

Table 8.4.4 generally illustrates the perceptions of interviewees 1, 3, 9 and 19 that adopting a modern management style such as ISO series as a TQM pillar and other management techniques can be the best indication of their wishes and intentions to drive their organisation towards a successful and effective TQM model.

Table 8.4.5: Focused Coding No. 5 for Q. 3: Despite willingness obstacles can play a significant role in influencing its application

There is obstacles and difficulties to implementing it effectively	
Interviewee 8	It's being worked upon, but I do not know if there is a real adoption of it
Interviewee 15	It's application isn't being implemented correctly
Interviewee 17	The application of this philosophy has encountered many difficulties and obstacles

(Data Analysis)

Table 8.3.1 provides the responses of the interviewees regarding the willingness of top management to apply TQM. The information gathered is summarised into one main topic: regardless of the depth of the managers' desire and willingness, difficulties and obstacles can be found in the actual application. As, according to interviewees 8, 15 and 17, regardless of the strength of the willingness of top management to adopt TQM, the concern is that a number of difficulties and obstacles have been noted through the process of the application. Interviewee 8 stated that barriers were experienced, such as lack of awareness and knowledge regarding TQM concepts, benefits and importance which require urgent solutions.

8.6. PERCEPTIONS ON DIFFICULTIES EXPERIENCED BY EMPLOYEES

The question 4 in the interview schedule aims to investigate the difficulties experienced by employees regarding quality from managers' perspectives. The findings on whether employees had any difficulties in understanding and implementing TQM requirements was presented in Table 8.5 and a further explanation for each sub theme is provided in the respective sub-table, namely, Table 8.5.1, Table 8.5.2 and Table 8.7.2.

Table 8.5: Results for Q. 4: Overview of Employee Related Difficulties in Implementing TQM

Question 4	**Do you think employees have difficulty in understanding and implementing TQM requirements?**
Focused Coding	
1	There are some difficulties in understanding and implementing TQM
2	Yes, especially in the lower management level
3	Yes, but through training, education and awareness, improvement can be attained
Theme	**There are some difficulties in understanding and implementing TQM, especially among lower management level and employees. However, with training, education and awareness, improvement can be reached**

(Data Analysis)

Table 8.5 depicts the findings regarding whether the workforces had any difficulties in understanding and applying TQM requirements. As the general theme and the

coded answers show, some interviewees believe that employees did have some difficulties, while others believe that they do but these difficulties can be overcome in time in various ways such as raising awareness, *etc*. The details provided for each sub theme were further analysed in the following tables.

Table 8.5.1 depicts the views of interviewees who stated that there are some difficulties in understanding and implementing TQM. These managers believed that oil and gas organisations encountered various difficulties and TQM obstacles as supported by interviewees 1, 2, 5, 9, 11, 12, 19 and 20. According to interviewees 6 and 15 most of the difficulties could be traced back to TQM awareness and education matters.

Table 8.5.1: Focused Coding No. 1 for Q. 4: Difficulties in understanding and implementing TQM

There are some difficulties in understanding and implementing TQM	
Interviewees 1, 2, 5, 9 & 20	Yes, there are difficulties to some extent
Interviewee 6	Yes, there are some difficulties from some personnel concerning quality awareness
Interviewee 7	Yes, there are some difficulties in understanding and implementing TQM
Interviewee 8	Yes, there are some difficulties in understanding quality requirements
Interviewee 10	Yes, there are difficulties especially in the middle and lower management level in understanding the meaning of quality
Interviewees 11 & 12	Yes, there are difficulties
Interviewee15	Yes, there are difficulties + they need more efforts to increase awareness and provide education regarding TQM
Interviewee 16	Yes, there are difficulties to some extent, especially in the beginning when introducing any program
Interviewee 19	Generally, yes

(Data Analysis)

In addition, interviewees 7, 8 and 10 commented that the difficulties in most cases involve the understanding of its meaning and also the actual requirements of TQM. In addition, interviewee 10 added that these difficulties were encountered at first line level and occasionally middle management level. Furthermore, interviewee 16 indicated that the difficulties are common when introducing any new philosophy or programme.

Table 8.5.2: Focused Coding No. 2 for Q. 4: Most of the difficulties are at the lower level

Especially in the lower management level	
Interviewee 2	It depends on management level such as workers + they need more awareness
Interviewee 3	At the lower level yes
Interviewee 4	Yes, awareness of TQM style in the first stage

Interviewee 5	Especially at lower management level, because of other commitments, there is not much interest in it
Interviewee 6	External environment has a direct effect on TQM
Interviewee 7	They see that the application of TQM will limit their efforts and enforce some extra programmes
Interviewee 8	There is resistance to change
Interviewee 17	Maybe at the lower levels there are difficulties
Interviewee 19	The employees do not accept changes immediately + they need time to do so

(Data Analysis)

Table 8.5.2 highlights the opinions of interviewees 2, 3, 4, 5, 6, 7, 8, 17 and 19 that most of the difficulties encountered were from lower management levels. Misunderstanding played a significant role in these difficulties. One was that TQM restricted their efforts and enforced some additional unwelcome programs and tasks.

Table 8.5.3: Focused Coding No. 3 for Q. 4: How, by the efforts such as awareness and training, changes and enhancement can be obtained

Through training, education and awareness, improvement can be reached	
Interviewee 1	Through training, education and awareness, employees become responsive
Interviewee 9	Eventually they responded to quality ISO programs, and others participated in applying this program. It is a culture which needs time
Interviewee 11	There is improvement in time
Interviewee 12	Education level and culture plays a key role in reducing these difficulties
Interviewee 13	There are not very many difficulties, but those difficulties that exist could be due to culture
Interviewee 14	There are not many difficulties, but continuous training on the importance and necessity of successful application is needed, and also how to make this philosophy a culture instead of a program or theory
Interviewee 20	But the personnel changing by time, step by step

(Data Analysis)

In further analysing the various views, Table 8.5.3 provides details as to why the interviewees believed that through awareness, training and education most of these difficulties would be sorted out.

According to interviewees 9, 11, 12, 13 and 20, as with previous management programs which faced such difficulties, time is an important factor in bringing about success and it is also critical in the implementation process due to the fact that we need to change the culture, which in turn, requires additional time to do so. Interviewee 9 stated that “for example, we spent plenty of time on introducing one of the pillars of TQM which is ISO 9001. However, by then the employees were adopting it and it was accepted easily”. Therefore, allowing enough time to implement any particular programmes is essential.

In addition, interviewees 1 and 14 explained that through the extensive provision of awareness, training and education regarding quality and TQM, difficulties would be overcome and also the expected advantages would be recognised and widely accepted, which would enable employees to receive and deal with such programs effectively. Interviewee 14 believed that such methods were working perfectly.

8.7. PERCEPTIONS IN TQM RESULTING INTO ADDITIONAL WORKLOAD

The fifth question in the interview schedule asked the managers in this section their views regarding whether TQM involves additional work.

Table 8.6 depicts the analysis of the coding for the question related to whether TQM adds to the workload or not. As can be seen, the results can be divided into three major findings. However, two divergent answers can be seen, where some interviewees stated that TQM does not add to the workload, whereas others disagreed. The other interviewees, however, considered that it is a consolidation of quality management and that they are complementary to each other.

Table 8.6: Results for Q. 5: Overview of TQM Resulting into Additional Workload

Question 5	**Do you think TQM involves additional work on top of established quality management?**
Focused Coding	
1	No, it does not involve additional work; it is helpful in raising the level of quality
2	It is a consolidation to quality management and they are complementary to each other
3	It adds to the workload in terms of budget
Theme	**No, it does not add to the workload; it is helpful in raising the level of quality, a consolidation to quality management and complementary to each other. However, it is an additional workload in terms of budget and time**

(Data Analysis)

The theme established in Table 8.6 is subjected to further discussions through the established sub-theme, and the results are presented from Table 8.6.1 to 8.6.3:

Table 8.6.1: Focused Coding No. 1 for Q. 5: TQM helps the organisation to reach a high level of quality in all its operations

No, it is not an additional workload it is helpful in raising the level of quality	
Interviewee 1	Quality includes everything + TQM is essential; it is the essence of motivation
Interviewee 3	I do not think so; it is helpful for raising the level of quality
Interviewee 4	I do not think so; quality management is a route to TQM + they are complementary to each other
Interviewee 7	No, it does not add to the workload + it involves all organisational activities + it is most beneficial + it helps the organisation to reach its objectives

Interviewee 8	It improves punctuality and efficiency
Interviewee 9	I do not think so
Interviewee 11	It is important to apply it
Interviewee 12	I do not think so; it is brings about excellence
Interviewee 14	No, it does not add to the workload + doing the work according to clear standards and methods is considered a successful approach to help entire organisation to reach their desired goals
Interviewee 15	No, it does not add to the workload
Interviewee 16	No, it does not add to the workload + it is a serious way of helping any organisation to succeed in its policies and it helps considerably in management developments
Interviewee 17	No, does is not add to the workload; but needs additional attention from top management which is not currently their priority
Interviewee 18	I do not think so + it does not add to the workload + it is sophisticated standard + it will reduce management errors + it has enormous benefits
Interviewee 19	It will be better for organisation and production in the future
Interviewee 20	No, it does not add to the workload + it plays a significant role in the continuity of operations + quality is necessary for all organisations

(Data Analysis)

Table 8.6.1 details the views of the respondents who argued that TQM does not involve additional work, but it is helpful in raising the level of quality in all aspects of the organisation. The reasons given for this were: TQM is essential for motivation; quality management is a pathway towards TQM; TQM involves all organisation activities; it is most beneficial; it helps the organisation to reach its objectives; it enhances punctuality and efficiency; it brings about excellence; it works towards clear standards aiding success for any organisational policies; it sets sophisticated standards and reduces management errors; it will improve organisation and productions in the future and finally it plays a significant role in the continuity of operations. These were the comments made by interviewees 1, 4, 7, 8, 12, 14, 16, 18, 19 and 20, respectively, in arguing that TQM does not add to the workload at all.

In addition, interviewees 3, 9, 11, 15 and 17 commented that TQM is helpful in raising quality aspects of an organisation horizontally and vertically; however, additional attention is needed from top management.

Table 8.6.2: Focused Coding No. 2 for Q. 5: TQM is complementary to quality management and also the next step

It is a consolidation of quality management and they are complementary to each other	
Interviewee 1	They complement each other + at the same time it is important
Interviewees 4,8,9 & 11	They complement each other
Interviewee 5	It consolidates quality management
Interviewee 13	Completes the quality stage + they complement each other
Interviewee 14	It is important in order to maintain work policies and to be in line with the rest of the world
Interviewee 15	It is important to adopt it fully in all companies + it is a must
Interviewee 20	All management programs are complementary to each other

Table 8.6.2 provides the statements of those respondents who argued that TQM consolidates quality management and they are complementary to each other. All of them (interviewees 1, 4, 8, 9, 11, 13 and 20) stated that TQM is the step/phase that complements the quality management process. In other words, it is the next stage after quality management. In addition, interviewees 5, 14 and 15 added that it helps consolidating the quality management process. Therefore, TQM is a must and it involves individual responsibility.

Table 8.6.3 summarises the findings of those participants who stated that it adds to the workload in terms of budget. The reasons given by them are discussed further below.

Table 8.6.3: Focused Coding No. 3 for Q. 5: TQM could add to the workload in relation to budget

It adds to the workload in terms of budget	
Interviewee 1	Basically it is important + might to some extent add to the workload.
Interviewee 2	It adds to the workload in terms of budget, otherwise no
Interviewee 6	Yes, it might to some extent add to the workload, but the result would be positive
Interviewee 10	Nowadays yes, because the employees cannot trusted, but later it will produce positive results
Interviewee 11	It does to some extent add to the workload
Interviewee 15	There are difficulties in its successful application
Interviewee 19	Yes, it might to some extent add to the workload, but the result will be positive

(Data Analysis)

According to interviewees 1, 2, 6, 10, 11, 15 and 19, to be fully applied and effective, many operations need to be carried out including training and educating all management staff along with other necessary changes in various management aspects. Furthermore, other related requirements need to be offered as well. As a result, funding is needed in order to cover and respond to the stated matters, which cost the organisation additional, time, effort and money. Thus, due to these tangible and intangible requirements and as well as other unexpected needs, TQM is considered to add to the workload.

8.8. PERCEPTIONS ON THE BENEFITS OF IMPLEMENTING TQM

After presenting the perceptions on whether or not TQM adds to the workload, a direct question was also asked of the interviewees concerning the benefits of TQM. The answers to this question were coded in Table 8.7.

Table 8.7: Results for Q.6: Overview of TQM Benefits

Question 6	What benefits do you think TQM delivers for your organisation?
Focused Coding	
1	Reduces the cost, time, efforts and risks as well as achieving customer and employee satisfaction
2	Ensures financial benefits
3	Offers continuous improvement
4	Enhances the reputation of the organisation
5	Achieves all organisation objectives
6	Provides maximum utilization of available resources and raises the level of performance
7	Offers security and safety for all operations
Theme	**There are enormous benefits such as reduction in the cost, time, efforts and risks of the overall organisation process as well as financial benefits, continuous improvement and enhancement of the reputation of the organisation. Additional benefits are customer and employee satisfaction, achieving all organisational objectives through the maximum use of available resources and raising level of performance within safe and secure conditions**

(Data Analysis)

Table 8.7 indicates the findings on the benefits that TQM can deliver for oil and gas organisations. As the general theme and the coded answers show, most of the interviewees believe that TQM can deliver enormous benefits, as identified from the sub-themes. The details provided for each sub-theme were further analysed through coding methods as follows:

Table 8.7.1: Focused Coding No. 1 for Q. 6: The core benefits of TQM is that it could reduce all types of cost and also help to gain clients' and workforce satisfaction

Reduce the cost, time, efforts and risks besides achieving customer and employee satisfaction	
Interviewee 2	Achieves customer satisfaction
Interviewee 3	Offers enormous provision for the involvement of employees + additional clients and suppliers trust
Interviewee 5	Customer satisfaction + reduces risks 'less risks more success'
Interviewee 8	Provides for the cost, time and efforts
Interviewee 9	Ensures provision of the service on time with specific standards and in less time with high quality
Interviewee 10	Reaching excellent products with less effort + employees satisfaction
Interviewee 11	Employees' satisfaction
Interviewee 12	Reduces costs during the process of productions along with other type of cost
Interviewee 13	Reduces costs
Interviewee 14	Increases employee satisfaction + reduces the cost and keeps it lower than expected
Interviewee 18	Decreases costs
Interviewee 19	Reduces the marketing risk, reduces all other type of risks

Table 8.7.1 depicts the views of the interviewees who stated that TQM reduces the cost, time, efforts and risks as well as bringing about client and employee satisfaction. In addition, the managers believed that TQM delivers both tangible and intangible benefits to oil and gas organisations such as customer satisfaction, enhancing trust of clients and suppliers, reducing risks, achieving excellent products with less effort, *etc*.

This with other benefits was supported by interviewees 2, 3, 5, 8, 9, 10, 11, 12, 13, 14 and 18.

Table 8.7.2: Focused Coding Number 2 for Question 6 (TQM delivers enormous financial benefits)

Financial benefits	
Interviewee 11	Financial benefits + tangible and intangible benefits
Interviewee 13	It has benefits in terms of marketing that give the priority to the organisation that uses quality standards and programs + additional productions
Interviewee 1	Positive effect on the final results

(Data Analysis)

Table 8.7.2 shows the results gathered from the interviewees regarding the financial benefits. This shows that no specific financial benefits can be derived; it depends on the nature of the departments/units objectives. An interviewee from a production department, for example, explained that financial benefits could be represented by a high standard of products. Interviewees 1, 11 and 13 agreed that benefits might be tangible or intangible and the fact is that positive effects would be seen in the final results, which in turn, influences the financial situation.

Table 8.7.3: Focused Coding No. 3 for Q. 6: TQM helps carry on continuous improvement process

Continuous improvement	
Interviewee 5	Encouragement for continuous improvement
Interviewee 9	Continuous improvement
Interviewee 10	Teamwork
Interviewee 14	Job loyalty + improvement to the workforce
Interviewee 15	Determines the roles and responsibility + easy to evaluate the organisation + resolve all problems and difficulties
Interviewee 16	Knowledge of duties and responsibilities
Interviewee 17	Renewal and revision of the policies of the organisation frequently and connection with the objectives + allows to estimate the amount of work + performance evaluation to be objective + availability of evaluation tools

(Data Analysis)

Table 8.7.3 highlights the statements of the interviewees who are of the opinion that TQM helps carry on continuous improvement process. The information gathered from the participating managers 5, 9, 10, 14, 15, 16 and 17 for this showed that all benefits of TQM finally lead the organisation to carry on a continuous improvement process in all aspects of the organisation. This could take place through team spirit, job loyalty, determining roles and responsibilities, evaluating the organisation, overcoming all problems and difficulties, knowledge of duties, frequent renewal and revision of the

organisation's policies and connecting it with the objectives, allowing the amount of work to be estimated, objective performance evaluation and lastly availability of evaluation tools.

Table 8.7.4: Focused Coding No. 4 for Q. 6: TQM enhances the organisation's image

Reputation of the organisation	
Interviewee 2	Adopt system for after sales service
Interviewee 3	Give clarity of vision
Interviewee 4	Enhance image of the company locally and internationally + reputation of the organisation
Interviewee 5	Reputation of the organisation
Interviewee 11	Reputation of the organisation + establishing the trust between the company and others
Interviewee 13	Establishing trust between employees and management

(Data Analysis)

As can be seen in Table 8.7.4 the interviewees articulated a number of ways the 'reputation of the organisation' can be improved. These include: 'giving clarity of vision' as mentioned by interviewee 3, 'enhancing the company's image locally and internationally' as stated by interviewees 4, 5 and 11, and 'establishing trust between the company and others' as stated by interviewees 2, 11 and 13.

Table 8.7.5: Focused Coding No. 5 for Q. 6: TQM assists greatly in achieving the organisation's targets

Achieve all organisation objectives	
Interviewee 2	Contributes to the success of the company's activities and its continuation
Interviewee 3	Drives the organisation towards success
Interviewee 4	High quality of overall results
Interviewee 6	Reaches the aims towards which the company is working
Interviewee 16,7,10,11,15,19 and 20	Achieves all organisational objectives in the fastest and easiest way
Interviewee 17	Shows achievement and the its ratio

Table 8.7.5 outlines additional benefits of TQM. The details given by the participants could be summarised as following:

Reaching the aim which towards which the company is working: All of the interviewees expressed opinion on this (interviews 2, 3, 4, 6, 7, 10, 15, 16, 17, 19 and 20) stressed that an essential benefit offered by TQM is that it helps in attaining specific targets with fewer problems by the easiest and short method. As can be seen from the table 8.7.5 all opinions are clearly consistent with this statement.

Table 8.7.6: Focused Coding No. 6 for Q. 6: Available resources would be used effectively within the TQM environment through high performance levels

Maximum utilization of available resources and raising the level of performance	
Interviewee 1	Maximum utilization of available resources
Interviewee 2	Quality of all processes
Interviewee 3	Raises the efficiency of the process performance throughout the organisation
Interviewee 4	Enhances process of productions + improves the standards of products
Interviewee 5	Maintains natural resources + maximum optimum utilization of available resources
Interviewee 7	Organises operations + clarity of objectives + discovering the weaknesses
Interviewee 10	Achieves best performance of work
Interviewee 14	Raises efficiency and productivity + maintains the assets
Interviewee 16	Knowledge of following up the work and workers from the mangers
Interviewee 18	Drives performance to the maximum level
Interviewee 20	Drives forward human development + gives the working atmosphere vigour and vitality

(Data Analysis)

Depicted in Table 8.7.6 is the category extracted from the entire list given by the respondents that available resources would be used effectively within TQM environment through high performance level. Based on the articulated opinions, TQM can raise the efficiency of the performance of an entire organisation by ensuring the quality of all processes, which in turn, maintains natural resources. This is achieved not only by helping the clarity of objectives and overcoming any weaknesses but also by driving work to the maximum level, making maximum use of available resources and creating a working atmosphere full of vigour and vitality.

Table 8.7.7: Focused Coding No. 7 for Q. 6: Creates an appropriate, safe and secure environment for all operations

Security and safety for the all operations	
Interviewee 10	Security and safety for the organisation
Interviewee 18	Ensures the safety of the procedure and its simplicity

(Data Analysis)

Table 8.7.7 summarises the findings of those participants who stated that TQM creates an appropriate, secure and safe environment for all operations. According to interviewees 10 and 18 as security and safety are critical issues across the oil and gas sector, rules, procedures and nature of any particular work need to be taken into consideration so all tasks must be undertaken securely and safely. Consequently, TQM is useful in this matter.

8.9. PERCEPTIONS ON THE IMPACT OF GOVERNMENT ON THE IMPLEMENTATION OF TQM

The interviewees were also questioned as to whether there is imposition or advice from Libyan government departments to implement TQM. The findings on this can generally be divided into three focused codings, which are presented in Table 8.8.

Table 8.8: Results for Q. 7: Overview of the Role of Libyan Government Departments Regarding TQM

Question 7	**Do any of the Libyan government departments impose the implementation of TQM on your company?**
Focused Coding	
1	There is indirect general guidance to enhance the management generally
2	It is achieved by personal motivation and comes from the organisation itself
3	There is no direct imposing or pressure from any government departments to apply TQM in oil and gas organisations
Theme	**There is indirect general guidance to enhance the management generally. However, the attention of TQM adoption is on personal motivation and comes from the organisation itself, though there is no direct imposing or pressure from any government departments to apply TQM in oil and gas organisations**

(Data Analysis)

Table 8.8 summarises the opinions expressed by the managers in relation as to whether Libyan government departments attempted to impose the application of TQM As the general theme and the coded answers show, some of the interviewees stated that there is indirect general guidance from the state departments to enhance the management generally, while others stated otherwise. The details provided for each focused coding was further analysed through coding methods below, and the results are presented from Table 8.8.1 to 8.8.3.

Table 8.8.1: Focused Coding No. 1 for Q. 7: There is guidance however to improve management as a whole

There is indirect general guidance to enhance the management generally	
Interviewee 5,8 and 10	There is indirect general guidance to enhance management generally
Interviewee 9 and 13	There is general guidance for enhancement
Interviewee 12	There is, to some extent, general guidance to enhance management generally from the owner and also to establish a unit or department for quality management.
Interviewee 14	There is general guidance to enhance management and a way of doing the work currently to be in line with improvements from the owner
Interviewee 17	The owner is welcoming and agrees with such programs.
Interviewee 19 and 20	There is general guidance for enhancement

(Data Analysis)

Table 8.8.1 depicts the statements provided by a number of interviewees for the focus coding" 'there is indirect general guidance to enhance management generally'. As can

be seen the responses provided by interviewees 5, 8, 9, 10, 12, 13, 14, 17, 19 and 20 show that all guidance and structures are about enhancing productions and operations generally, and also about reminding to carry on with operations and keep them running. Thus, it is clear that NOC paid great attention to manufacturing operations and was less concerned about management aspects.

Table 8.8.2: Focused Coding No. 2 for Q. 7: Implementation of TQM is personally motivated and stems from inside the organisation

It is personal motivation and stemmed from the organisation itself	
Interviewee 1and 4	It is personally motivated and it stems from the company itself
Interviewee 3	There is no reluctance or disagreement
Interviewee 7	This is general direction of the organisation
Interviewee 8	International Labour Organization refers to and emphasizes the importance of the implementation of such philosophy
Interviewee 9	It is a culture.
Interviewee 20	The general policies of the company and the owner are complementary to each other

(Data Analysis)

Table 8.8.2 provides the details the responses given to focused coding that implementation of TQM is personally motivated and stems from inside the organisation. It is obvious from interviewees 1, 3, 4, 7, 8, 9 and 20 that the main reason behind the implementation is internal commitment. In other words, some oil and gas organisations embrace this approach due to internal motivations and responded to their needs and concerns. Some of the interviewees commented that it is a general direction of the organisation and it is also a matter of culture.

Table 8.8.3: Focused Coding No. 3 for Q. 7: Libyan government departments do not impose TQM on the oil sector

There is no direct imposition of pressure from any government departments to apply TQM in oil and gas organisations	
Interviewees 1 & 2	There is no imposition or commitment from any government departments
Interviewee 3	I do not think there is imposition or pressure from any government departments
Interviewees 4, 5, 6, 7, 9, 11 & 13	There is no imposition or commitment from any government departments
Interviewees 14, 15, 16, & 17	For TQM there is no impositions or pressure from any government departments
Interviewee 18	There is no direct imposition or pressure from any government departments

(Data Analysis)

Table 8.8.3 shows the statements provided for the focused coding 3 that Libyan government departments did not impose TQM across the oil and gas sector. According to interviewees 1 2, 3, 4, 5, 6, 7, 9, 11, 13, 14, 15, 16, 17 and 18 there was no written evidence or verbal advice or guidance regarding the imposition of TQM; therefore, based on their experience there is no imposition or pressure from any government departments to adopt TQM currently in the oil and gas sector.

8.10. OPINIONS ON THE TQM MODELS USED

The Question 8 focused on the perspective of the sampled managers in relation to TQM models. This question was considered important, as it helped to determine whether the petro-chemical organisations utilise a particular model to guide in the implementation of quality management.

As can be seen in Table 8.9., the majority of the respondents, namely 85.0%, commented that they did not use any TQM models including 'Malcolm Baldrige Model, EFQM Business Excellence Model and Deming prize'. While 15.0 % of them stated that they used other models.

Table 8.9: Results for Q. 8: The TQM Models Used

Question 8: What TQM models do you use to implement quality management as a guideline in your organisation?							
		Frequency	Percent	Valid Percent	Cumulative Percent	Mean value	St. deviation
Valid	Malcolm Baldrige Model	-	-	-	-	4.150	0.36635
	EFQM Business Excellence Model	-	-	-	-		
	Deming prize	-	-	-	-		
	None	17	85.0	85.0	85.0		
	Other	3	15.0	15.0	100.0		
	Total	20	100.0	100.0			

As the results indicate the oil and gas companies do not employ widely-recognised models to ease the task and the implementation process towards quality.

From the results depicted in Table 8.10., it is apparent that the majority of the respondents, namely 65% stated that their organisation did not use the 'supply chain' technique, whereas, 35% of them answered that it is used within their organisation. Regarding the '5 Ss or 5 Cs' technique, the result indicated that 95.0% of the interviewees stated that it was not used.. On the use of SPC as a quality technique, 85% of the interviewees answered 'no', while 15% answered 'yes'. Based on the results, a major portion of the respondents, 95%, stated that their organisation did not use 'Six Sigma'. Nevertheless, it is worthwhile noting that 70% of the respondents stressed that their organisation utilises 'IS0 9001/2008' and in some cases 'IS0

9001/2000', which implies that 30.0% of the respondents answered 'no' to this question.

In addition 65% of the respondents answered 'no' regarding 'customer focus – internal, external' quality technique. As evidenced in Table 8.10., all the respondents stated 'no' to the quality management technique of 'benchmarking' and the statement that 'there is no specific quality approach in place'. Furthermore, 95% the interviewees stated that 'management change strategies' were not utilised in their respective organisations, while 5% answered otherwise. In relation to 'other technique' that might be used within the oil and gas organisation, a relatively high percentage of the respondents, around 65%, stated that particular techniques were in place. Meanwhile, 35% of them answered 'no' which means that no particular technique is being used.

Table 8.10: Results for Q 9: Opinions on the Use of TQM Techniques

Question 9: What aspects of the TQM techniques and process are implemented in your organization?					
Supply chain					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	13	65.0	65.0	65.0
	yes	7	35.0	35.0	100.0
	Total	20	100.0	100.0	
5 S s or 5 Cs					
Valid	no	19	95.0	95.0	95.0
	yes	1	5.0	5.0	100.0
	Total	20	100.0	100.0	
SPC (Statistical Process Control)					
Valid	no	17	85.0	85.0	85.0
	yes	3	15.0	15.0	100.0
	Total	20	100.0	100.0	
Six Sigma					
Valid	no	19	95.0	95.0	95.0
	yes	1	5.0	5.0	100.0
	Total	20	100.0	100.0	
IS0 9001/2000					
Valid	no	6	30.0	30.0	30.0
	yes	14	70.0	70.0	100.0
	Total	20	100.0	100.0	
Customer focus – Internal /Extern					
Valid	no	13	65.0	65.0	65.0
	yes	7	35.0	35.0	100.0
	Total	20	100.0	100.0	
Benchmarking					

Valid	no	20	100.0	100.0	100.0
	yes	-	-	-	
	Total	20	100.0	100.0	
Management change strategies					
Valid	no	19	95.0	95.0	95.0
	yes	1	5.0	5.0	100.0
	Total	20	100.0	100.0	
There is no specific quality approach in place					
Valid	no	20	100.0	100.0	100.0
	yes	-	-	-	-
	Total	20	100.0	100.0	
Other					
Valid	no	7	35.0	35.0	35.0
	yes	13	65.0	65.0	100.0
	Total	20	100.0	100.0	

(Data Analysis)

8.11. OPINIONS ON TQM GENERALLY AND VISION FOR ITS IMPLEMENTATION

Table 8.11 depicts the findings on the opinions about TQM. As the general theme and the coded answers show, most of the interviewees agreed that TQM is a new management revaluation that covers all organisational aspects.

Table 8.11: Results for Q. 10: Overview of the Participants' Perception for TQM

Question 10	**What is your opinion about TQM generally?**
Focused Coding	
1	A new concept which requires appropriate culture
2	Excellent, successful system which has a clear impact on organisations' performance
3	A comprehensive management system that has enormous influence on developing the level of work to the unexpected level
Theme	**TQM is an excellent, successful new concept, and a comprehensive management system which requires an appropriate culture in order to make a clear impact on the organisations' performance by developing the level of work to the unexpected level**

(Data Analysis)

The focused codings as part of the general theme in Table 8.11 further analysed below by providing the individual positions of some of the interviewees:

Table 8.11.1: Focused Coding No. 1 for Q. 10: The culture needs to be changed to suit the new concepts

A new concept that requires an appropriate culture	
Interviewee 1	Generally, it is a new concept + it should be a national culture + our religion encourages us to do things to a high quality
Interviewee 2	It needs a suitable culture in order to be applied properly
Interviewee 3	From my point of view it is a wonderful culture + it is a matter of trust and awareness

Interviewee 9	If there is clear guidance and direction towards it and the people become aware of it and it becomes a culture then there will be improvements in the way of doing work and productions
Interviewee 17	We need a clear structure of how it works in different political environments and how it works effectively between the owner and the operator

(Data Analysis)

As the statements of focused coding in Table 8.11.1 above shows, we can see that these statements generally indicate that the culture needs a clear guidance and structures in order to make the people aware of it and then it will become a way of life; this was supported by interviewees 1, 2, 3, 9 and 17. Some of them commented that our religion works in the same direction; thus, it should be easy to make it our culture.

Table 8.11.2 provides the responses of those interviewees who stated that TQM is an excellent and successful system, which has a clear impact on organisations' performance. The results helps to conclude that most of the respondents were able to see the truth and value of TQM as they used comments such as 'wonderful', 'positive effects', 'it is important', 'successful system', 'good', 'excellent', *etc*. Hence, it is obvious that there is an acceptable level of agreement that TQM is beneficial among the managers of some oil and gas based organisations.

Table 8.11.2: Focused Coding No. 2 for Q. 10: TQM is a matter of non-stop value

Excellent and successful system which has a clear impact on organisations' performance	
Interviewee 4	Good, helps in setting specific policies in the organisation + it is excellent system
Interviewee 5	It is extremely high, raising the efficiency of management, performance and manufacturing + it is safest way to achieve success and continues improvement
Interviewee 6	It is wonderful
Interviewee 8	Practically, I don't have understand it fully + but I trust in this philosophy
Interviewee 13	It is wonderful and must be applied successfully + it is beneficial in the long and short term
Interviewee 14	It has a positive effect on all areas and aspects + all its criteria are effective and real and represent the essence of the modern management approach + all organisations must apply it as it is essential
Interviewee 15	It is a wonderful and positive managerial philosophy + it should be imposed from the owner to the rest of the organisation going through the application step by step
Interviewee 16	It is a philosophy which helps companies to achieve their objectives smoothly and easily
Interviewee 18	It is important to all organisations + it eases procedures and helps greatly to achieve goals + ensures accuracy and eases evaluation
Interviewee 19	Successful system which has clear impact on many organisations' performance + it is a system with strong pillars such as ISO 9001, 14001, 18001 and others
Interviewee 20	It is important, all international organisations should go in this direction

(Data Analysis)

Table 8.11.3: Focused Coding No. 3 for Q. 10 (TQM offers continuous work improvement)

A comprehensive management system that has enormous an influence on developing the level of work to the unexpected level	
Interviewee 2	It is a comprehensive management system
Interviewee 4	It helps to draw up policies and objectives perfectly
Interviewee 7	It is a management system, a new management revolution, we suggest adopting it in all types of organisation and for all activities + it is a system of organising processes
Interviewee 8	I suggest adopting it effectively + it involves and activates all company activities and enhance all processes of the operational entirely
Interviewee 10	It should be incorporated + it is a new type of management and phenomenon to some extent + all signs showed it to be successful and beneficial + it must be applied effectively
Interviewee 11	I am support its successful and effective application
Interviewee 12	Comprehensive, explicit and clear application; has enormous benefits
Interviewee 14	New managerial philosophy that has enormous influence on developing the level of work to an unexpected level
Interviewee 17	As an approach it attains huge, effective achievements
Interviewee 19	A comprehensive system that should be in all organisations

(Data Analysis)

As can be observed in Table 8.11.3, interviewees 2, 4, 7, 8, 10, 11, 12, 14, 17 and 19 generally stated that TQM would lead to continuous improvement over entire organisational areas and aspects through various methods and techniques. This can be noted from their statements and answers such as 'TQM involves and affects all company activities, enhances all operations processes entirely, comprehensively and explicitly and has unlimited benefits, effective achievements', *etc*. As perceived by the participants, it can therefore be generalised that TQM is a comprehensive management system which has a direct impact on developing the standard of work to an unexpected level. Question 11 in the interview schedule aimed at locating the opinion of the interviewees on their organisational vision to implement TQM. The results are depicted in Table 8.12.

Table 8.12: Results for Q. 11: Overview of Vision for TQM Implementation

Question 11	**Does your organisation have a clear vision of TQM implementation?**
Focused Coding	
1	There is vision and real desire for this issue
2	There is concern and attention paid in most departments regarding TQM
3	However, there is no official clearly written guidance regarding TQM
Theme	**There is a vision and general orientation in this issue and also there is concern and attention paid in all departments regarding TQM. However, there is no officially clear written guidance regarding TQM**

(Data Analysis)

As the general theme and the coded answers show in Table 8.12, some of the interviewees deemed their organisation to have vision and intention for TQM, while

others stated otherwise. The information provided for each focused coding was further analysed through coding methods below:

Table 8.12.1: Focused Coding No. 1 for Q. 11: There is general vision and orientation regarding TQM

There is vision and general orientation in this issue	
Interviewee 1	We hope to apply it successfully + in short we need our organisation to succeed in the application of it in the shortest possible time, and we also need our company to be an example in this field
Interviewee 2	There is clear attention to be a TQM organisation + we work towards that
Interviewee 5	We discussed all aspects of the quality system, and asked about the related issues + there is advice and guidance towards a comprehensive application of quality
Interviewee 6	During departments objectives
Interviewee 7	There is general guidance in all departments in order to raise the level of awareness regarding quality + there is orientation and commitment to using a quality management system + there is clear interest from member of management committee and chairman of the management committee in the quality system
Interviewees 9 & 10	There is general guidance
Interviewee 11	There is clear vision, but still in the beginning and we have quality policy
Interviewee 14	We roughly adapted this approach in our work and we do guide and encourage the departments to adept it successfully and effectively
Interviewees 18 & 19	There is vision + but there is no clear written guidance regarding TQM
Interviewee 20	There is clear vision through the unified work regulation that emphasis on achieve the work according to chain of specific procedures

(Data Analysis)

The results for the focused coding 1 in Table 8.12.1 show that the philosophy of TQM were spearheaded across some organisations and some departments by including it in their objectives and tasks. However, the degree of clarity of vision depends on the nature of the organisation and also on how its vision and intention is expressed.

Table 8.12.2: Focused Coding No. 2 for Q.11: There is a tendency in some departments towards TQM

Concern and attention is given in some departments to TQM	
Interviewee 12	There is concern in all departments regarding TQM
Interviewee 13	There are attempts and efforts to establish this culture effectively + but there is concern in all departments regarding quality
Interviewee 14	Though we do not have a framework or model to show it, all the policies and the declared strategies are working according to this philosophy + we reached ISO 14001 in the manufacturing department as one stage of the completed form
Interviewee 18	All managerial meetings refer to and encourage us towards quality of performance and work and also towards enhancement and excellence

(Data Analysis)

Table 8.12.2 provides the responses of the interviewees who commented that there was concern and, therefore, attention had been paid in some departments to TQM. The responses gathered help to summarise that due to the concern, and attention paid, some departments in some organisations want to establish and prepare an appropriate

culture for quality generally and TQM particularly which can be translated as future vision to be effective and successful in the long term.

Table 8.12.3: Focused Coding No. 3 for Q. 11: Officially there is no obvious written document concerning TQM

There is no officially clear written guidance regarding TQM	
Interviewee 3	There is no clear plan that comprises time and resources for the full implementation of TQM
Interviewee 4	It is not much clearer + there is no clear and explicit vision regarding TQM + it is in the first stages + but for quality its clear
Interviewee 8	There is no clear written guidance regarding this + but there is general orientation on the matter
Interviewees 12 & 13	There is no clear vision regarding the application of TQM
Interviewee 15	There is no clear vision regarding the application of TQM + the culture is still not at the right level, the issue need additional efforts to be implemented effectively
Interviewee 16	There is no clear vision regarding the application of TQM + although there is a mechanism it is not in a clear and effective form
Interviewee 17	There is no clear, official vision regarding the application of TQM

(Data Analysis)

Table 8.12.3 provides the responses of the interviewees for clarity of vision for TQM for the focused coding No. 3. As the statements by the respective interviewee identify some of the organisations have no specific clear vision regarding the application of TQM; in particular, there is no clear written document or obvious procedure dealing with such matters.

8.12. OPINIONS ON THE OBSTACLES FACED IN IMPLEMENTING TQM

This section aims to analyse the interview data in relation to the obstacles and difficulties faced in implementing the TQM, which is the subject of Question 12 in the interview schedule.

Table 8.13: Results for Q. 12: Overviewing the Obstacles and Difficulties to TQM

Question 12	**What obstacles and difficulties have you encountered in the successful and effective application of TQM in Libyan oil and gas organisations?**
Focused Coding	
1	Lack of understanding of TQM and resistance to change
2	Laws and regulations
3	Bureaucratic management style
4	Lack of organisational culture
5	Lack of resources and facilities
Theme	**There are a number of obstacles and difficulties that prevent the effective application of TQM within the oil and gas sector, such as lack of understanding of TQM and understanding, resistance to change, restriction of laws and regulations, dominating of bureaucratic management style, lack of organisational culture and lack of resources and facilities to support TQM**

According to Table 8.13, the opinions of the interviewees in relations to the perceived obstacles can be generalised into five main categories: “lack of understanding of TQM and resistance to change”; “Laws and regulations of the owner”; “Bureaucratic management style”; “Lack of organisational culture”; and “Lack of resources and facilities”. After establishing the general theme for Question 12, each of the focused coding is further analysed through the statement provided by the interviewees and they are presented in Tables 8.13.1 to 8.13.5.

Table 8.13.1: Focused Coding No. 1 for Q.12: Difficulties of awareness and understanding which in turn lead to resistance to change

Lack of understanding of TQM and resistance to change	
Interviewee 1	Employees’ limitation of awareness
Interviewee 2	Time restriction making workers aware of the concept
Interviewee 7	There is no clear acceptance from workers regarding such a program + there is fear from beyond this program due to lack of understanding of TQM + they think that the management is looking for errors rather than wishing to make improvements to the work
Interviewee 8	Resistance to change generally from employees
Interviewee 9	Resistance to change generally from older employees
Interviewee 10	Lack of understanding of TQM from the majority of workers
Interviewee 12	Fear of change + resistance to change + lack of understanding from top management level about the importance of TQM
Interviewees 14,18, & 19	Resistance to change
Interviewee 20	An ambiguity to the idea of TQM to some extent in some functional segments

(Data Analysis)

As the statements for focused coding No.1 in Table 8.13.1 indicate, generally there are actual difficulties at some management levels regarding the essence of TQM, such as employees’ resistance to changes and amendments. The main reason given for resistance to change is the fear of what might happen after this program. This was supported by interviewees 1, 2, 7, 8, 9, 10, 12, 14, 18, 19 and 20. Some of them commented that the ambiguity of the idea of TQM greatly affected its effective implementation and therefore created resistance against TQM.

Table 8.13.2: Focused Coding No. 2 for Q. 12: The laws and regulations

Laws and regulations	
Interviewee 1	Restriction of regulations and lack of renewing process
Interviewee 3	Fundamentally, the restriction of laws and regulations of the Libyan work
Interviewee 4	The restriction of Laws and regulations
Interviewee 5	The impact of the laws
Interviewee 19	Laws and regulations of the owner

As can be seen in Table 8.13.2, a number of statements provided by each of interviewee for the focused coding 2. Interviewees 1, 3, 4, 5 and 19 argued that there are regulations and laws imposed by owners upon all subsidiaries of oil and gas organisations. Therefore, some of these regulations restrict and limit the freedom to act with such programs and some of the laws are not in line with the requirements of TQM. Thus, additional flexibilities in these regulations need to be delegated and certain changes and amendments in relation to the laws need to take place.

Table 8.13.3: Focused Coding No. 3 for Q. 12: The influence of old management approach

Bureaucratic management style	
Interviewee 1	Other external work obstacles such as internal security service and others
Interviewee 4	The inherited administrative routine + the job of the operations and marketing are separated
Interviewee 13	External intervention by forcing some employees into different position and jobs + other exceptions.
Interviewee 15	Turnover of employees and managers + there is no independence in oil sector
Interviewee 16	Social environment that has significant impact on the implementation of TQM and on its requirements also affects the managerial categories ' work and decision + external environment
Interviewee 18	Social pressure + personal relationships.

(Data Analysis)

The respondents' statements in relation to the influence of old management approach in the form of bureaucratic management style are depicted in Table 8.13.3, which shows that there are external and internal interventions across some oil and gas organisations which forces some employees into different positions and jobs. Thus, these problems, among others, were the key obstacles that influence the implementation process. According to interviewees 1, 4, 13, 15, 16 and 18 the spreading of bureaucratic management style hindered any attempt to be effective.

Table 8.13.4: Focused Coding No. 4 for Q. 12: The difficulties of existing culture

Lack of organisational culture	
Interviewee 1	Undeveloped culture
Interviewee 2	Lack of availability of TQM culture
Interviewee 3	People's culture needs extensive awareness
Interviewee 6	Culture matters
Interviewee 11	It is a culture issue at all management levels
Interviewees 13, 16 & 18	The general culture

(Data Analysis)

The statements of the interviewees for the focused coding 4 are presented in Table 8.13.4 Interviewees 1, 2, 3, 6, 11, 13, 16 and 18 all agreed that the key obstacles can be traced back to the absence of real intention for a change in culture. In other words,

lack of organisational culture or stagnant culture with its principles is considered as a hindrance to success.

Table 8.13.5: Focused Coding No. 5 for Q. 12: Lack of resources and facilities

Lack of resources and facilities	
Interviewee 2	Budget + problem of invisible costs that would be spent on workers awareness
Interviewee 5	The delay of full application (further delay further problems) + the focus on production rather than managerial aspects
Interviewee 7	There is no system commitment + there is no clear guidance from management staff
Interviewee 8	Urgency of the results from the general management
Interviewee 9	Certain training courses do not target the right employees + the training courses focus only on the lower level and ignore the rest
Interviewee 15	Lack of consultancy and there are no responsible, specialist bodies to help regarding TQM
Interviewee 17	TQM implementation for the organisation are not a necessity or priority + there is no motivation to do so and they feel comfortable with the existing approach + there is no real push towards enhancement
Interviewee 20	Lack of consultancy and there are no specialist bodies regarding TQM

(Data Analysis)

In relation to the statements provided for the focused coding No. 5 (lack of resources and facilities), it can be seen in Table 8.13.5 that a set of difficulties result in delaying the comprehensive application of TQM such as the fear of invisible costs which would be spent on the awareness process, less care about managerial improvement, the assessment of the need for training courses not being right and lack of consultancy or responsible specialist bodies with reference to TQM to provide help and support. This result implies that that overcoming these problems would assist in achieving a successful and completed model.

8.13. LOCATING THE SOURCES OF BARRIERS AND OBSTACLES IN FRONT OF THE EFFICIENT IMPLEMENTATION OF TQM

This section aims to locate the perceived sources of concerned obstacles in front of efficient implementation of TQM through interview data analysis.

Table 8.14: Results for Q. 13: Overview of the Reasons for Obstacles to TQM and the Sources of the Obstacles

Question 13	**What are the reasons for the barriers to implementing TQM and how have they emerged in the Libyan oil and gas organisation?**
Focused Coding	
1	The period of sanctions and the managerial heritage
2	Lack of continuity for quality programs and the effect of educational levels
3	Previous economic policy approach ‘socialism’ and resistance to change as a culture matter
4	Lack of qualified professionals
Theme	**The main reasons behind these obstacle are the period of sanctions and the old managerial heritage, lack of continuity for quality programs and the effect of educational level,**

	previous economic policy approach 'socialism' and the resistance to change as a culture matter and finally the lack of qualified professionals

(Data Analysis)

Table 8.14 indicates the findings on the reason for obstacles perceived to be in action in Libyan oil and gas organisations. As the general theme and the coded answers show, some interviewees commented that managerial heritage and the period of sanctions have really played a critical role in the appearance of barriers. In addition, a lack of continuous quality programs, the impact of educational level, a 'socialist' approach that led to resistance to change due to culture and a lack of qualified professionals have also had an influence on the formation of obstacles. Four of the established focused coding are further analysed as follows;

Table 8.14.1: Focused Coding No. 1 for Q. 13: The effect of the period of sanctions and the pressures of managerial heritages

The period of sanctions and the old managerial heritage	
Interviewee 1	Systems, regulations and laws are not consistent with TQM requirements
Interviewees 2 & 4	Due to the period of sanctions
Interviewee 3	The economic policy is the main reason for the obstacles
Interviewee 5	The ignorance of such programs from management level creates obstacles to it + there is no control over the organisation's activities
Interviewee 6	The managerial heritage and the period of sanctions
Interviewee 7	There is no commitment towards the system and the influence of old management style
Interviewee 11	Managerial heritage + the period of sanctions
Interviewee 13	Previous bad managerial habits + personal relationships
Interviewee 14	Following a bureaucratic approach and the period of sanctions
Interviewee 16	Being used to the traditional work
Interviewee 18	Lack of transparency

(Data Analysis)

Table 8.14.1 shows the responses of the interviewees who argued that the period of sanctions and the old managerial heritage were reasons behind the observed barriers. It was stated that the challenge during the sanctions was how to keep all operations running and reaching the specified level of productions, which resulted in compromises in quality and methods of assuring quality. Secondly, the management style and in particular governance problems, according to the participants, affected all attempts at improvements as stated by interviewees 1, 3, 5, 6, 7, 11, 13, 14, 16 and 18.

Table 8.14.2: Focused Coding No. 2 for Q, 13: Inconsistency of quality programs and inappropriate educational levels

Lack of continuity for quality programs and the effect of educational level	
Interviewee 3	There is no continuity for quality programs from the early stages to what is known as TQM today
Interviewee 4	General awareness + novelty of the idea within the sector

Interviewee 5	Lack of qualified employees
Interviewees 8 & 19	Education level
Interviewee 9	The misconception from the employees that quality is an additional workload
Interviewee 11	The quality concept is quite a new idea to some extent in this organisation
Interviewees 12 & 20	Lack of awareness

(Data Analysis)

Table 8.14.2 depicts the statements provided by some of the interviewees on focused coding No. 2 related to the perceived barrier or obstacle that is the inconsistency of quality programmes Interviewees 3, 4, 5, 8, 9, 11, 12, 19 and 20 argued that for various reasons there were no updating programmes following up quality management from the early stages to the current period and these need to be continuous. In addition, they identified that in order to be in line with new management programmes a certain level of education in particular subjects is required; however, in some oil and gas organisations such requirements did not exist.

The respondents' answers in Table 8.14.3 for the focused coding show that the domination of the Libyan 'socialist' economic policy approach with its principles, as a culture, contributed to forming resistance to change. Interviewees 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 19 and 20 considered this as a core reason for most of the existing barriers. One example is the problem of external intervention in the form of patronage in the manager's tasks, and there is very little clear concern regarding such interventions philosophy from upper management in some organisations, therefore, the difficulties moved from the top to the lower level.

Table 8.14.3: Focused Coding No. 3 for Q. 13: The 'socialist' approach as an economic policy and the culture of resistance to change

Previous 'socialist' economic policy approach and the resistance to change as a culture matter	
Interviewee 3	The effect of a'socialist' approach over many years
Interviewee 4	Structural organisation within the sector + specialty distribution
Interviewee 5	Society culture + the fear on the positions and resistance to change + the tendency towards consistency and stability
Interviewee 6	Some of our traditions and habits
Interviewee 7	The resistance from the employee to correction and development
Interviewee 8	The resistance to change as a cultural matter + environmental circumstances
Interviewees 9 & 11	Cultural matter
Interviewee 10	Cultural and managerial heritage
Interviewee 12	The problem of external intervention in the manager's tasks and their managerial affairs
Interviewee 15	Employees' culture
Interviewee 16	Employees' culture has a significant impact on any development programs and the difficulty of change
Interviewee 17	Inertia and internal inadequacy of managers + TQM is not spreading culture + there is no real

	concern regarding such philosophy from the upper management level + difficulties moved from the top to the lower level
Interviewees 1 9 & 20	Organisational culture

(Data Analysis)

Table 8.14.4 shows the responses of the interviewees for the focused coding which locates the sources of the problems with consultancy and specialists. The statements as a response can be summarised as: inadequate availability of qualified professionals whether regarding ordinary operations in terms of solving problems in modern management style; lack of coordination between departments; resistance to involve employees in decision making and working as a team; no clear guidance for forming clear strategies, evaluating the results of stabilising, controlling and assessing the organisation as whole; lack of attention paid to all aspects of the organisation and also consultancy concerning TQM and quality generally.

Table 8.14.4: Focused Coding Number 4 for Question 13 (Problems regarding consultancy and specialists)

Lack of qualified and professionals	
Interviewee 5	Shortage of professionals in this area
Interviewee 7	Solving problems without finding the solution in advance as a modern management style
Interviewee 8	Seeking quick results which affect the development programs various reasons
Interviewee 9	Weak coordination between departments and units within the organisation + lack of training programs and also the mechanism for choosing trainees
Interviewee 13	There is no specified standard regarding the processes to prevent abuse
Interviewee 14	The resistance of managers to involve employees in decision making and work as a team due to a fear of being worthless
Interviewee 15	There are no clear strategies + there are no responsible bodies to evaluate the results and help to apply it
Interviewee 17	There is no clear guidance or orientation towards it + there is no pressure to do so
Interviewee 18	Managerial instability + lack of control and assessment
Interviewee 20	Lack of concern from management

(Data Analysis)

8.14. OPINIONS ON THE SOLUTIONS TO OVERCOME THE OBSTACLES AND BARRIERS

This section aims to discuss the opinions of the interviewees in relation to how to overcome the identified barriers and obstacles.

Table 8.15: Results for Q. 14: Overview of Solutions in Relation to Existing Barriers

Question 14	**From your experience, how can these barriers and challenges be overcome in Libyan oil and gas organisations?**
Focused Coding	
1	The owner should have a clear written stated policy + provide all required resources to subsidiary

	organisations
2	Clear independence should be given to all petrochemical organisations to deal with suppliers and clients and they should be given the right to improve their operations continuously
3	Extensive continuous awareness programs in relation to TQM should be established at all management levels
4	A new appropriate culture should be introduced through training and education programs
5	All aspects of the organisation should be reviewed and analysed and all necessary resources should be provided
6	Employees should be motivated, encouraged and involved
Theme	**The mentioned obstacles might be overcome in various steps including having a clear written stated policy and providing all required resources to their subsidiary organisations, clear independence for all petrochemical organisations to deal with suppliers and clients and have the right to improve their operations continuously, An extensive continuous awareness programs should be established in relation to TQM at all management levels, a new appropriate culture should be introduced through training and education programs, all aspects and factors of the organisation should be reviewed and analysed and all necessary resources should be provided; employees should also be motivated, encouraged and involved.**

(Data Analysis)

The responses of the interviewees in articulating their opinions related to solution are depicted in Table 8.15. As can be seen, the statements or the opinions can be generalised into six main themes: (i) 'the owner should provide its subsidiaries with clear written documents, a stated policy and all required resources'; (ii) 'all petrochemical organisations should be given independence in dealing with suppliers and clients as well as having the right to develop their operations continuously'; (iii) 'extensive continuous awareness programmes should be implemented regarding TQM for all management levels'; (vi) 'new appropriate culture should be introduced through training and education programmes'; (v) 'all aspects and elements of the organisation should be reviewed and all necessary resources should be provided'; and (vi) 'the workforce should be motivated, encouraged and involved'. These six sub categories are the proposed solution for employing an effective form of TQM. After establishing the general theme for Question 14, each part of the focused coding is further analysed and the results are presented in Tables 8.15.1 to 8.15.6; the supporting information for each theme follows shortly after each respective table.

Table 8.15.1: Focused Coding No. 1 for Q. 14: Written evidence, stated policy and provision for needs and requirements must be made

The owner should have a clear written and stated policy and provide all required resources to subsidiary organisations	
Interviewee 1	The state should adopt this approach
Interviewee 2	NOC as an owner should have a clear written and stated policy and provide all required resources to implement it correctly, effectively and clearly
Interviewee 5	TQM should be approached from the beginning (school/university)
Interviewee 6	They should be given best oil company practices and how they overcome such problems
Interviewee 11	Should be applied it in all organisation activities

Interviewee 17	Such strategy should start from the top (the owner)

(Data Analysis)

Table 8.15.1 shows the opinons of the interviewees regarding the possible solution to existing obstacles, as part of focused coding No.1. As can be seen, interviewees 1, 5, 6, 11 and 17 stated that NOC should contact its subsidiaries with direct, clear written documents regarding the matter and provide all the required resources. Some interviewees added that the best oil company practices should be communicated to all oil and gas organisation as an indication of clear intention and moving forward. In addition, some interviewees stated that TQM should be involved in our lives by being taught at state schools and universities as noted by some interviewees.

Table 8.15.2: Focused Coding No. 2 for Q. 14: Independence in operations and initiative in development

Clear independence for all petrochemical organisations in dealing with suppliers and clients and having the right to improve their operations continuously	
Interviewee 3	Take the right of dealing with the suppliers and clients + loosen some legal restrictions
Interviewee 4	Take the right to deal with suppliers and clients + renew procedures and regulations in line with TQM requirements.
Interviewee 6	Joint finisher (foreign participation) with other foreign company in some aspects
Interviewee 13	Pay attention to the quality of procedures, material and operations and ensure that all these are in line with set standards
Interviewee 14	Continuous effective implementation + work according to standards in all departments + create team spirit between organisations
Interviewee 15	Clear independence for all oil and gas organisations
Interviewee 17	Pay attention to organisational culture
Interviewee 18	Respect decisions and laws + eliminate the personal effect on work procedure
Interviewee 19	Continuous change
Interviewee 20	Give additional flexibility to oil and gas organisations

(Data Analysis)

As the respondents' statements for focused coding No. 2 depicted in Table 8.15.2 show the second choice for the owner is to allow additional rights and responsibilities to its subsidiaries in dealing with internal and external environments. In other words, they all expect comprehensive independence in the operations of all oil and gas organisations and also freedom to undertake new initiatives to better the conditions of the organisations.

Table 8.15.3: Focused Coding No. 3 for Q.14: Comprehensive awareness programs

Establishing extensive continuous awareness programs in relation to TQM at all management levels	
Interviewee 2	Awareness and education
Interviewee 3	Increase the level of employees awareness by training
Interviewee 4	Awareness and education for the employees

Interviewee 5	Illustrate the benefit beyond the implementation of TQM
Interviewee 6	Awareness and education + participate in conferences and international seminars
Interviewee7	Through the policy of spreading awareness of TQM + awareness and education
Interviewee 8	Pay attention to awareness and education continuously at upper management level + non-stop awareness at all management levels due to previous errors that paid attention to the lower level and ignored the high level which resulted in some difficulties such as the current resistance to change
Interviewee 9	Continuous awareness at all levels + make the quality as a culture
Interviewee 10	Make workers aware of quality and its aspects
Interviewee 11	Raise the level of awareness
Interviewee 12	Raise the level of awareness from upper level to the lower
Interviewee 13	Awareness and education through conferences and seminars regarding the issue + extensive continuous awareness
Interviewee 14	Disseminate the awareness and the reality of this philosophy
Interviewee 16	Participating in awareness programs such as conferences, seminars and lectures regarding the issue + intensification of programmes to develop human resource
Interviewee 18	Continuity of the awareness
Interviewee 19	Raise people's awareness of the benefit of change

(Data Analysis)

Table 8.15.3 illustrates the responses of the interviewees for focused coding No. 3 stating that comprehensive awareness programmes are crucial in overcoming the observed obstacles and barriers. It is worthwhile noting that most of the interviewees (from interviewee 3 to 14, 16, 18 and 19) stressed that awareness programmes through education and training are essential to develop a better understanding of TQM. Thus, it is beneficial to the oil sector to begin with this strategy to resolve their difficulties from basic.

Table 8.15.4 shows the results gathered from the interviewees regarding creation of a suitable culture as being an important factor for the solution to the existing difficulties. This shows that interviewees 1 2, 5, 6, 7, 9, 10, 11, 12, 13, 14, 16 and 20 considered that continuous extensive training and education programmes would enable some of the obstacles, including cultural matters, to be successfully overcome.

Table 8.15.4: Focused Coding No. 4 for Q.14: Creating suitable culture

Introducing a suitable new culture through training and education programs	
Interviewee 1	The need for training and rehabilitation to become a culture
Interviewee 2	Regarding the culture as an obstacle can be overcome through training
Interviewee 5	Training and educating the workforce in order to form the culture
Interviewee 6	Research + people training
Interviewee 7	Change the negative concepts through training
Interviewee 9	Extensive training + choosing the appropriate person to be trainer and to be trines
Interviewees 10, 12, 13 & 16	Extensive training
Interviewee 11	Training and educating the employees of its benefit + objectives and advantages

Interviewee 14	Continuously involving all staff in training and education programs regarding the philosophy until it becomes a culture
Interviewee 20	Pay attention to continuous training which will result in culture change

(Data Analysis)

Table 8.15.5: Focused Coding No: 5 for Q. 14: The need for review of organisational elements

Review and analyse all organisational aspects and factors and provide all necessary resources	
Interviewee 3	Analysis of difficulties + factor analysis available within the company
Interviewee 5	Put employees in the picture
Interviewee 7	Having strategies to deliver the information smoothly is a critical point for success in introducing any program
Interviewee 8	Allow plenty of time for the implementation process
Interviewee 10	Specify the desired goal and results precisely
Interviewee 15	Advanced planning of the budget and other activities
Interviewee 17	Adopt strategies for strange that cover all aspects
Interviewee 18	Create a work environment which is not affected by external factors; take responsibility for all work and actions; work in a scientific way
Interviewee 20	Determine budget for these programs, research and development programs

(Data Analysis)

As regards to the focused coding 5, the respondents' answers in Table 8.15.5 reveal that there is an urgent need to review and analyse all organisational aspects and factors as well as to provide the necessary resources in order to obtain satisfactory results and resolve any possible obstacles. In this regard, interviewee 3 stated that analysing the work force properly and accurately in terms of level of education and level of performance, then choosing qualified personnel and assigning them to the right positions, is a very important phase in this process; interviewee 10 also added that illustrating the benefits beyond the implementation of TQM, continuous controlling, assessing, following up the system of quality within the organisation, taking advantages of the errors that occurred at the introduction of the quality process, are all critical in solving TQM difficulties. In addition, a clear budget, clear strategies and all production requirements for a whole year must be clear. Furthermore, it is articulated that taking control and responsibility for all departments is vital as the first stage of problem-solving, as mentioned by interviewee 15.

Table 8.15.6: Focused Coding No. 6 for Q. 14: Attracting employees' attention and aspirations

Motivating, encouraging and attracting employees	
Interviewee 3	Raise motivation + create employees' loyalty in various way; salary and motivations.
Interviewee 5	Motivate the workers to create a suitable work environment +indirect engagement of employees in quality programs
Interviewee 7	The way of attracting people is also important
Interviewee 15	Qualified workers + right controlling

Interviewee 17	Those who can risk doing it are not in the right position

(Data Analysis)

In further analysing the various views, Table 8.15.6 provides detailed statements from the interviewees for the focused coding No. 6 that motivating employees' attention and aspirations can be a source for tackling the observed barriers and challenges. According to interviewees 3, 5, 7, 15 and 17 employee loyalty can be created and stimulated in various ways, including increasing their salaries and other motivations in the first phase; which was stated as essential in bringing about success and overcoming existing barriers, as well as easing the process of implementation.

8.15. OPINIONS, RECOMMENDATIONS AND CONCERNS ON THE IMPLEMENTATION OF TQM

This section further examines the primary data collected through interviews for this study with the objective of identifying concerns and further comments by the interviewees on the implementation of TQM in general and in their organisation in particular.

The first interview question in this section relates to whether there is any direct contact person in the organisation for TQM related issues, for which the answers are depicted in Table 8.16.

Table 8.16: Results for Q. 15: Overview of the Recommendation from the Interviewed Managers

Question 15: Is there any person you think I should talk to about these issues?	
Interviewees 1, 3, 4 & 5	Manager of Quality Department
Interviewees 2, 4, 5 & 6	Quality Regulation representative
Interviewee 4	Quality Circles organisers
Interviewee 14	Member of Management Committee (Manager of Managerial and Financial Affairs)
Interviewee 15	Manager of Manufacturing Department
Interviewee 16	Planning Department

(Data Analysis)

As can be seen from Table 8.16, interviewees 1, 3, 4 and 5 referred to the Manager of the Quality Department, interviewees 2, 4, 5 and 6 recommended the Quality Regulation representative, interviewee 4 put forth the Quality Circles organisers, interviewee 14 referred to a member of the Management Committee (Manager of

Managerial and Financial Affairs), interviewee 15 recommended the Manager of the Manufacturing department and interviewee 16 mentioned the Manger of the Planning Department. In response to these recommendations, the researcher visited most of them and distributed the interviews successfully.

The interviewees were further probed for their concerns and further comments on the implementation of TQM, and the results are presented in Table 8.17.

Table 8.17: Results for Q. 16: Overview of Concerns/Comments on Implementation of TQM

Question 16	**Do you have any concerns/comments on TQM implementation?**
Focused Coding	
1	All Libyan management including NOC must adopt this philosophy effectively
2	Raising the level of awareness and education concerning TQM urgently and seriously through various methods
3	Additional research must be carried out across these organisations regarding this issue
Theme	**All Libyan management including NOC must adopt this philosophy effectively and take action to raise the level of awareness and education concerning TQM urgently and seriously using various methods as well as paying extensive attention to additional research and studies that must be carried out across these organisations regarding this issue**

(Data Analysis)

According to Table 8.17, the comments and concerns of the participants over the implementation of TQM can be generalised into three main categories: (i) 'All Libyan management including NOC must adopt this philosophy effectively'; (ii) 'Levels of awareness and education must be raised concerning TQM urgently and seriously using various methods'; and (iii) 'Additional research must be carried out across these organisations regarding this issue'. These three focused groups are the summary of all interviewees' notes, comments and concerns, which form the general theme. After establishing the general theme for Question 16, each focused coding was further explored and the results are presented in Table 8.17.1 to Table 8.17.3. The supporting information for each category follows shortly after each respective table.

Table 8.17.1 shows the results gathered from the interviewees regarding the first focused coding for this section, which shows that private and government organisations in Libya must employ at least some form of TQM culture as a first step towards progressing, which would bring about success more quickly and overcome all possible obstacles. As interviewee 3 stated, "all TQM requirements are available we need just vision and real management to implement it". In addition, interviewees 1, 6, 7, 10 and 16 highlighted that TQM is an international system, therefore clear vision

regarding such a system and culture is required; this can happen by reforming the existing laws, regulations and policies. Furthermore, it was suggested that plenty of time needs to be allowed and commitments must be followed for TQM to be introduced and successfully implemented in Libyan oil and gas organisations.

Table 8.17.1: Focused Coding No. 1 for Q.16: TQM must be employed across petro-chemical organisations and others

All Libyan management including NOC must adopt this philosophy effectively	
Interviewee 1	All management in Libya must implement the philosophy of TQM culture as a first step towards future improvement
Interviewee 3	This idea should be adopted from upper management levels in all Libyan organisations
Interviewee 6	All information and regulations come from the owner therefore they should have a clear vision regarding this system and culture
Interviewee 7	TQM is an international system that helps to raise the performance levels of Libyan societies and developing countries to be in the right position and reach a unified standard in dealing with each other and with foreign investors + it is a new world direction
Interviewee 10	Several international organisations have applied it, therefore we need to be patient about the results and allow plenty of time to see satisfactory outcomes + benefit from best practice throughout the world
Interviewee 16	Nothing happens without commitment or clear order +NOC should guide and instruct its subsidiaries to implement this philosophy

(Data Analysis)

In further analysing the various opinions, Table 8.17.2 provides details regarding focused coding No. 2 (additional awareness is required). According to interviewees 1, 8 and 16 as management of the oil and gas organisations face certain difficulties, and therefore serious efforts regarding quality and TQM generally need to be taken into consideration through the process of raising awareness via training courses, seminars and lectures, *etc.* The interviewees also stated that there is also a need for the assistance of experts and professionals, as well as benefitting from organisations that practise TQM to take advantage of their experience in relation to such hindrance.

Table 8.17.2: Focused Coding Number 2 for Question 16 (Action must be taken to spread and increase the awareness level locally)

Raising the level of awareness and education concerning TQM urgently and seriously through various methods	
Interviewee 1	Serious efforts must be made regarding quality generally through the process of awareness via courses, seminars and lectures + the help of experts and professionals is needed + benefit from organisations that practise TQM.
Interviewee 8	More attention needs to be paid to this issue through extensive courses of awareness and education
Interviewee 16	Continuous awareness + keeping up to date with new management sciences

(Data Analysis)

Table 8.17.3: Focused Coding No. 3 for Q. 16: Further and deeper studies and research must be carried out in order to attract/pay additional attention in relation to such matters

Additional research must be carried out across these organisations regarding this issue	
Interviewees 2 & 3	I am pleased that research and studies regarding TQM are being carried out in the oil and gas sector + it is a positive point and a step in the right direction
Interviewees 4 & 5	I hope there will be more research in this area and on these companies
Interviewee 9	I hope this study will help to apply this philosophy effectively and successfully
Interviewee 17	Choosing oil and gas organisations is appropriate + it is an appropriate research environment

(Data Analysis)

As can be seen in Table 8.17.3 the interviewees articulated a number of statements expressing their desire for additional research on TQM and other related issues now and in the future in expressing their opinions for focused coding No. 3. In addition, some of the interviewees were pleased to participate in a study regarding TQM stating that "it is great pleasure to be involved in such research" as was stated by interviewee 3. Overall, interviewees 2, 4, 5, 9 and 17 stated that they were delighted at being a part of this study and their organisations were studying and investigating in order to obtain real, possible, practical solutions to their problems.

This section aims to analyse the interviewees' responses in relation to as to whether they implement TQM philosophy in their organisations.

Table 8.18: Results for Question 17: Overview of Actual TQM Implementation)

Question 17	**Do you implement TQM philosophy in your organisation**
Focused Coding	
1	Attempts to implement it effectively
Theme	**There are attempts and efforts to achieve the right application however the surrounding culture needs time to be applied**

(Data Analysis)

As can be inferred from Table 8.18, there was only one theme established upon reviewing the responses. As the general theme and the coded answers show, some oil and gas organisation demonstrated an attempt to reach full implementation. However, certain obstacles are preventing them from doing so. After establishing the general theme for Question 17, the focused coding was analysed further to find additional information, which is presented in Table 8.18.1

Table 8.18.1: Focused Coding No. 1 for Q. 17: TQM was introduced however difficulties need to be overcome

Attempts to implement it effectively	
Interviewees 2, 3 & 4	Yes, we adopted this culture/philosophy, but our organisation is still trying to complete it.
Interviewee 5	Yes, for about three years + and we had been preparing quality programs since 2006
Interviewee 15	Yes, we adopted this culture/philosophy

(Data Analysis)

As can be seen in Table 8.18.1, interviewees 2, 3, 4, 5 and 15 stated that their organisations had embraced this philosophy at different times; nevertheless, some of them were trying to reach full implementation. Interviewee 3 commented that "regardless of the depth of the application, this philosophy needs a suitable environment and culture to be active and effective; therefore, our concern now is how to settle these issues down". Thus, it is clear that almost all the organisations sampled in this study were looking to overcome their difficulties in line with building a new, appropriate culture consistent with TQM requirements.

In delving into further issues regarding the implementation of TQM, Question 18 aimed at probing the interviewees as to whether they have any assessment tool used to identify the implementation problems for which the results are depicted in Table 8.19.

Table 8.19: Results for Q. 18: Overview of Assessment Tools used to Identify Implementation Problems

Question 18	**Do you have a specific mechanism in place to ensure that the process of implementation goes well?**
Focused Coding	
1	Internal procedures, regulations and models
Theme	**The organisation utilises a set of rules and procedures to monitor and assess certain tasks and jobs**

(Data Analysis)

As can be noted from Table 8.19, there was only one theme established upon reviewing the responses. Noting this, there is no additional focused coding table provided as the issue is obvious. Accordingly, it can be stated that some of the organisations used particular strategies to evaluate their operations and applications, this included procedures, regulations and models. As interviewee 3 stated "there are a number of procedures in place to ensure the assessment success such as models and questionnaires in order to assess the level of performance and quality applications to find out if we doing our work properly".

As part of the implementation of TQM, internal and external customer need is essential. For this the interviewees were asked whether this takes place in their organisations, and for this the results are depicted in Table 8.20. As stated by the interviewees, some organisations take this responsibility into consideration using various methods, such as direct connection and complaints/suggestions box[12] for the internal customer[13]. In addition, there are certain structures and tools for dealing with external clients. However, it is important to note several findings: For example, as articulated by the interviewees, most organisations pay sufficient attention to their customers through a visits team that helps to solve particular problems related to products and also via other procedures. In addition, interviewee 3 stated that "we have many procedures and models that work on determining customer feedback and reaction, which we transfer to the responsible department or unit to deal with the issue; then the responsible body after investigating reconnects the customer".

Table 8.20: Results for Q. 19: Overview of the Attention Paid to Clients

Question 19	**Do you pay attention to the internal and external customers**
Focused Coding	
1	There is a structure and tools to deal with clients
Theme	**The organisation has a visit team and certain procedures and methods for dealing with clients**

(Data Analysis)

In further exploring the implementation issues, interviewees were asked to state their opinion regarding as to whether global markets and competition motivates their organisation to implement TQM in order to have competitive advantage, and the findings are depicted in Table 8.21.

Table 8.21: Results for Q. 20: Overview of the Competitive Advantages of Adopting TQM

Question 20	**Do you think there is an effect on your organisation from global markets and competition regarding production, whether your organisation adopts TQM or not**
Focused Coding	
1	It is international direction
Theme	**The concern and attention of international market are currently all upon quality and TQM is an important quality initiatives.**

(Data Analysis)

[12] For internal customer, there are special boxes in different areas (based on departments) which allow customers to post their complaints, suggestions and comments to whom it may concern.
[13] Here 'internal customers' means the whole workforce of the organisation. In other words, they are treated as internal customers.

As can be noted from Table 8.21, there is only one theme established upon reviewing the responses. Based on the responses gathered TQM definitely has competitive advantages especially with regard to its effect on some oil products. It is also worthwhile noting that the current international market is concerned with quality and TQM is the last station of quality; in other words, it is the essence of quality. One such statement by interviewee 5 is in line with this, as he stated that "I do not know, but it is clear that all international organisations pay significant attention to being TQM organisations due to the fact that it improves entire operations and products in addition to helping to achieve any aim. In fact, quality becomes a part of any type of work".

Question 21 was related to the existence of a Quality Department. This question is considered important as it was able to help determine whether the oil and gas organisations are really concerned with quality. Table 8.22 illustrates the findings on this issue.

Table 8.22: Results for Question 21: Overview of the Existence of a Quality Department

Question 21	**Do you have Quality Department in your organisation?**
Focused Coding	
1	There are departments and committees in some organisations but not in others yet
Theme	**In some oil and gas organisations there are departments and committees devoted to quality; however in others they are still being established**

(Data Analysis)

Table 8.22 shows the responses received from respondents regarding the existence of a Quality Department in their organisation. Generally, the answers can be classified into one broad category; in some oil and gas organisations there are departments or committees devoted to quality; however they are still being established in the rest. The details provided for the sub-theme was further analysed through coding methods as follows:

Table 8.22.1: Focused Coding No. 1 for Q. 21: In some oil and gas companies there is a Quality Department or committee but not yet in others

There is departments and committees in some organisations and not yet in others	
Interviewee 3 & 5	Yes, there is Quality Department
Interviewees 7 & 9	Yes, there is committee devoted to quality
Interviewees 16 & 17	No, but we plan to launch a new department in the near future.

Table 8.22.1 shows the results gathered from the interviewees regarding the existence of a Quality Department. It shows that no unified answers were provided, as interviewees 3 and 5 stated that there is a quality department in their organisation,[14] which takes responsibility for dealing with quality issues. However, other organisations established committees in order to follow up and evaluate quality matters[15] as highlighted by interviewees 7 and 9. In addition, in some cases there was neither a quality department nor a committee dealing with quality. According to interviewees 16 and 17, their organisation intends to establish a body in the form of a department, unit or committee to help with quality issues in the near future. Thus, it is worth noting that there were clear differences between these organisations in terms of their real willingness and intention to adopt an approach to quality. However, as can be seen, majority of them were definitely going in the right direction and exerting extensive and significant efforts to be in line with quality programs.

Since training, research and awareness has been identified as one of the major obstacles in the implementation of TQM in the sampled organisation, the participants were asked if they offer any courses for such ends. The results are depicted in Table 8.23.

Table 8.23: Results for Q. 22: Overview of the Availability of Quality Courses within Oil and Gas Organisations

Question 22	**Does the Quality Department offer courses in order to educate and raise employees' awareness in order to help the management to apply quality in their own work**
Focused Coding	
1	There are very limited courses in relation to TQM
Theme	**Courses cover particular aspects of the organisation's activities, especially safety matters; however there are very limited courses in relation to TQM philosophy**

(Data Analysis)

Table 8.23 shows the results gathered from the interviewees regarding the availability of quality courses within oil and gas organisations. This shows that in most cases there are no specific courses in relation to TQM; the majority of courses provided cover or include aspects of quality. In addition, other courses provided, such as safety and security, involving some quality elements, as commented by interviewee 5 who stated that "there are courses about safety in closed spaces and other related courses,

[14] See appendix 4.4e for RASCO organisation structure.
[15] For example of quality committee see appendix 4.5d for SOC organisation structure.

but these courses do not cover all quality aspects; we need additional efforts to do so" Therefore, it is obvious that there is a lack of TQM courses across the sector in Libya.

In locating the issues in larger context, the participants were asked to state their opinions on as to whether there are effective local quality standards, for which the results are depicted in Table 8.24.

Table 8.24: Results for Q. 23: Overview of Local Quality Standards

Question 23	**Are there effective local quality standards?**
Focused Coding	
1	There are no effective local quality standards
Theme	**In this industry the organisations follow and utilise a number of international standards in relation to certain work due to the lack of local standards**

(Data Analysis)

As can be seen in Table 8.24, the interviewees articulated a number of statements summarised in the form that the majority of oil and gas based organisations follow and utilise a number of international standards in relation to certain work due to the fact that there are no local standards to be used. In supporting this view, interviewee 5 commented that "while there is a standard centre, unfortunately it does not play any role in controlling the quality of activities in our organisation and does not even provide us with information or any help". Hence, it is clear that no effective local standards are used across the oil and gas sector.

8.16. CONCLUSION

This chapter presented the results of the coding and thematic analysis conducted with the primary data gathered through semi-structured interviews. The aims of this chapter were to further explore the state of TQM through the perceptions of particular managers and determine the obstacles and barriers to the application of TQM. As the analysis so far indicates, these aims were satisfied together with an analysis of the key themes of the interviewees in relation to TQM. It is expected that the knowledge developed in this chapter can be useful in transferring the Libyan petro-chemical organisations from a traditional management style to a successful TQM organisation style and to assist in improving their performance, operations and competitiveness in the future.

In the next chapter, the analysis of the findings derived from the questionnaires and interviews are discussed in detail through an interpretative method.

Chapter 9

CONTEXTUALISING THE FINDINGS: AN INTERPRETATIVE DISCUSSION

9.1. INTRODUCTION

Chapters 6, 7 and 8 presented empirical analyses exploring the current state of TQM application and identifying obstacles to the effective implementation of TQM in Libyan oil and gas organisations. This chapter provides further discussion by examining the results in more detail using an interpretative method. In doing so, the findings of this study are contextualised within the existing body of knowledge but also in the 'bigger picture' specific to Libya. In doing so, the hypotheses developed but could not be presented due to space are tested in this chapter by drawing on evidence from the earlier empirical chapters.

With respect to the stated aims and objectives, this chapter is divided into three main sections. The first section consists of testing the hypotheses relating to the participants' levels of awareness and knowledge of quality, quality management techniques, importance and necessity of TQM. The second section tests the hypotheses related to the observed obstacles and barriers to TQM implementation, while the third section provides a summary of the chapter.

9.2. AWARENESS, UNDERSTANDING AND KNOWLEDGE: HYPOTHESES TESTING

Awareness, understanding and knowledge provide the fundamental basis for the success of any philosophy/program (Crosby, 1996). For the purpose of this research, awareness relates to whether the participants, working in Libyan oil and gas organisations, have the necessary understanding of quality as a concept and a process. It is expected that, under the normal circumstances, the majority of the respondents, being managerial categories in Libyan petro-chemical organisations, should be aware of and understand the concept of quality and its aspects and initiatives. It would

be useful here to reiterate the following objectives expected to be achieved in this part:

- to test the hypotheses related to the participants' levels of awareness of quality with the analyses provided so far;
- to test the hypotheses related to the participants' levels of knowledge about quality management techniques with the analyses provided so far;
- to test the hypotheses related to the participants' levels of understanding of the concept of TQM with the analyses provided so far;
- to test the hypotheses related to the participants' levels of awareness and understanding regarding the reason behind employing TQM within their organisation with the analyses provided so far;
- to test the hypotheses related to the participants' levels of awareness and understanding regarding TQM with the analyses provided so far.

In order to fulfil these objectives, the following hypotheses were formulated to be tested in this section:

Hypothesis 1: The majority of Libyan oil and gas organisations' *managerial categories* ***have appropriate level of awareness about quality.***

The descriptive analysis results in Table 6.7 in Chapter 6 show that most of the respondents have a fair level of awareness and knowledge regarding the meaning of quality. This can also be substantiated in the interview results in Table 8.2 in Chapter 8. Hence, the results suggest that the null hypothesis that the majority of Libyan oil and gas organisations' managerial categories have appropriate level of awareness regarding quality can be accepted.

It is important to note that the majority of the respondents chose definitions that reflected their perception of quality such as "quality is conformance to specification" and "quality is realized when client satisfaction is maximized because the service/ product fits its intended purpose/use". This confirms other definitions and matches the two ways that Juran describes quality as consisting of freedom from deficiencies and consisting of those product/service features that meet the needs and expectations of the customer and thus provide product/service satisfaction (Hoyer and Hoyer, 2001).

It is worth stating that quality awareness is the fundamental basis that facilitates the introduction of the related aspects and initiatives of quality easily and smoothly. Therefore, achieving an appropriate level of awareness and knowledge is essential in addressing any potential obstacles facing the process of TQM implementation.

The following sub-hypotheses have been developed to explore whether there are any significant differences in the levels of awareness and understanding of quality across the participants' sub-groups for each category. For the evidence for the relevant question in relation to the hypotheses is presented in Table 7.1, Chapter 7.

$H_{1\text{-}1}$: There is no statistically significant difference regarding the concept of awareness of quality across participants from oil and gas organisations.

Based on the results depicted in Table 7.1 in Chapter 7, the null hypothesis has to be accepted and the alternative hypothesis rejected, since the *p*-value is higher than the critical *p*-value of 0.05. This implies that there is no statistically significant difference regarding the level of quality awareness and understanding among the participants.

Some differences in participants' awareness of quality concepts would be expected considering their different positions and roles in each of the organisations in question. The descriptive findings in Chapter 6 demonstrate certain differences of awareness of quality among the participants; these differences however are proved to be insignificant. This could be attributed to the fact that their in-house training on the relevant issues is lacking and also perhaps critical thinking and approach in the work environment is missing within the existing organisational culture. With such differences, it would be normal to expect that regardless of their position and backgrounds, participants have more or less the same understanding level.

$H_{1\text{-}2}$: There is no statistically-significant difference regarding the concept of awareness of quality across various age groups within the sector.

As can be seen in Table 7.1., for the age category, the statistical results failed to reject the null hypothesis. This suggests that there is no statistically significant difference regarding the awareness of the concept of quality across various age groups within the sector.

$H_{1\text{-}3}$: There is no statistically significant difference regarding the concept of awareness of quality across various qualification profile groups within the sector.

Regarding the qualification category, the findings in Table 7.1 depict that at $\alpha = 0.05$, the null hypothesis is accepted, since the estimated *p*-value is much higher than the critical p-value. Hence, it is concluded that there is no statistically significant difference concerning the level of awareness and understanding of the concept of quality across various qualification profile groups within the sector.

$H_{1\text{-}4}$: There is no statistically-significant difference regarding the concept of awareness of quality across various position groups within the sector

At $\alpha = 0.05$, the null hypothesis is accepted, since the estimated *p*-value is lower than the critical value. Therefore, there is no statistically significant difference regarding the concept of awareness of quality across various position groups within the sector.

$H_{1\text{-}5}$: There is no statistically-significant difference regarding the concept of awareness of quality across various groups with different durations of experience within the sector

For the final hypothesis of this cluster, at $\alpha = 0.05$, the null hypothesis is accepted, since the estimated *p*-value is significantly higher than the critical *p*-value. Therefore, for the durations of experience category, there is no statistically significant difference regarding the concept of awareness of quality across various groups with different durations of experience within the sector.

In brief, as discussed in Section 7.2 (Chapter 7), no categories achieved statistical significance in this section, implying that there are no significant differences in terms of awareness and understanding in relation to quality across the various groups in each category. Nevertheless, quality may possibly mean different/specific things to different people. Some may take it to represent the products/services and client satisfaction, and others may interpret it as compliance with standards and requirements (Sun, 2000). It can be seen from Table 8.2 in Chapter 8 that participants had different understandings of the meaning of quality: some understood it as a high quality of process and outputs and also focused on customer and employee satisfaction, while others described it as conformity to specifications.

In addition, quality for some meant cost and time reduction, while others went further than that by including developing the organisation and human resources as an essence of quality. In fact, it is obvious that there is a degree of awareness and understanding of quality across the oil sector within the management level. However, the depth of this understanding is under investigation. The results in each category identified respondents from AGACO, aged 20-30 years those with higher academic qualifications, those working in top management position and those with 5-10 years of experience, as having a better awareness and understanding of quality.

Consequently, extended analysis was conducted in order to respond to Hypothesis 2, which considers the level of knowledge of the respondents who claimed to be aware of quality management techniques. The response for the main hypothesis is based on the results presented in Table 6.8 (Chapter 6). The core hypothesis and sub-hypotheses are as follows:

Hypothesis 2: The majority of Libyan oil and gas organisations' managerial categories have appropriate and fair level of knowledge about quality management techniques.

The frequency analysis depicted in Table 6.8 in Chapter 6, indicate that 81.7% of the respondents are familiar with the some quality management techniques suggesting that the null hypothesis, that the majority of Libyan oil and gas organisations' managerial categories have appropriate and fair level of knowledge about quality management techniques, can be accepted.

It is important to note that most of those who were familiar with quality management techniques mentioned IS0 9001/2000-2008 (approximately 60% of the total respondents). This is due to the fact that most of the oil and gas organisations obtained some ISO certificates, and as a result, a high percentage of oil sector managerial categories were familiar with this technique. This is substantiated by the interview results in Table 8.10 in Chapter 8, which show that about 70% of the managerial categories were aware of and familiar with this technique. However, other quality techniques were known by only around 22% of the total participants, whereas approximately 19% of them were not familiar with any of these techniques, as can be

observed from Table 6.8 in Chapter 6. These are quite surprising results which need to be considered further.

Next, further sub-hypotheses were formulated in order to explore which groups of respondents have better levels of awareness and knowledge. All results of the hypothesis testing are presented in Table 7.1 in Chapter 7. The hypotheses are as follows:

$H_{2\text{-}1}$: There is no statistically significant difference regarding the knowledge of quality management techniques across participants from oil and gas organisations.

At the identified $\alpha = 0.05$, the null hypothesis is rejected, since the K-W test results achieved a lower estimated *p*-value than the critical *p*-value. Consequently, the alternative hypothesis suggests that there is a statistically significant difference regarding the awareness and knowledge of quality management techniques across participants from oil and gas organisations. The result also indicates that members of AGOCO staff have a better level of awareness than other sampled companies' staff.

$H_{2\text{-}2}$: There is no statistically significant difference regarding the knowledge of quality management techniques across various age groups within the sector.

For this hypothesis, the result at $\alpha = 0.05$ suggests the acceptance of the null hypothesis, since the statement *p*-value is higher than the critical p-value. Thus, it can be determined that there is no statistically-significant difference regarding the awareness and knowledge of quality management techniques across various age groups within the sector

$H_{2\text{-}3}$: There is no statistically significant difference regarding the knowledge of quality management techniques across various qualification profile groups within the sector.

Similarly, for the qualification profile groups, the null hypothesis is accepted, since the estimated *p*-value is significantly higher than the critical *p*-value. Hence, it can be concluded that there is no statistically significant difference regarding the awareness and knowledge of quality management techniques across various qualification profile groups within the sector.

$H_{2\text{-}4}$: There is no statistically significant difference regarding the knowledge of quality management techniques across various position groups within the sector.

In this hypothesis at $\alpha = 0.10$, the null hypothesis is rejected and the alternative hypothesis is accepted, since the estimated *p*-value is lower than the critical *p*-value. Consequently, the results suggest a statistically significant difference regarding the awareness and knowledge of quality management techniques across various position groups within the oil and gas sector. In addition, the result also indicates that top management has a better level of awareness and knowledge compared to other position groups. This result, as part of the outcome of the questionnaire can be substantiated with the findings from the interviews, as Table 8.10 in Chapter 8 indicates that 70% of the participants are aware of the technique. The selected sample is considered as top management level.

$H_{2\text{-}5}$: There is no statistically significant difference regarding the knowledge of quality management techniques across various groups with different durations of experience within the sector.

As for the durations of experience category, the null hypothesis is rejected suggesting that the alternative hypothesis is accepted, since estimated *p*-value is significantly lower than the critical *p*-value. Thus, it can be concluded that statistically significant differences regarding the awareness and knowledge of quality management techniques across various groups with different durations of experience within the sector are established. It is worth noting that this result can be attributed to the fact that around 79% of the participants, as depicted in Table 6.5 in Chapter 6, have a Bachelor Degree or Higher Studies certification which allowed them to be in tune with new developments in science and with knowledge in general. In addition, the rules and procedures of most oil and gas organisations lead to the employment of those who at least have the appropriate level of education; this could explain why those with five years of experience or less have a better level of understanding.

According to the above sub-hypotheses testing, only two out of five null hypotheses are accepted and the remaining three are rejected. The three rejected hypotheses categories are organisation, position, and duration of experience, whereas the accepted null hypotheses are related to the age and qualification categories. As

discussed earlier, in Chapter 7, a significant level of awareness and knowledge can be seen with regard to AGACO in top management position, and experience period of five years or less. The researcher has categorized these groups of respondents as the managers who should have a better level of awareness and knowledge of the subject matter.

Hypothesis 3 was formulated with the objective of determining the overall knowledge and understanding of the oil and gas organisations' managerial categories of the concept of TQM. As stated, the majority of the managerial categories would be expected to understand it. The key hypothesis and sub-hypotheses to be tested are as follows:

Hypothesis 3: The majority of Libyan oil and gas organisations' managerial categories have appropriate and fair level of understanding of the concept of TQM.

The results in Table 6.9 (Chapter 6) were used in responding to this hypothesis, and suggest that the vast majority of the respondents have a general awareness of the concept of TQM. This further strengthens the findings from the analysis of interviews as depicted in Table 8.4 in Chapter 8, suggesting that the null hypothesis that the majority of the Libyan oil and gas organisations' managerial categories have an appropriate and fair level of awareness of the concept of TQM, can be accepted. Nevertheless, the depth of the understanding is still deemed to be low, as can be seen in the analysis of the interviews in Table 8.9 in Chapter 8, which shows that 85% of the participants were not familiar with any quality management models. This is reflected in the fact that their understanding in relation to TQM is clearly superficial, therefore additional efforts are needed in order to raise and extend the depth of the understanding. The findings in this study seem to mirror the outcomes of Wong and Fung (1999) that the implementation of many quality programs in developing countries failed owing to the lack of understanding of quality management (QM). It should be noted that the concept of TQM are well-understood and widely practiced in Japan, Europe, and North America and the growing economies of East Asia; nevertheless, some organisations have experienced difficulties and obstacles in implementing TQM effectively and successfully (Krygier, 1993).

Consequently, the following sub-hypotheses were tested to find out whether there is any statistically significant difference in the level of TQM understanding across various groups of respondents. The results of the testing for each individual hypothesis are presented in Table 7.1 in Chapter 7.

$H_{3\text{-}1}$: There is no statistically significant difference regarding the understanding of the concept of TQM across participants from oil and gas organisations.

At the significance level of $\alpha = 0.05$, the null hypothesis is accepted, suggesting that there is no statistically significant difference regarding the understanding of the concept of TQM across participants from oil and gas organisations.

$H_{3\text{-}2}$: There is no statistically significant difference regarding the understanding of the concept of TQM across various age groups within the sector.

As regards the understanding of TQM across various age groups, at $\alpha = 0.05$, the null hypothesis is accepted, since the estimated *p*-value is higher than the critical *p*-value. Consequently, it is found that there is no statistically significant difference regarding the understanding of the concept of TQM across various age groups within the sector.

$H_{3\text{-}3}$: There is no statistically significant difference regarding the understanding of the concept of TQM across various qualification profile groups within the sector.

The result of the Kruskal-Wallis test at $\alpha = 0.05$ failed to reject the null hypothesis. Thus, the result confirms the null hypothesis that there is no significant difference regarding the understanding of the concept of TQM across various qualification groups within the sector.

$H_{3\text{-}4}$: There is no statistically significant difference regarding the understanding of the concept of TQM across various position groups within the sector.

The result of the Kruskal-Wallis test confirms the null hypothesis that there is no significant difference regarding the understanding of the concept of TQM across various position groups within the sector.

$H_{3\text{-}5}$: There is no statistically significant difference regarding the understanding of TQM concept across various groups with different durations of experience within the sector.

Testing for this hypothesis concluded that there is no significant difference regarding the understanding of the concept of TQM across various groups with different durations of experience within the sector. However, as discussed in detail in section 7.2 in Chapter 7, a higher level of understanding concerning the subject matter can be seen for groups from AGACO aged above 60, those who have Baccalaureate degree, those in top management positions and those who have five years or less of experience. These groups scored a higher mean value, which indicates that they have a better level of understanding compared to the other groups within each category.

Although the findings generally show that there was a degree of awareness of the concept of TQM, participants still fell short in terms of their levels of understanding regarding the subject matter. This situation to some extent seems to mirror the outcomes of Lewis (1992) who found no difference between Spanish and American quality managers, which was traced back to their common lack of awareness and knowledge regarding TQM.

Although the philosophy of TQM has been in operation for more than 15 years in the Libyan business environment, it is in fact quite alarming to realise that the level of awareness and understanding among managerial categories is still deemed as relatively low. This confirms that there is still a plenty of work to be done and huge efforts need to be made in the education and training process. However, one of the most critical and essential challenges to the organisations is to provide all staff with a comprehensive awareness and understanding of TQM (Schmoker and Wilson, 1993). Therefore the findings suggest that the gap in awareness and understanding that exists within the sector should be improved and addressed; the most effective and successful immediate action that can be taken is an education and training process stemming

directly from heads/executive managers of oil and gas organisations with the cooperation of their owners.

Hypothesis 4, therefore, was formulated to further determine the overall awareness and understanding of the oil and gas organisations' managerial categories of the reason for employing TQM within their organisations. As highlighted, the majority of managerial categories would be expected to be aware of and understand the reason behind it. The core hypothesis and sub-hypotheses for testing are as follows:

Hypothesis 4: The majority of Libyan oil and gas organisations' managerial categories have appropriate and fair level of awareness and understanding regarding the reason behind employing TQM within their organisation.

The results in Table 6.10 in Chapter 6 validate the hypothesis that the majority of Libyan oil and gas organisations' managerial categories has an appropriate and fair level of awareness and understanding regarding the reason behind employing TQM within their organisation. Therefore, it can be concluded that in general the managerial categories of the sampled organisations have an acceptable and fair level of knowledge and understanding of the necessity and importance of adopting TQM. This is supported by the evidence provided from the interview findings in Tables 8.7 and 8.11 in Chapter 8.

According to these findings there are a number of benefits in TQM, among them, a reduction in the cost, time, efforts and risks of entire organisational process, as well financial benefits, continuous improvement, enhancing the reputation of the organisation and achieving customer and employee satisfaction and, in addition, achieving all organisational objectives through the maximum utilization of available resources and raising levels of performance within safe and secure conditions. All these can be considered as reasonable justification for employing the philosophy. Nevertheless, the researcher is of the opinion that further explanations and illustrations need to be carried out in order to strengthen and consolidate current perceptions and expectations concerning the subject matter. In addition, an understanding of the 'big picture' needs to be provided and help to reflect on these benefits by incorporating it into everyday practice would be the best way of doing so.

The following sub-hypotheses were, therefore, formulated in order to discover whether there are any significant differences across various groups in the five control variables. The results of the hypotheses testing can be referred to in Table 7.1 in Chapter Seven.

$H_{4\text{-}1}$: There is no statistically significant difference regarding the reason behind employing TQM across participants from oil and gas organisations.

For the first hypothesis, the result of the Kruskal-Wallis test suggests that the null hypothesis is to be rejected in favour of the alternative hypothesis. Hence, it can be stated that, statistically, there is a significant difference regarding the reason behind employing TQM across participants from oil and gas organisations.

$H_{4\text{-}2}$: There is no statistically significant difference regarding the reason behind employing TQM across various age groups within the sector.

The result of the Kruskal-Wallis test failed to reject the null hypothesis. Thus, the result confirms the null hypothesis that there is no significant difference regarding the reason behind employing TQM across various age groups within the sector.

$H_{4\text{-}3}$: There is no statistically significant difference regarding the reason behind employing TQM across various qualification profile groups within the sector.

For this hypothesis, the testing results were unable to reject the null hypothesis, meaning that there is no significant difference regarding the reason behind employing TQM across various qualification profile groups within the sector.

$H_{4\text{-}4}$: There is no statistically significant difference regarding the reason behind employing TQM across various position groups within the sector.

The results suggest that the alternative hypothesis is rejected in favour of the null hypothesis, indicating that there is no significant difference regarding the reason behind employing TQM across various position groups within the sector.

$H_{4\text{-}5}$: There is no statistically significant difference regarding the reason behind employing TQM across various groups with different durations of experience within the sector.

The results of the Kruskal-Wallis test for this hypothesis suggest that there is a significant difference regarding the reason behind employing TQM across various groups with different durations of experience within the sector. This implies that the alternative hypothesis should be accepted.

Unlike the outcomes in the preceding hypothesis cluster, in this case, the results, which attained the statistically-significant value, can only be seen in two of the categories, namely 'organisation and 'experience. As discussed in detail in Chapter 7, the groups which show a higher level of understanding based on higher mean value can be seen to be those groups who work in AGACO and those who have experience of 11-15 years. On the other hand, the results for the three remaining categories, namely age, qualification and position, suggest that there are no significant differences in terms of awareness among these groups. In this case, the researcher has classified groups from the 31-40 age group, those who have a relatively low level of education (secondary certificate or equivalent) and those from the middle management position as groups who have better awareness of the reason behind employing TQM in their organisations.

The preceding findings suggest that there is an acceptable level regarding the awareness of the reason for employing TQM among the managerial categories. Consequently, the following hypotheses intend to find out whether the managerial categories are aware and understand the real meaning of TQM accurately and in depth. All results of the hypotheses testing are available in Table 6.11 in Chapter 6 and Tables 7.2 and 7.20 in Chapter 7.

Hypothesis 5: The majority of Libyan oil and gas organisations' managerial categories have appropriate and fair level of awareness and understanding regarding TQM

The response for hypothesis 5 was based on the analysis results presented in Table 6.11 in Chapter 6. All the results for the relevant questions, as is evident from the table, suggest that the null hypothesis is rejected. This means that the majority of Libyan oil and gas organisations' managerial categories do not have an appropriate and fair level of awareness and understanding regarding TQM, which could have detrimental results on the performance of the companies in question.

In addition, knowledge of TQM, according to the literature review, is most important in order to overcome obstacles in the implementation process. In this regard, the findings of this study are similar to those found by Lewis (1992), Does *et al*. (1997), Al-Kahalifa and Aspinwall (2000) and Wong and Fung (1999). In support of these, the interview results indicated that there are no real indications of how well the TQM principles were understood and in some cases what TQM means. This in fact suggests limited potential and possible learning opportunities to develop the understanding and knowledge aspects of TQM.

In line with this result, it can be argued that providing the whole workforce with appropriate and comprehensive understanding and knowledge is considered a crucial task and challenge for many organisations (Alpert *et. al*, 1993). In this regard, managerial categories in oil and gas companies needs to urgently develop their managerial abilities and understanding concerning TQM due to their responsibilities and roles. This could be done with continuous improvement of an ongoing education and training process. Knowledge of what TQM is should be the first step towards implementing it successfully. Therefore, establishing a structure and plans that assist and provide the staff with the required awareness and knowledge would be the best way of addressing the existing gap in the understanding and knowledge of TQM.

It should be noted, however, that regardless of the results presented here, there is in fact a certain degree of understanding among the participants in relation to the subject. However, practically, that knowledge is not sufficient to be considered adequate to achieve successful implementation. It is important to point out that according to Juran and Godfrey (1999) there are a number of obstacles preventing quality improvement in developing countries, one of which was found to be inadequate knowledge. The results of this study thus verify Juran and Godfrey (1999).

In order to investigate which groups of managerial categories have better awareness and understanding of the subject matter, the following sub-hypotheses were formulated. Again, for this analysis, Kruskal-Wallis tests were used. The results of the tests are depicted in Tables 7.2 and 7.20 in Chapter 7, which cover all of the following hypothesis testing.

$H_{5\text{-}1}$: There is no statistically significant difference regarding the awareness and understanding of TQM across participants from oil and gas organisations.

The result proves that the null hypothesis is accepted, which suggests that there is no statistically-significant difference regarding the awareness and understanding of TQM across participants from oil and gas organisations.

$H_{5\text{-}2}$: There is no statistically significant difference regarding the awareness and understanding of TQM across various age groups within the sector.

As for the age category, the statistical results fail to reject the null hypothesis, which suggests that, statistically, there is no significant difference regarding the awareness and understanding of TQM across various age groups within the sector.

$H_{5\text{-}3}$: There is no statistically significant difference regarding the awareness and understanding of TQM across various qualification profile groups within the sector.

For this category, the null hypothesis is accepted, and it is concluded that there is no significant difference regarding the awareness and understanding of TQM across various qualification profile groups within the sector.

$H_{5\text{-}4}$: There is no statistically significant difference regarding the awareness and understanding of TQM across various position groups within the sector.

As for position group category, the results did not achieve the statistical significance needed in order to reject the null hypothesis. Therefore, it can be concluded that there is no significant difference regarding the awareness and understanding of TQM across various position groups within the sector.

$H_{5\text{-}5}$: There is no statistically significant difference regarding the awareness and understanding of TQM across various groups with different durations of experience within the sector.

For this final category, the test results confirm the null hypothesis, which means that there is no significant difference regarding the awareness and understanding of TQM across various groups with different durations of experience within the sector.

As discussed in Sections 7.3 and 7.7 in Chapter 7, there are no statistically significant differences at $\alpha = 0.05$ regarding the awareness and understanding of TQM across the variables. However, a significant level of awareness and understanding can be seen in favour of RASCO, and with participants over 60 years of age, with a degree of baccalaureate level, at the top management and experience of 30 years or above. The researcher has categorized these groups of respondents as the managerial who had a better level of awareness of the subject matter.

As is evident from the overall outcomes of the findings of this section, the awareness levels of the participants regarding quality, quality management techniques, the necessity of TQM and the concept of TQM are considered to be acceptable. However, regarding the understanding and knowledge of TQM, the current study found that the level of knowledge was below that which was expected. Therefore, high level managerial categories should strongly encourage employees and their middle and first line managers to be involved in TQM programs and enhancement tasks and activities, as well as paying more attention to employees' needs and suggestions, and take responsibility for staff's actions. In addition, employees must not feel excluded from involvement in day-to-day decision-making and other related activities due to the fact that TQM is a culture matter which should include all employees of any organisation. Hence, in-house training and education is one of the main contributing factors that could improve the level of awareness and understanding among the staff.

9.3. POSSIBLE OBSTACLES AND BARRIERS TO THE IMPLEMENTATION OF TQM: HYPOTHESES TESTING

As mentioned in Chapter 3, there are various difficulties and obstacles related to the implementation process of TQM across many organisations throughout the world. In investigating these in the case of Libya with the sampled organisations, the questionnaire listed a number of such obstacles taken from the literature that could be expected in the case of Libya as well; these difficulties and barriers might have a negative influence on its efficient and effective application. As stated earlier in Chapter 1, one of the key objectives of the current study is to explore, identify and analyse these difficulties and barriers that could affect the implementation of TQM in the sampled organisations. Therefore, participants in this study were presented with statements, which were thought to address this subject in order to determine their

opinions and perceptions of the existence and effects of each obstacle in their organisation. As a result, the core aim of this section is to explore the existence and impacts of the 14 determined obstacles extracted from the literature, which could represent particular barriers to the TQM implementation process.

In response to the stated objective the following hypotheses were constructed.

Hypothesis 6: There are many possible obstacles and barriers to the successful and effective application of TQM from the majority of Libyan oil and gas organisations' managerial categories perspectives.

Regarding hypothesis 6, the examination and testing process is carried out later at the end of this chapter. As the results of testing of the subsequent hypotheses constitute and formulate the answers for the hypothesis 6.

9.3.1. Top Management and Leadership Commitment: Hypothesis Testing

Hypothesis 7: The majority of Libyan oil and gas organisations' managerial categories considered top management and leadership commitment to be an obstacle to the successful and effective application of TQM across the oil and gas sector.

As can be seen from the results in Table 6.12 in Chapter 6, the majority of Libyan oil and gas organisations' managerial categories ***did*** not consider top management and leadership commitment as an obstacle to the successful and effective application of TQM across the oil and gas sector. Therefore the alternative hypothesis should be accepted. This result can be substantiated from the results presented in Table 8.4 in Chapter 8, which shows that there is, to some extent, a degree of willingness and desire to achieve TQM by top management and leaders. However, as indicated in Table 8.4.5 in Chapter 8, they experienced barriers such as lack of awareness and knowledge regarding the concept of TQM and its benefits and importance across management levels. Specifically and to clarify, according to Table 6.12 in Chapter 6 in particular questions 20 and 21, almost half of the respondents indicated that top management and leaders were considered to be obstacles to successful TQM implementation.

Although, the null hypothesis was rejected, this does not negate the fact that top management and leaders' commitment is a real barrier to TQM. For this purpose, overall mean analysis was conducted and the results can be seen in Table 7.3 in Chapter 7. It is important to note that, based on the mean value test, the top management and leaders' commitment ranked tenth, the outcomes depicted that the overall mean for the existence of problems is 2.441 (out of 5). This indicates that there was an agreement concerning the existence of the identified obstacle. However, practically, it is almost impossible to determine the border and scope of each obstacle or even to specify where the influences of this obstacle start and end. In fact, oil and gas companies still lack a certain amount of commitment from top management, which is considered an answer as to why TQM could not be implemented in its entirety. The findings demonstrate that almost half the respondents agreed that lack of management commitment is one reason for the failure of TQM. This finding is consistent with those of Brown *et al*. (1994), Al-Zamany *et al*. (2002) and Schein (1989) who stated that lack of top management commitment was a barrier to many companies in the AQC.

The lack of managerial commitment in Libyan oil and gas companies is perhaps attributable to a lack of TQM understanding and knowledge. Wong and Fung (1999) and Yusof and Aspinwall (2000), in their respective case studies, found lack of communication and vision of TQM, and Hackman and Wageman (1995) stated that lack of a shared vision is a barrier to the implementation of TQM in many organisations. This can be substantiated by Table 8.12.3 in Chapter 8, as the respondents mentioned that there is no clear, official, written guidance regarding TQM. In relation to such a problem, Dale *et al*. (1994) stated that without the total commitment of top management and other lines of organisation managers the result of the projects/programmes would be insufficient and nothing would be accomplished. This confirms the fact that most of the problems and difficulties associated with quality initiatives are attributed to management, as also argued by Juran (1974).

It is well-documented in the literature that to be successful in the implementation of TQM, it is important to involve all members in it, in particular top management and leaders. The commitment of management and leaders is crucial and fundamental to support what the TQM requires; this includes changing management and changing

responsibilities and setting up objectives, procedures and policies. It is also emphasised in the literature that no TQM program can succeed if the top management and leaders are not willing and committed to adopting the concept of TQM. However, in the case of the sampled Libyan organisations, there seems to be a lack of leadership found by this study, which is in fact in line with the study conducted by Quazi *et al*. (2002), who stated that in many organisations lack of leadership was a barrier to implementation of ISO 9000.

In fact these difficulties in general and the lack of commitment of those managerial categories might be attributed to the system of promoting directors and managers which in some cases is not based on qualifications, with the possible outcome that the wrong people are employed in certain positions. Indeed, this situation is a common cultural barrier influencing the TQM implementation process. On the other hand, it is quite difficult to change and address, in a short time, such existing traditional systems. Therefore, managerial categories usually do not accept any comments, notes and suggestions from their employees, preferring to concentrate on the existing system and objectives. Therefore, clear policies, rules and structures need to be employed as a strong leadership approach from management is the only way forward.

The following sub-hypotheses were framed in order to determine whether there are significant differences across various groups of the control variables. The outcomes of the hypotheses testing can be referred to in Tables 7.4 and 7.20 in Chapter 7.

$H_{7\text{-}1}$: There is no statistically significant difference regarding top management and leadership as an obstacle to the successful and effective application of TQM across participants from oil and gas organisations.

The inferential test in Table 7.20 in Chapter 7 at $\alpha = 0.05$, shows an insignificant result confirming that there is no significant difference in considering top management and leadership as an obstacle to the successful and effective application of TQM across participants from oil and gas organisations. Thus, the result does not reject the null hypothesis.

$H_{7\text{-}2}$: There is no statistically significant difference regarding top management and leadership as an obstacle to the successful and effective application of TQM across various age groups within the sector.

The statistical test in Table 7.20 reveals that there is a significant difference in considering top management and leadership as an obstacle to the successful and effective application of TQM across various age groups within the sector. This implies that there is significant difference in the age category in favour of the younger generation who were expected to have various perceptions and opinions regarding the role of top management whether they are committed or not. According to Table 7.19, the most frequently significant control variable in this study is age category.

$H_{7\text{-}3}$: There is no statistically significant difference regarding top management and leadership as an obstacle to the successful and effective application of TQM across various qualification profile groups within the sector.

Statistical analysis depicted in Table 7.20 in Chapter Seven, at a 95% confidence level, shows that there is no significant difference regarding top management and leadership as an obstacle to the successful and effective application of TQM across various qualification profile groups within the oil sector. Therefore, the Kruskal-Wallis test failed to reject the null hypothesis.

$H_{7\text{-}4}$: There is no statistically significant difference regarding top management and leadership as an obstacle to the successful and effective application of TQM across various position groups in each organisation within the sector.

For the position category, the statistical analysis similarly shows that there is no significant difference regarding top management and leadership as an obstacle to the successful and effective application of TQM across various position groups in each organisation within the sector. The results suggest that the alternative hypothesis should be rejected in favour of the null hypothesis.

$H_{7\text{-}5}$: There is no statistically significant difference regarding top management and leadership as an obstacle to the successful and effective application of TQM across various groups with different durations of experience within the sector.

As the results indicate, at $\alpha = 0.05$, there is no significant difference regarding top management and leadership as an obstacle to the successful and effective application of TQM across various groups with different durations of experience within the sector. This implies that the null hypothesis is accepted.

The findings in this section further add value to previous similar studies by confirming that quite a large number of Libyan oil and gas managers at different levels consider top management and leaders' commitment as a real and important obstacle to the application of TQM within the Libyan oil and gas sector. As for the sub-hypotheses, the outcomes demonstrate that four out of the five null hypotheses related to the organisations, qualification, position and experience category are accepted.

The results from the statistical tests (see Table 7.20) in this section show that those who work in RASCO, had Baccalaureate qualification, held administrative appointments and had less than five years of experience had differing opinions and perceptions regarding whether top management and leaders are an existing barriers within their organisation.

It can be understood that the respondents from the stated categories were freer to express their opinions than other groups; as can be observed they had appropriate educational backgrounds and they were in a good position to judge because they tended to be closer to the employees than actual managers. As a result, they were more or less able to avoid bias leading them to support the alternative hypotheses in various cases.

9.3.2. Organisational Culture: Hypothesis Testing

Hypothesis 8: The majority of Libyan oil and gas organisations' managerial categories considered organisational culture an obstacle to the successful and effective application of TQM across the oil and gas sector.

In response to this hypothesis, the frequency analysis results presented in Table 6.13 in Chapter 6 are used. They suggest that the alternative hypothesis is to be rejected, since the majority of respondents agreed with the provided statements that supported the argument of the existence of the organisational culture as a barrier to TQM. This result is in line with the researcher's expectation, since most of the TQM literature states that organisation culture is, among others, an obstacle to the successful TQM process in many organisations throughout the world. For further evidence, overall mean analysis was employed and the outcomes can be observed in Table 7.3 in Chapter 7. It is interesting to note that, based on the mean value test, the

organisational culture variable ranked seventh; the outcomes depicted that the overall mean for organisational culture as a barrier is 2.575 (out of 5). This indicates that there was agreement concerning organisational culture being an obstacle.

It should be noted that it is also widely argued in the literature that appropriate culture is crucial for quality initiatives to be successful, as stated by Deming (1986), Juran (1974, 1986, 1988 and 1989) and Crosby (1979, 1992 and 1996). Furthermore, Vanisina (1990), Dale (1999) and Farid and Wahba (2004) expressed a similar view that organisational culture obstacles are the most important obstacles to overcome in order to drive the organisation towards successful implementation of TQM. The findings of this research are in line with those in the literature by Kirkptrick (1985), Triandis (1990), Berry (1990), Hofstede (1980 and 1991), Kamensky (1996), Tata and Prasad (1998), Cameron and Quinn, 1999), Claver *et al.* (2000), Oakland (2000), Riley *et al.* (2001) Low *et al.* (2000) and Kumar (2006).

It is worthwhile mentioning that bureaucratic culture is prevalent in the Libyan oil and gas organisation as is evident from Tables 8.13.3, 8.13.4 and 8.14.3 in Chapter 8. One particular problem that was highlighted is that external and internal intervention can result in people moving across in oil and gas organisations to different positions and jobs without any rationale or reason. In addition, until recently 'socialism', dominated Libyan economic policy and management style and should be considered as a reason for the existing ineffective organisational culture. Furthermore, oil and gas organisations still seem to manage and to run their operations according to a traditional style of management, which may not follow specific job definitions and rationale appointments, as patronage system played an important role in the running of organisations so far in Libya.

Since organisational culture also includes teamwork, lack of real teamwork was established in the sampled organisations concerned, as evident in Table 6.20 in Chapter 6. Such reasons should be considered as factors creating a bureaucratic culture across the oil sector, as identified by the respondents' responses. Thus, it can be concluded that a lack of full understanding and knowledge of TQM would result in further difficulties within the existing culture, which in turn, would result in resistance to change. Therefore, serious planned efforts need to be framed and employed in order to address such obstacles. In addition, communication channels between

management and employees must be activated and the roles of managers must be fully identified. Furthermore, the negative perceptions and attitudes of employees towards TQM implementation must be eliminated as this also creates a major hindrance forming a culture barrier.

Moreover, as highlighted in the interview analysis in Tables 8.5, 8.5.1 and 8.5.2 in Chapter 8, some of the employees have difficulty in understanding the meaning and requirements of TQM, which may not help in the development of organisational culture. Thus, this issue needs to be considered.

It is interesting to investigate the findings further to identify whether there is a statistically significant difference in terms of considering organisation culture as a barrier to the implementation of TQM within the oil sector. Consequently, in order to fulfil the aim, the following sub-hypotheses were formulated. Kruskal-Wallis tests were employed and the results of the testing and details of the discussion of the findings can be found in Table 7.20 in Chapter Seven.

$H_{8\text{-}1}$: There is no statistically significant difference regarding organisational culture as an obstacle to the successful and effective application of TQM across participants from oil and gas organisations.

The estimated *p*-value 0.105 suggests that the null hypothesis is to be accepted, which implies that there is no significant difference regarding whether organisational culture is considered to be an obstacle to the successful and effective application of TQM across participants from oil and gas organisations.

$H_{8\text{-}2}$: There is no statistically significant difference regarding organisational culture as an obstacle to the successful and effective application of TQM across various age groups within the sector.

At $\alpha = 0.05$, the result from Table 7.20 suggests that the alternative hypothesis is to be rejected in favour of the null hypothesis, as the estimated p=0.589. Thus, it can be concluded that there is no statistically significant difference regarding whether organisational culture is seen as an obstacle to the successful and effective application of TQM across various age groups within the sector. It should be noted that with

relaxing the criteria to α = 0.10, then it might be possible to accept the alternative hypothesis.

$H_{8\text{-}3}$: There is no statistically significant difference regarding organisational culture as an obstacle to the successful and effective application of TQM across various qualification profile groups within the sector.

For this hypothesis, the estimated p=0.784 results in rejecting the null hypothesis, meaning that there is no significant difference regarding whether organisational culture is seen as an obstacle to the successful and effective application of TQM across various qualification profile groups within the sector.

$H_{8\text{-}4}$: There is no statistically significant difference regarding organisational culture as an obstacle to the successful and effective application of TQM across various position groups in each organisation within the sector.

The result from Table 7.20 with estimated p= 0.471 indicates that the alternative hypothesis is rejected, which suggests that there is no significant difference in whether organisational culture is seen as an obstacle to the successful and effective application of TQM across various position groups in each organisation within the sector.

$H_{8\text{-}5}$: There is no statistically significant difference regarding organisational culture as an obstacle to the successful and effective application of TQM across various groups with different durations of experience within the sector.

At 95% confidence level, the result of p=0.453 confirms the null hypothesis that, statistically, there is no significant difference in whether organisational culture is seen as an obstacle to the successful and effective application of TQM across various groups with different durations of experience within the sector.

As discussed in Section 7.7 in Chapter 7, groups of respondents who seem to differ in their opinions regarding whether they consider organisational culture to be a real barrier to TQM come from SOC as organisation, are those aged 51-60, those who hold a Secondary Certificate or equivalent, those who work as top management and those who have 30 years of experience or more.

It is beneficial to state that new culture is a fundamental TQM requirement, in particular within the organisation in question. Therefore, to achieve the best result from TQM implementation, a particular TQM culture should be built with the cooperation and collaboration of management and should include teamwork, an open system, organisational learning support, focus on the customer and involve all aspects of the organisation. In other words, the organisation's culture needs to be extensively considered.

9.3.3. Employee Involvement and Empowerment: Hypothesis Testing

Hypothesis 9: The majority of Libyan oil and gas organisations' managerial categories considered employee involvement and empowerment to be an obstacle to the successful and effective application of TQM across the oil and gas sector.

The results in Table 6.14 in Chapter 6 show that some of the respondents indicated that employee involvement and empowerment is deemed as an obstacle to the successful and effective application of TQM across the oil and gas sector; this suggests that the null hypothesis is rejected. However, the result supports the argument that there is no comprehensive and effective involvement of all employees as such. In other words, there is a lack of involvement and participation of employees. As managers explained, the workers feel that TQM systems are difficult to learn and implement, which can be further evidenced from the results depicted in Tables 8.5, 8.5.1 and 8.5.2 in Chapter 8.

In support of this, this study found that a lack of employee involvement and empowerment prevents the successful and effective application of TQM across the oil and gas sector. This result relates to other studies such as Werther (1981), Ishikawa (1985), Cotton (1993), Morgan and Murgatroyd (1994), Ludwig-Baker (1999) and Hoyle (2001).

As demonstrated in the interview analysis in Table 8.13.4 in Chapter 8, in some cases no proper organisational structure has been established to assist TQM implementation in Libyan oil and gas companies. The organisational structure in certain Libyan oil and gas companies was still centralised, which in practice inhibited the management from involving and engaging employees in decision-making, due to which most management levels feel that they have to follow the hierarchical structure in dealing

with lower level employees. This is evidenced from Tables 8.13 and 8.13.2 in Chapter 8. It is worth mentioning that some of the interviewees' responses stated that involvement of employees in decision-making in teamwork and in solving problems was possibly not happening due to the traditional management style, regulations, fear of losing positions of power and lack of trust in the employees.

Furthermore, most of the oil and gas organisations managers are of the opinion that the majority of tasks need a greater level of skills and very knowledgeable employees. However, the stated reasons are not put into practice. In this regard, Crosby (1999) stated that the primary asset of any organisation is its employees, nevertheless, many managers around the world do not realise this fact. In addition, Crosby (1999) went on to say that the same equipment and materials could be available for all competitors, but one thing cannot be the same and that is the workforce. Therefore, managers in the selected organisations must motivate, reward and encourage their employees, as well as making them feel a part of their organisation. For this purpose, mean analysis conducted in Table 7.3 in Chapter 7 provides evidence. The results, hence, demonstrate that the top management and leaders' commitment ranked tenth, and that the outcomes depicted that the overall mean for considering employee involvement is 2.441 (out of 5), which indicates an agreement concerning the existence of the identified obstacle.

Subsequently, the following sub-hypotheses were formulated with the purpose of analysing whether there are any significant differences across control variables within the petro-chemical organisation. In this analysis, Kruskal-Wallis tests were employed to provide meaningful results. The outcomes for each tested hypothesis are presented in Table 7.20 in Chapter 7.

$H_{9\text{-}1}$: There is no statistically significant difference regarding employee involvement and empowerment as an obstacle to the successful and effective application of TQM across participants from oil and gas organisations.

The result from Table 7.20 (Chapter 7) suggests that the null hypothesis is accepted, which implies that there is no significant difference regarding employee involvement and empowerment as an obstacle to the successful and effective application of TQM across participants from oil and gas organisations.

$H_{9\text{-}2}$: There is no statistically significant difference regarding employee involvement and empowerment as an obstacle to the successful and effective application of TQM across various age groups within the sector.

At α = 0.10, the Kruskal-Wallis test in Table 7.20 for this category yielded a significant result (p=0.093); consequently the null hypothesis cannot be accepted. Hence, it can be concluded that there is a significant difference regarding employee involvement and empowerment as an obstacle to the successful and effective application of TQM across various age groups within the sector. The results are in favour of the 20-30 years age group.

$H_{9\text{-}3}$: There is no statistically significant difference regarding employee involvement and empowerment as an obstacle to the successful and effective application of TQM across various qualification profile groups within the sector.

For this category, the estimated p=0.356 suggests that acceptance of the null hypothesis, which states that there is no significant difference regarding whether employee involvement and empowerment is considered to be an obstacle to the successful and effective application of TQM across various qualification profile groups within the sector.

$H_{9\text{-}4}$: There is no statistically significant difference regarding employee involvement and empowerment as an obstacle to the successful and effective application of TQM across various position groups in each organisation within the sector.

Similar results at critical p-value of 0.05 can also be seen in this category, where the null hypothesis is accepted owing to an insignificant Kruskal-Wallis test results. Therefore, it can be concluded that there is no significant difference regarding employee involvement and empowerment as an obstacle to the successful and effective application of TQM across various position groups in each organisation within the sector

$H_{9\text{-}5}$: There is no statistically significant difference regarding employee involvement and empowerment as an obstacle to the successful and effective application of TQM across various groups with different durations of experience within the sector.

In the final category, as the results did not reach the level of statistical significance, the null hypothesis is accepted. Hence, it can be concluded that there is no significant difference regarding whether employee involvement and empowerment is considered to be an obstacle to the successful and effective application of TQM across various groups with different durations of experience within the sector.

In overall, unlike the outcomes in the preceding hypothesis cluster, in this part only the age category attained the statistically significant value. As discussed in Chapter 7, for the four remaining categories, namely organisation, qualification, position and experience did not show any significant differences among the groups in the respective categories. In this case, the researcher has classified groups from AGACO, who have a relatively high level of education background (Baccalaureate), those from the top management position and those who have 30 years of experience or above as groups who differ in their opinions concerning whether they consider employee involvement and empowerment as an obstacle to the successful and effective application of TQM.

As a result of the discussion in section 6.4.3 in Chapter 6, employees must be empowered to implement quality improvement efforts, encouraged to play an important role in improving TQM, be involved in management decisions and activities, have clearly-identified quality objectives and also be given a share of work responsibilities. It is worth mentioning that the true essence of any type of organisation is simply its people at all levels, therefore people with full involvement and empowerment will benefit any organisation (Hoyle, 1994). Thus, all organisations must help to push its employees to use their abilities, starting with encouraging them by keeping individuals and groups involved at all levels.

9.3.4. Employee Resistance to Change: Hypothesis Testing

Hypothesis 10: The majority of Libyan oil and gas organisations' managerial categories considered employee resistance to change to be an obstacle to the successful and effective application of TQM across the oil and gas sector.

The response for hypothesis 10 was based on the findings shown in Table 6.15 in Chapter 6. Most of the results for the relevant questions, as is evident from the table, suggest that the null hypothesis is rejected. This implies that some Libyan managerial

categories regard resistance to change as an obstacle to the successful and effective application of TQM across the oil and gas sector. However, the findings in the table demonstrated that around 62.5% of the respondents indicated that they agree that they do not resist changes. Nevertheless, employees' resistance to change is still an issue across the sector which needs to be addressed. This can be inferred from Table 8.13.1 in Chapter 8, which shows that a high percentage of respondents claimed that there is no clear acceptance from the workers regarding such a program. It should also be noted that there is a concern regarding what could happen from the quality initiative generally; this is due to a real lack of TQM understanding, which in turn, brings about resistance to change.

This is in fact consistent with the personal observation of the researcher that there is to some extent an obvious resistance to change from the staff generally. This could be interpreted as most of the workforces theoretically accepting certain change. However, practically and intangibly they mostly tend to avoid new tasks and responsibilities. Regardless of the fact that quality is the responsibility of everyone in the organisation, a relatively large number of employees complained about new quality procedures and regulations and in some cases they were convinced that quality was not their concern or responsibility; it was the responsibility of the quality committee or unit/department. According to the interview analysis in Chapter 8, some employees avoid taking direct responsibility and engaging in quality programmes due to the fear that it could perhaps cause problems and could require additional effort and further work without recognition and expected benefits.

In addition, large segments of the workforce were convinced that a new programme needs new skills and involves additional work, which could imply learning special information and techniques. In some cases they do not want to follow the rules and procedures required by the system, which in fact represents the nerve system of quality initiatives. Thus, it can be concluded that the existence of such perceptions can be attributed to a lack of management awareness and real understanding in relation to TQM requirements.

It is important to state that this finding is similar to that of Macadam (1996) who stated that employees avoid undertaking more responsibilities, as the quality system requests, and at the same time they have a stronger feeling of being controlled by the

quality system. In addition, the findings of this study are similar to the findings by Moser and Bailey (1997), Lipovatz *et al.* (1999), Glover and Siu (2000), Fuentes *et al,* (2000) and Tsim *et al.* (2002). However, it is hard to identify the exact and explicit possible reason behind employee resistance. In order to understand the reasons for this resistance, other factors should be investigated. Thus, to delve into the potential reasons for such an outcome, overall mean analysis was conducted and the results presented in Table 7.3 in Chapter 7. It is important to note that based on the mean value test, employees' commitment towards TQM is ranked 10th, with the overall mean of 2.441 (out of 5). This also provides further evidence for the existence of the identified obstacle.

Subsequently, additional analysis was performed to establish which groups of respondents showed significant differences regarding whether they consider employee resistance to change to be an obstacle to the successful and effective application of TQM. The analysis was conducted with the intention of testing the following sub-hypothesis.

$H_{10\text{-}1}$: There is no statistically significant difference regarding employee resistance to change as an obstacle to the successful and effective application of TQM across participants from oil and gas organisations.

In responding to the hypothesis, the results from Kruskal-Wallis in Table 7.20 are used. The results suggest that there is no significant difference regarding employee resistance to change as an obstacle to the successful and effective application of TQM across participants from oil and gas organisations.

$H_{10\text{-}2}$: There is no statistically significant difference regarding employee resistance to change as an obstacle to the successful and effective application of TQM across various age groups within the sector.

The test results for the age groups were significant; thus the null hypothesis can be rejected. Therefore, it can be concluded that there is significant difference regarding employee resistance to change as an obstacle to the successful and effective application of TQM across various age groups within the sector. It should be noted that, in particular, those who are aged over 60 differ significantly regarding whether they consider employees' resistance to change to be a possible barrier to TQM. The

researcher is of the opinion that this category is perhaps the most judgmental due to the fact that they have spent a long time working within the sector, thus they have the experience to reflect upon the working environment with a critical eye.

$H_{10\text{-}3}$: There is no statistically significant difference regarding employee resistance to change as an obstacle to the successful and effective application of TQM across various qualification profile groups within the sector.

The inferential statistical results in Table 7.20 failed to achieve the level of significance at $\alpha = 0.05$. Consequently, the null hypothesis is accepted, which means that there is no significant difference regarding employee resistance to change as an obstacle to the successful and effective application of TQM across various qualification profile groups within the sector

$H_{10\text{-}4}$: There is no statistically significant difference regarding employee resistance to change as an obstacle to the successful and effective application of TQM across various position groups in each organisation within the sector.

Unlike the previous hypothesis, in this category the outcome achieved the statistically significant level in particular at $\alpha = 0.10$ in Table 7.20, which suggests that the null hypothesis is rejected. This means that there is a significant difference regarding employee resistance to change as an obstacle to the successful and effective application of TQM across various position groups in each of the organisations within the sector. This clearly indicates that those who are working in a supervisory position differ significantly regarding whether or not they consider employees to be resistant to change. As the supervisors are close to, and most of the time they work with the employees they seem to be in the best position to offer a clear picture regarding the state of the workforce.

$H_{10\text{-}5}$: There is no statistically significant difference regarding employee resistance to change as an obstacle to the successful and effective application of TQM across various groups with different durations of experience within the sector.

Based on the findings depicted in Table 7.20, at $\alpha = 0.05$, the results indicate that the null hypothesis cannot be rejected. Therefore, there is no significant difference regarding employee resistance to change as an obstacle to the successful and effective

application of TQM across various groups with different durations of experience within the sector.

Based on the sub-hypotheses testing, three out of five null hypotheses were accepted and the remaining two were rejected. The two rejected hypotheses categories are the age and position groups, whilst the accepted null hypotheses are related to organisation, qualification and experience. As discussed in Chapter 7, the significant differences can be seen in the over 60 year of age and supervision position categories. The researcher has considered these groups of respondents as the managerial staff who differ significantly regarding whether they consider employees' resistance to change as a real hindrance to the implementation process of TQM over the sector.

In overall, according to Table 7.7 in Chapter 7, all of the results for the relevant questions suggest that those who work in RASCO, who hold a high diploma (three years after high school) and have work experience of 30 years or above scored a high mean value compared with other groups in their categories. These participants perhaps are of the opinion that the employees resist changes to TQM by not working to improve the future of the organisation, resisting training that would enable them to work more efficiently and to improve quality and resist understanding quality and its aspects.

9.3.5. Quality Strategic Plan: Hypothesis Testing

Hypothesis 11: The majority of Libyan oil and gas organisations' managerial categories considered quality strategic planning as an obstacle to the successful and effective application of TQM across the oil and gas sector.

The frequency analysis results in Table 6.16 in Chapter 6 show that a percentage of the respondents feel that there is no quality strategic planning as such within the sector. In addition, according to Table 8.12.3 (Chapter 8), there is no clear planning and vision regarding TQM generally. In other words, it can be safely interpreted that most of the participants want strategic planning and vision in Libyan oil and gas organisations to be obvious to everyone because the strategic planning clearly includes quality goals and these strategies should be related both to internal workers and to external customers to achieve the expected quality as well as long-term training targets for developing skills to improve quality.

Overall, based on the results, the null hypothesis is accepted implying that there are no significant differences. The conclusion for this hypothesis confirmed Juran's (1993) view that the causes of some organisations failing to apply quality initiatives is their inability to determine which quality strategy is best for their organisation. It is important to state that this finding is similar to that of Warwood and Antony's (2003) findings, who state that lack of clarity of vision is considered to be another source of failure of TQM in many companies. In addition, the results also confirmed the findings by Rad Ali (2006), as well as those of Frederick Hau (2000), Macdonald (1998) and Black (1993) who consider inadequacy of vision and planning as some of the observed obstacles in TQM implementation.

As the results of this study demonstrate, respondents were of the opinion that management in the Libyan oil sector is less concerned with long-term vision, which would result in the effective implementation of TQM. As the results of the interviews show in Table 8.9, no quality models have been employed in the organisations in question, nor are there any clear intentions to do so in the future. This mirrors the fact that most of these organisations do not have obvious vision in relation to quality. This lack of strategic vision could be explained by a lack of proper understanding of the strategic objectives and the importance of future plans and vision for the development of the organisation. Therefore, in order to manage and address the lack of strategic vision and planning regarding quality, it is strongly recommended by proponents of the idea of vision sharing (Balzarova *et al*, 2002) that identifying and sharing the company's vision and plan is essential in order to allow TQM to be successful and also utilising it as an organisation measurement tool of performance will help to overcome the barriers to its successful implementation.

It should be noted that this finding is similar to that of Quazi *et al.* (2002) who highlighted that for many organisations a lack of shared vision was a barrier to the implementation of TQM. As demonstrated in the results of this study there is a lack of quality planning within the organisations in question. For this purpose, mean analysis was conducted and the results can be seen in Table 7.3 in Chapter 7. It is important to note that, based on the mean scoring, the quality strategic plan ranked twelfth, and the overall mean for the lack of quality plan scored 2.388 (out of 5). This indicates that there is a degree of agreement concerning the existence of this identified obstacle.

In responding to the results, it should be mentioned that management have to make every effort to address the existing difficulties and hindrances by clarifying their plans and should clearly relate to quality and associated measurable effects with appropriate resource deployment. In addition, they have to involve employees when forming such plans and consider other related factors such as restructuring the organisational hierarchy to suit development issues. Furthermore, management problems should be explicitly analysed in order to identify the reasons for them. Thus, implementation of such suggestions is expected to improve the chances of TQM being successful.

In relation to this general result a number of sub-hypotheses tests were conducted in order to establish whether there is any significant difference in opinions as regards to strategic planning for quality across the various groups in the study control variables. The hypotheses are as follows:

$H_{11\text{-}1}$: There is no statistically significant difference regarding strategic planning for quality as an obstacle to the successful and effective application of TQM across participants from oil and gas organisations.

The results in Table 7.20 indicate that the null hypothesis is to be accepted, which means that there is no significant difference regarding whether strategic planning for quality is considered to be an obstacle to the successful and effective application of TQM across participants from oil and gas organisations. This suggests that all the participants more or less have a similar view about the subject matter.

$H_{11\text{-}2}$: There is no statistically significant difference regarding strategic planning for quality as an obstacle to the successful and effective application of TQM across various age groups within the sector.

The result in Table 7.20 proves that the null hypothesis is rejected, which suggests that there are no significant differences regarding whether strategic planning for quality is an obstacle to the successful and effective application of TQM across various age groups within the sector. The results show that the participants over 60 years of age differed most regarding whether they consider strategic planning for quality as an obstacle to the successful and effective application of TQM among other groups.

$H_{11\text{-}3}$: There is no statistically significant difference regarding quality strategic planning as an obstacle to the successful and effective application of TQM across various qualification profile groups within the sector.

Unlike the previous hypothesis, in this category the outcomes achieved the statistically insignificant level in particular at $\alpha = 0.10$ in Table 7.20, which suggests that the null hypothesis is accepted. This means that there is no significant difference regarding quality strategic planning being an obstacle to the successful and effective application of TQM across various qualification profile groups within the sector.

$H_{11\text{-}4}$: There is no statistically significant difference regarding quality strategic planning as an obstacle to the successful and effective application of TQM across various position groups in each organisation within the sector.

Similar results can also be seen in this category, where the inferential testing results in Table 7.20 suggest that the null hypothesis is accepted. This means that there is no significant difference regarding considering quality strategic planning as an obstacle to the successful and effective application of TQM across various position groups in each organisation within the sector.

$H_{11\text{-}5}$: There is no statistically significant difference regarding quality strategic planning as an obstacle to the successful and effective application of TQM across various groups with different durations of experience within the sector.

For this hypothesis, the result in Table 7.20 at critical *p*-value of 0.05 rejected the null hypothesis owing to yielding significant results. Thus, it can be concluded that there is a significant difference in considering quality strategic planning as an obstacle to the successful and effective application of TQM across various groups with different durations of experience within the sector. This indicates that those who have over 30 years' experience represented significant differences regarding whether or not they consider quality strategic plan as an obstacles. This result suggests that the assessment of those people would be accurate due to the long experience that they have gained in their positions.

As discussed generally in Sections 7.5.5 and 7.7 (Chapter 7), the two groups from the age and experience, categories, namely the over 60 years age group and the over 30

years of experience group, respectively, showed higher mean values which reflects that they are of the opinion that there is a lack of vision and planning for quality across their organisations. This statement was the basis on which the researcher accepted the null hypothesis and also emphasises that strategic plans must include goals for quality and that those strategic plans should be clear and known they should encourage employees to carry out the organisation's plans and vision, as a strategic plan is considered the backbone of the management. Therefore, the management in the organisations considered for this study need to pay close attention to strategic planning as the best and easiest way forward.

9.3.6. Employee Training, Development and Education: Hypothesis Testing

Hypothesis 12: The majority of Libyan oil and gas organisations' managerial categories considered lack of employee training, development and education to be an obstacle to the successful and effective application of TQM across the oil and gas sector.

The frequency analysis results in Table 6.17 in Chapter 6 suggest that the null hypothesis is accepted, which means that Libyan oil and gas organisations' managerial categories considered lack of employee training, development and education as an obstacle to the successful and effective application of TQM. This can be further supported from Table 8.15.4 in Chapter 8, which shows that the respondents agreed that there is a lack of training and development programmes and they also believed that training is extremely vital for the success of a TQM program (Claver *et al.*, 2003). As mentioned in Chapter 3, insufficient education and training is a significant obstacle in the implementation and development of a quality program (Newall and Dale, 1990). In this regard, the study discovered that a high percentage of managerial categories agree that employees were not trained in problem-identification and problem-solving techniques and there were no group discussion and communication techniques training sessions in place.

In addition, employees are not trained enough in quality improvement skills and there is no real concentration paid to ongoing in-house development of personnel by establishing training programs to cover all aspects of TQM. Furthermore, there is a lack of staff training in the Libyan oil and gas organisation regarding TQM techniques

as can be seen from Table 8.13.5, 8.14.2 and 8.15.3 in Chapter 8. This was enough to have a direct effect on the ability of the companies to implement and sustain TQM.

As can be seen, the findings of this research are in line with a number of studies including: Ngai and Cheng (1997), who located insufficient quality training and education, Liu (1998) and Rahim and Whalen (1994) who referred to lack of proper training as being among the main barriers for TQM implementation. In addition, Rajashekhar (1999) cited in Bhat and Rajashekhar (2009) found not identifying and providing the right type of training to be a barrier, while Stevenson and Barnes (2001), Chini and Valdez (2003 cited in White *et al*, 2009) mentioned the costs of training; and Al-Khalifa and Aspinwall (2000) referred to lack of information/education/training. These studies also verify the results established by this study.

In further exploring the issues under this section, sub-hypotheses were formulated in order to investigate whether there is any statistically significant difference in opinions across the groups within the study control variables. The hypotheses are as follows:

$H_{12\text{-}1}$: There is no statistically significant difference regarding employee training, development and education as an obstacle to the successful and effective application of TQM across participants from oil and gas organisations.

At the critical level of α = 0.05 in Table 7.20, (p=0.176), the null hypothesis is accepted, suggesting that there is no significant difference regarding whether employee training, development and education is considered an obstacle to the successful and effective application of TQM across participants from oil and gas organisations.

$H_{12\text{-}2}$: There is no statistically significant difference regarding employee training, development and education as an obstacle to the successful and effective application of TQM across various age groups within the sector.

For this hypothesis with the estimated p= 0.044 at α = 0.05 in Table 7.20, the null hypothesis is rejected. Consequently, it is found that there is a statistically-significant difference regarding employee training, development and education as an obstacle to

the successful and effective application of TQM across various age groups within the sector.

$H_{12\text{-}3}$: There is no statistically significant difference regarding employee training, development and education as an obstacle to the successful and effective application of TQM across various qualification profile groups within the sector.

The result of the Kruskal-Wallis test (p=0.444) in Table 7.20 failed to reject the null hypothesis. Thus, the result confirms the null hypothesis that there is no statistically significant difference regarding employee training, development and education as an obstacle to the successful and effective application of TQM across various qualification profile groups within the sector.

$H_{12\text{-}4}$: There is no-statistically significant difference regarding employee training, development and education as an obstacle to the successful and effective application of TQM across various position groups in each organisation within the sector.

The result of the Kruskal Wallis test with p=0.093 at α = 0.10 in Table 7.20 confirms the alternative hypothesis that there is no statistically significant difference regarding employee training, development and education as an obstacle to the successful and effective application of TQM across various position groups in each organisation within the sector.

$H_{12\text{-}5}$: There is no statistically significant difference regarding employee training, development and education as an obstacle to the successful and effective application of TQM across various groups with different durations of experience within the sector.

Testing for this hypothesis with p=0.068 at α = 0.10 in Table 7.20 concluded that there is a statistically-significant difference regarding employee training, development and education as an obstacle to the successful and effective application of TQM across various groups with different durations of experience within the sector.

The findings in this study further add value to previous similar studies by confirming that quite a large number of Libyan oil and gas managers from various levels cited employee training, development and education as an obstacle to the successful and

effective application of TQM within the Libyan oil and gas sector. It is important to note that, based on the mean value test, employee training, development and education ranked 11th. It should also be mentioned that the findings depicted the overall mean for the lack of training as an obstacle is 2.405 (out of 5). This indicates that there is an agreement concerning the existence of the identified obstacles. As for the sub-hypotheses, the outcomes demonstrated that two out of the five null hypotheses related to the organisations and qualification categories are accepted. The results from the testing (Table 7.20) illustrated that those who work for RASCO, who had Secondary Certificate or equivalent qualifications, have about the same differences opinions and perceptions regarding considering employee training, development and education as an existing barrier within their organisation.

In summary, a high percentage of the personnel have appropriate qualifications and experience as evidenced in Table 6.5 in Chapter 6 and Table 8.1 in Chapter 8, which is required in order to improve their quality of work. However, training in the oil and gas organisations must be determined according to actual needs that have to be covered by training and development efforts, as the presence of workforces with low education levels within the organisations would have a direct influence on the effective implementation of TQM. Therefore, top management and leaders must be educated and well trained regarding the quality initiative and improvement process before others are. Hence, TQM training and education should be continuous throughout the TQM implementation phases and beyond (Ghobadian and Gallear, 2001). In fact, in order to achieve the full potential of TQM it is vital to train all people at all levels within the company in order to establish TQM awareness, desire, interest and action. Consequently, top management and leaders' attention might be fruitfully focused on the improvement of appropriate training and education programs on TQM implementation, particularly regarding its importance, benefits, tools and techniques, This is also the conclusion of other studies in the literature, such as: Changiz (2011), Rajab *et al.* (2010), Natarajan (2006), Jaca (2012), He (2009), Jørgensen *et al.* (2003) and Pun *et al.* (2001).

9.3.7. Information and Communication: Hypotheses Testing

Hypothesis 13: The majority of Libyan oil and gas organisations' managerial categories considered lack of information and communication as an obstacle to the successful and effective application of TQM across the oil and gas sector.

The response for hypothesis 13 was based on the analysis results presented in Table 6.18 in Chapter 6. All the results for the most relevant questions, as is evident from the table, suggest that the null hypothesis is accepted. This means that Libyan petroleum organisations' managerial categories considered lack of information and communication as an obstacle to the successful and effective application of TQM, which can have clear detrimental results on the performance of the companies in question. This is further supported from the mean ranking, as the information and communication ranked first with 2.684 (out of 5). This indicates that there was a comprehensive agreement concerning the existence of the identified obstacles.

It should be noted that the findings of this study in relation to this particular issue are similar to those of Alamri (1995), Aly (1997), Kadasah (2000), Samson (1997) and Fuentes *et al.* (2000), as these studies also mentioned that lack of information and communication routes were considered, among others, as an obstacle to TQM implementation. In addition, lack of integration between an existing management information system and quality information system is a major obstacle for TQM implementation, as identified by Laza and Wheaton (1990), Boyett *et al.* (1992), Katz (1993), Brown (1993), Zangwill (1994), Goodman *et al.* (1994), Dale and Cooper (1994), Tatikonda and Tatikonda (1996) and Najmi and Kehoe (2000).

As well as lack of information and communication hindering related to the TQM process, the interview results also showed that there were no clear signs and indications on how well understood the TQM concept, techniques and rules are. This should also be interpreted as a lack of a proper information system. As can be seen from the responses in Table 6.18 in Chapter 6, there is a lack of information about TQM and there is insufficient communication between top management levels and others. The results also revealed that the communication channels providing information about customer and market expectations are also not effective in delivering the required information to improve quality generally.

In fact, most of the existing difficulties are perhaps due to the presence of authoritative managers and this may be due to a lack of understanding and knowledge of TQM understanding. As can be inferred from Table 6.11 in Chapter Six, the results show that there are difficulties for the personnel in discussing matters and concerns seriously and effectively with their managerial categories. In addition, communication with employees, according to managers' perceptions, is deemed as the first step towards losing superiority and respect. Furthermore, the existence of a traditional organisational structure based on a strong hierarchy in these organisations, should be considered as a reason for a communication gap between the top and the lower management level and seems inappropriate.

Therefore, to generate greater insight into TQM, communication between departments has to be effective and the organisation has to seriously work to transform various data into information so that information can be turned into beneficial knowledge before ultimately that information and knowledge are distilled into useful insights. However, it is crucial to gather appropriate data/standards to ultimately drive the effective implementation, as successful implementation relies on the free flow of information and communication and availability of appropriate knowledge. This is evident from Tables 8.9 and 8.23 in Chapter 8, which illustrates that there are no local standards that can be followed and there is no appropriate knowledge in relation to TQM in place.

To better understand the findings, the following hypotheses were formulated with the purpose of determining which group(s) show significant differences regarding whether information and communication are an obstacle to the successful and effective application of TQM. The outcomes of the following hypotheses, which were the products of the Kruskal-Wallis test, are presented in Table 7.20 in Chapter Seven.

$H_{13\text{-}1}$: There is no statistically significant difference regarding information and communication as an obstacle to the successful and effective application of TQM across participants from oil and gas organisations.

For the first hypothesis, the result in Table 7.20 emphasises that the null hypothesis is to be accepted. Hence, it can be stated that statistically there is no significant difference regarding information and communication as an obstacle to the successful

and effective application of TQM across participants from oil and gas organisations. This suggests that most of the respondents have roughly similar views concerning the subject matter.

$H_{13\text{-}2}$: There is no statistically significant difference regarding information and communication as an obstacle to the successful and effective application of TQM across various age groups within the sector.

The result shown in Table 7.20 proves with (p=0.052) at $\alpha = 0.10$ or even at some relaxation of the critical value at 5%, that the null hypothesis is rejected, which suggests that statistically there is significant difference regarding information and communication as an obstacle to the successful and effective application of TQM across various age groups within the sector. The results show that the over 60 years of age group has significant differences in their opinions compared with other groups. This can perhaps be explained by this group holding traditional opinions regarding the role of management within the organisation in question.

$H_{13\text{-}3}$: There is no statistically significant difference regarding information and communication as an obstacle to the successful and effective application of TQM across various qualification profile groups within the sector.

The result of the Kruskal Wallis test in Table 7.20 failed to reject the null hypothesis, which confirms the null hypothesis that there are no significant differences regarding information and communication as an obstacle to the successful and effective application of TQM across various qualification profile groups within the sector.

$H_{13\text{-}4}$: There is no statistically significant difference regarding lack of information and communication as an obstacle to the successful and effective application of TQM across various position groups in each organisation within the sector.

For this hypothesis the test results in Table 7.20 were unable to reject the null hypothesis, meaning that there are no statistically significant differences regarding lack of information and communication as an obstacle to the successful and effective implementation of TQM across various position groups in the organisations in question.

$H_{13\text{-}5}$: There is no statistically significant difference regarding lack of information and communication as an obstacle to the successful and effective application of TQM across various groups with different durations of experience within the sector.

For the final hypothesis in this cluster, the result in Table 7.20 suggests that the alternative hypothesis is rejected in favour of the null hypothesis, indicating that there are no significant differences regarding lack of information and communication as an obstacle to the successful and effective application of TQM across various groups with different durations of experience within the sector. However, according to Table 7.10 in Chapter 7, most of the mean values of the experience category were very close to the significant limit, thus, the group with over 30 years of experience would be expected to have significant differences considering the subject matter.

Unlike the outcomes in the preceding hypothesis cluster, in this situation the results, which attained the statistically significant value can only be seen in one of the categories, namely age, in particular the over 60 years of age group. On the other hand, the results for the four remaining categories, namely organisation, qualification, position and experience, suggest that there are no significant differences in terms of opinions between the groups in the respective categories.

Therefore, the researcher has classified groups as discussed in detail in Chapter 7, which show a higher level of agreement regarding information and communication as an existing obstacle, based on the higher mean value those who work in SOC, have high diploma, work as top management and have over 30 years' experience. In fact, the results enhance the argument that better information and communication would dramatically increase the chance of TQM being successful.

In summary, managerial categories urgently need to communicate to everyone within the organisation that information-sharing and collaboration is crucial and needs to be applied, as the more easily information and data flows between various parts of the organisation the easier it can lead to an efficient working environment, overcoming many difficulties in conducting everyday business. In addition, having in-depth dialogues with employees regarding the information that they find valuable and important, and having objective conversations with them concerning what ancillary

services and information are available for them, will improve the efficiency and will result in a better outcome.

9.3.8. Continuous Improvement and Innovation: Hypotheses Testing

Hypothesis 14: The majority of Libyan oil and gas organisations' managerial categories considered lack of continuous improvement and innovation to be an obstacle to the successful and effective application of TQM across the oil and gas sector.

According to the results presented in Table 6.19 in Chapter 6, the null hypothesis is accepted. This means that Libyan petroleum organisations' managerial categories considered lack of continuous improvement and innovation to be an obstacle to the successful and effective application of TQM across the petro-chemical sector. It is worth noting that, based on the mean value test, continuous improvement and innovation ranked 8th; the outcomes depicted that the overall mean for the existence of this issue as a barrier is 2.505 (out of 5). This proves that there is acceptance concerning lack of continuous improvement and innovation.

As depicted in Table 8.2 in Chapter 8, the definition of quality management includes continuous improvement activities for the entire organisation. In addition, in Tables 8.7 and 8.7.3, there is clear agreement that TQM and continuous improvement are complementary to each other. Furthermore, as identified by Jabnoun and Anwar (2006), the benefits of TQM will ultimately lead an organisation to carry on a continuous improvement process at all levels. However, according to the results of the interview chapter (Chapter 8), the factors of continuous improvement are not employed in the selected companies. In this regard, one definition of continuous improvement is a policy of organisation to understand and implement *e.g.* Deming's theory of PDCA or Malcolm Baldrige Model (see Chapter Two for further information). However, most Libyan oil and gas managerial categories do not know any TQM models as can be evidenced from Table 8.9 in Chapter 8.

It should be noted that an appropriate level of understanding of TQM philosophy would result in continuous improvement processes for the entire organisation (Juran, l986). However, as evidenced earlier in the analysis of hypothesis 5, the level of TQM understanding in the organisations in question was deemed low. Therefore, the

process of continuous improvement would not reach the expected level. According to Table 6.19 in Chapter 6, there is no obvious indication in relation to the effective promotion of innovation across the organisations in question and the role of the R&D department is lacking in innovative developments within the sector; this is perhaps due to the fact that most managers are convinced that such activities are not worthwhile or effective within the oil business environment. Furthermore, in most cases R&D departments are not active and they do not have a mandate to contribute to the development process.

From these results, it is important to note that the finding of this research is in line with those of Ljungstrom and Klefsjo (2002) and Masters (1996). Hence, managers in the oil sector must seriously take into consideration the fact that long-term ignorance in this matter would result in failure.

The following sub-hypotheses have been constructed in order to explore whether there is any significant difference regarding continuous improvement and innovation as an obstacle to TQM across the participants' sub-groups for each category. The statistical test for the relevant question in relation to the hypothesis is presented in Tables 7.11 and 7.20 in Chapter 7.

Some differences would be expected in participants' opinions considering the varying education levels of each of the participants in each organisation in question. These differences are proved to be insignificant. This could be attributed to the fact that they have the ability to realise the existing gap and also perhaps critical thinking helps them to assess the current situations. With this explanation, it would be normal to expect that, regardless of their qualifications, participants have roughly the same view regarding the issue

$H_{14\text{-}1}$: There is no statistically significant difference regarding lack of continuous improvement and innovation as an obstacle to the successful and effective application of TQM across participants from oil and gas organisations.

Based on the results depicted in Table 7.20 in Chapter 7, the null hypothesis has to be accepted, since the *p*-value (0.371) is higher than 0.05. This implies that there is no statistically significant difference regarding lack of continuous improvement and

innovation as an obstacle to the successful and effective application of TQM across participants from petroleum organisations

$H_{14\text{-}2}$: There is no statistically significant difference regarding lack of continuous improvement and innovation as an obstacle to the successful and effective application of TQM across various age groups within the sector.

As can be seen in Table 7.20, for age category, the statistical results again failed to reject the null hypothesis, which suggests that statistically, there is no significant difference regarding lack of continuous improvement and innovation as an obstacle to the successful and effective application of TQM across various age groups within the sector

$H_{14\text{-}3}$: There is no statistically significant difference regarding lack of continuous improvement and innovation as an obstacle to the successful and effective application of TQM across various qualification profile groups within the sector.

Regarding the qualification category the findings in Table 7.20 show that the null hypothesis is rejected, since the estimated *p*-value (0.095) is lower than the extended critical *p*-value of 0.10. Hence, it can be concluded that, statistically there is significant difference regarding lack of continuous improvement and innovation as an obstacle to the successful and effective application of TQM across various qualification profile groups within the organisation in question.

$H_{14\text{-}4}$: There is no statistically significant difference regarding lack of continuous improvement and innovation as an obstacle to the successful and effective application of TQM across various position groups in each organisation within the sector

For the fourth hypothesis, Table 7.20 shows that at $\alpha = 0.05$, the null hypothesis is accepted, since estimated *p*-value (0.246) is much higher than the critical *p*-value. Therefore, it is concluded that there is no statistically significant difference regarding lack of continuous improvement and innovation as an obstacle to the successful and effective application of TQM across various position groups in each organisation within the sector.

$H_{14\text{-}5}$: There is no statistically significant difference regarding lack of continuous

improvement and innovation as an obstacle to the successful and effective application of TQM across various groups with different durations of experience within the sector.

Since the estimated *p*-value of 0.389 in Table 7.20 is significantly higher than the critical *p*-value 0.05, for the final hypothesis of this cluster, the null hypothesis is accepted. It can, therefore, be concluded that for the durations of experience category, statistically there is no significant difference regarding lack of continuous improvement and innovation as an obstacle to the successful and effective application of TQM across various groups with different durations of experience within the sampled organisations.

Overall, the results from the Kruskal-Wallis test in Table 7.20 show that the respondents from RASCO, those who are from 20-30 age group, those with administrative positions, and those with less than five years of experience gained the highest mean score, indicating that there are significant differences in the opinions of those in relation to the this matter. In either event, the owners of oil and gas companies must pay extensive and serious attention to certain aspects and tasks such as innovation strategies, which should include quality improvement in all its dimensions. In addition, a culture of quality improvement has to be prevalent within the organisations along with working towards reviewing the performance of their organisation as whole. This could be done in order to tackle all the existing obstacles by conducting the necessary reforms for positive change.

It should be mentioned that efforts need to be made to identify the gaps in the training strategy and the efficient running of TQM and all its aspects. In addition, a system of motivations and rewards needs to be in place and regularly updated. Furthermore, efforts to improve quality should be oriented and redirected in order to meet expectations in terms of desired results and also to enhance the level of performance, as overall performance is associated with continuous improvement. According to TQM theory, the best way to develop organisational output is to continually improve performance (Corbett and Rastrick, 2000) as TQM can be described as a management philosophy that focuses on working towards continuous improvement throughout the entire organisation's activities (Brockman, 1992; Oakland, 2000; Harrison and Petty, 2002 and Rajab, 2010).

9.3.9. Teamwork: Hypotheses Testing

Hypothesis 15: The majority of Libyan oil and gas organisations' managerial categories considered lack of teamwork as an obstacle to the successful and effective application of TQM across the oil and gas sector.

The result in Table 6.20 in Chapter 6 shows that most of the responses to the relevant questions which gauge lack of teamwork as a real obstacle, are in support of the null hypothesis. This implies that the Libyan oil and gas organisations' managerial categories consider lack of teamwork to be an obstacle to the successful and effective application of TQM across the selected petro-chemical organisations. A further summary in Table 7.3 in Chapter 7 shows that, based on the mean value test, lack of teamwork ranked 4th and the outcomes illustrated that the overall mean for the existence of the barrier is 2.617 (out of 5). This indicates a general agreement with reference to the existence of the identified obstacle. Looking at Table 6.20 in Chapter 6, it is obvious that there is no real utilisation of cross-functional teamwork across selected petroleum companies, through which different employees from various departments/units could work smoothly together and perhaps learn extensively from each other.

Consequently, problems and difficulties could be easily addressed with cross-functional teamwork in an effective manner (Dale, 1999). According to the literature on TQM, the role of the employee has changed from that of a worker to a problem solver. In addition, the most effective and successful way to harness the talents and ideas of the entire workforce is the use of teamwork to overcome obstacles and solve problems (Kumar, 2011). However, the results in this study also indicated that Libyan oil and gas companies do not clearly and explicitly identify and train their best employees to work together as a team.

It should be noted that the findings of this research are similar to those of Alamri (1995), Aly (1997), Kadasah (2000), Lee *et al.* (1999) and Glover and Siu (2000). In responding to the identified problem, it should be noted that the top management in the selected organisations has to regard team spirit as an important factor for improving working conditions and therefore should encourage employees to work as a team. In general, teamwork as a concept within the oil industry must be given more urgent attention in order to create an efficient working environment.

In order to investigate this hypothesis further the following sub-hypotheses were designed to establish whether there are significant differences across various groups of the control variables. The outcomes of the testing can be seen in Tables 7.12 and 7.20 in Chapter 7.

$H_{15\text{-}1}$: There is no statistically significant difference regarding lack of teamwork as an obstacle to the successful and effective application of TQM across participants from oil and gas organisations.

At α=0.10, the Kruskal-Wallis testing for this category in Table 7.20 yielded significant result (p=0.093); consequently the null hypothesis cannot be accepted. Hence, it can be concluded that there is a significant difference regarding lack of teamwork as an obstacle to the successful and effective application of TQM across participants from sampled oil and gas organisations. The results are in favour of RASCO, which obtained a high mean value compared with other groups.

$H_{15\text{-}2}$: There is no statistically significant difference regarding lack of team work as an obstacle to the successful and effective application of TQM across various age groups within the sector.

At α = 0.05, the null hypothesis is accepted, since the estimated p-value (0.117) in Table 7.20 is lower than the critical value, which implies that there is no statistically-significant difference regarding lack of team work as an obstacle to the successful and effective application of TQM across various age groups within the sector.

$H_{15\text{-}3}$: There is no statistically significant difference regarding lack of team work as an obstacle to the successful and effective application of TQM across various qualification profile groups within the sector.

The results in Table 7.20 suggest that the null hypothesis is rejected, as the estimated p-value (0.088) is lower than the extended p-value of 0.10 limit implying that there is a significant difference in considering lack of team work as an obstacle to the successful and effective application of TQM across various qualification profile groups within the sector.

$H_{15\text{-}4}$: There is no statistically significant difference regarding lack of team work as an obstacle to the successful and effective application of TQM across various position groups in each organisation within the sector.

The findings in Table 7.20 suggest the null hypothesis that there is no significant difference regarding lack of teamwork as an obstacle to the successful and effective application of TQM across various position groups in the organisation within the sector is accepted. This can be seen as the estimated *p*-value (0.805) is significantly higher than the critical *p*-value of 0.05.

$H_{15\text{-}5}$: There is no statistically-significant difference regarding lack of team work as an obstacle to the successful and effective application of TQM across various groups with different durations of experience within the sector.

As the findings in Table 7.20 depict, there is no significant difference regarding lack of teamwork as an obstacle to the successful and effective application of TQM across various groups with different durations of experience within the studied organisations.

As discussed earlier in Sections 7.5.5 and 7.7 in Chapter 7, organisation and qualifications showed higher mean values implying that there are significant differences in their opinions in relation to whether lack of teamwork is seen as an obstacle. As a result, the null hypothesis is rejected. On the other hand, the results for the three remaining categories, namely age, position and experience, suggest that there are no significant differences in terms of opinions among the groups for these categories. The results, hence, show that for the 20-30 year age group, those with middle management positions and those who have a relatively low duration of experience (less than five years) tend to differ in their opinions regarding whether lack of teamwork is an obstacle to the efficient implementation of TQM.

9.3.10. Internal and External Customer Satisfaction: Hypotheses Testing

Hypothesis 16: The majority of Libyan oil and gas organisations' managerial categories considered lack of internal and external customer satisfaction to be an obstacle to the successful and effective application of TQM across the oil and gas sector.

The main table, which is used to respond to this hypothesis, is Table 6.21 in Chapter 6. It is clear that most of the responses tend to agree with the null hypothesis, meaning that quite a high percentage of Libyan petroleum organisations' managerial categories considered lack of internal and external customer satisfaction as an obstacle to the successful and effective application of TQM across the oil and gas sector. This is evidenced from the fact that the lack of internal and external customer satisfaction ranked 5th, the outcomes show that the overall mean for the existence of obstacle is 2.612 (out of 5). Therefore there is, to some extent, consensus among respondents regarding the lack of internal and external customer satisfaction as a hindrance.

Although the primary and most critical asset of any organisation is its employees, many managers world-wide do not acknowledge this fact. In addition, the same equipment and materials could be available for all competitors; the only factor distinguishing one organisation from any other is its workforce (Crosby, 1999). Furthermore, the leading contenders of quality (*e.g.* Deming, Juran, Feigenbaum and Ishikawa) concluded that high quality and customer satisfaction are equated. It is worthwhile noting that most of the TQM literature emphasises that customer satisfaction is fundamental and essential to TQM philosophy (Garvin, 1984; Ishikawa, 1985; Vuppalapati *et al.*, 1995; Claver *et al.*, 2001; Ghobadian and Gallear, 2001; Ljungstrom and Klefsjo, 2002; Vora, 2002; Kocakoc and Sen, 2006; Yang, 2006; Tanninen, 2010).

According to Table 8.2.2 in Chapter 8, some top managers recognise, in theory, which the real meaning of quality management is to enable both clients and the workforce to achieve satisfaction. In addition, Table 8.7.1 in Chapter 8 shows that another core benefit of TQM is the reduction of all types of cost and that this helps in gaining customer and personnel satisfaction. However, in practice, the results of the survey in Table 6.21 in Chapter 6 reveal that there is no real customer feedback system in place, and also from Chapter 8, it seems that the level of personnel satisfaction is deemed to be low. Furthermore, there is no obvious assessment system, which determines current and future customer requirements and expectations, which could result in a lack of cooperation from clients.

The logical interpretation is that some managers do not know the real benefits of sharing and gathering feedback regarding their internal and external customers.

Furthermore, they treat most of their information as confidential and secret data, as well as being convinced that publishing and sharing their information would cause problems whether in the short or long term. It should be noted that sharing particular information between management and employees and clients is essential in order to bridge the gap between improvement activities and their consequences (Samson, 1997). In fact, satisfying internal and external customers is the responsibility of all management levels, as discussed in Chapter 3. The migration of professionals in most oil companies is due to the lack of internal satisfaction and also due to the lack of an evaluation and feedback system. Consequently, clear communication channels and an obvious feedback system is definitely the best and easiest way to carry out organisational activities successfully, as well as addressing most of its existing barriers.

In order to obtain further details, the following sub-hypotheses are constructed to investigate whether there is a significant difference regarding lack of internal and external customer satisfaction as a hindrance to the successful and effective application of TQM across the participants' sub-groups for each category. The statistical test for the relevant questions in relation to the hypothesis is presented in Tables 7.13 and 7.20 in Chapter 7.

$H_{16\text{-}1}$: There is no statistically significant difference regarding lack of internal and external customer satisfaction as an obstacle to the successful and effective application of TQM across participants from oil and gas organisations.

According to the results presented in Table 7.20, the null hypothesis is accepted. Thus, there is no significant difference regarding lack of internal and external customer satisfaction as an obstacle to the successful and effective application of TQM across participants from selected petro-chemical organisations. This indicates that the participants have similar views concerning the issue under discussion.

$H_{16\text{-}2}$: There is no statistically significant difference regarding lack of internal and external customer satisfaction as an obstacle to the successful and effective application of TQM across various age groups within the sector.

In relation to the second hypothesis, at $\alpha = 0.10$, the Kruskal-Wallis testing in Table 7.20 yielded significant result (p=0.090), consequently the null hypothesis is rejected.

Hence, it can be concluded that there is a significant difference regarding lack of internal and external customer satisfaction as an obstacle to the successful and effective application of TQM across various age groups within the sector. The results are in favour of the 20-30 years old age group.

$H_{16\text{-}3}$: There is no statistically significant difference regarding lack of internal and external customer satisfaction as an obstacle to the successful and effective application of TQM across various qualification profile groups within the sector.

At critical *p*-value of 0.05 in Table 7.20, there is a significant difference regarding lack of internal and external customer satisfaction as an obstacle to the successful and effective application of TQM across various position groups in each organisation within the sector.

$H_{16\text{-}4}$: There is no statistically significant difference regarding lack of internal and external customer satisfaction as an obstacle to the successful and effective application of TQM across various position groups in each organisation within the sector.

In relation to this category, the findings suggest that there is no significant difference regarding lack of internal and external customer satisfaction as an obstacle to the successful and effective application of TQM across various position groups within the selected organisations, as is evident in Table 7.20 from the *p*-value of (0.378), which is significantly higher than the critical *p*-value of 0.05.

$H_{16\text{-}5}$: There is no statistically significant difference regarding internal and external customer satisfaction as an obstacle to the successful and effective application of TQM across various groups with different durations of experience within the sector.

In the final category, as the results in Table 7.20 did not reach the level of statistical significance, the null hypothesis is accepted. Hence, it can be confirmed that there is no significant difference regarding lack of internal and external customer satisfaction as an obstacle to the successful and effective application of TQM across various groups with different durations of experience within the studied organisations.

The findings for the hypothesis cluster in this section show that statistically-significant results are only seen in two categories, namely age and qualification. As discussed in Chapter 7, the results for the three remaining categories, namely organisation, position and experience, suggest that there are no significant differences between the groups in the respective categories. Therefore, the researcher has classified groups from RASCO, those holding administrative positions and those who with less than five years of experience as groups who tend to differ in their opinions concerning lack of internal and external customer satisfaction as an obstacle to the successful and effective application of TQM.

As a result of the discussion in Section 6.4.10 in Chapter 6, employees must be treated as customers and managers of petroleum companies have to encourage their employees to provide customer satisfaction by utilising feedback in order to improve all their processes and services. In addition they should maintain their workforce and the level of productivity as well as quality. Deming (1986) emphasized that quality should be defined in terms of customer satisfaction.

9.3.11. Measurement and Evaluation Issues: Hypotheses Testing

Hypothesis 17: The majority of Libyan oil and gas organisations' managerial categories considered lack of measurement and evaluation as an obstacle to the successful and effective application of TQM across the oil and gas sector.

Based on the results presented in Table 6.22 in Chapter 6, the null hypothesis is accepted suggesting that some Libyan petro-chemical organisations' managerial categories consider lack of measurement and evaluation as an obstacle to the successful and effective application of TQM across the oil and gas sector. In this regard, it is important to note that, based on the mean test, measurement and evaluation ranked 6th and the outcomes depicted that the overall mean for the existence of problem is 2.605 (out of 5). This indicates that there was agreement concerning the existence of the identified barrier.

As the feedback from the respondents revealed, there is a lack of measurement and evaluation criteria for quality within the sector generally (as seen in Table 6.22 in Chapter 6). However, the literature suggests that measurement and evaluation is the key issue for any organisation that needs to accomplish its objectives at a certain time

and within a limited budget. In this regard, this study found that some managers consider TQM to be a philosophy that will improve the measurement and evaluation tools, which will influence performance, as evident from Tables 8.7.3 and 8.11.2 in Chapter 8.

The literature is full of evidence that measurement and evaluation programmes should be designed to provide accurate and explicit results and also to assess the organisation performance as whole, implying that not all employees have the same values. Indeed, evaluation practices have become the key tool for many organisations to reach their objectives. This is due to the fact that whenever our aims must be accomplished through others, measurement and evaluation becomes our greatest limiting factor. In addition, employees perform better, if there is an effective and reliable evaluation system. As the study found that quality is not effectively measured, the null hypothesis is accepted. Thus, this finding is similar to findings by Black (1993), Macdonald (1998), Oakland (1993, 2000) and Frederick Hau (2000), who all stated that there is a lack of TQM measurement. In addition, the findings of the study are in line with Ghobadian and Gallear (1997) and Rad (2005) in terms of lack of performance evaluation. Therefore, there needs to be an actual and tangible response in order to address the problems and to drive the application towards success.

The next step is to explore which groups of respondents exhibit statistical difference regarding the subject matter. For this purpose, the following sub-hypotheses 17-1 to 17-5 were framed. Tables 7.14 and 7.20 in Chapter 7 provide evidence for these hypotheses.

$H_{17\text{-}1}$: There is no statistically significant difference regarding lack of measurement and evaluation as an obstacle to the successful and effective application of TQM across participants from oil and gas organisations.

The Kruskal-Wallis testing in Table 7.20 for the first category yielded a significant result with the estimated p=0.008. Thus, at $\alpha = 0.05$, the null hypothesis is rejected. Consequently, it can be emphasised that, statistically, there is a significant difference regarding lack of measurement and evaluation as an obstacle to the successful and effective application of TQM across participants from petroleum organisations. In

addition, the result also indicated that the AGOCO group displayed a high mean value among other groups.

$H_{17\text{-}2}$: There is no statistically significant difference regarding lack of measurement and evaluation as an obstacle to the successful and effective application of TQM across various age groups within the sector.

The results in Table 7.20 suggest that the null hypothesis is accepted, stating that there is no significant difference regarding lack of measurement and evaluation as an obstacle to the successful and effective application of TQM across various age groups within the sector. In this case, the result shows that the 20-30 years of age group are more likely to differ significantly in their opinions about this matter.

$H_{17\text{-}3}$: There is no statistically significant difference regarding lack of measurement and evaluation as an obstacle to the successful and effective application of TQM across various qualification profile groups within the sector.

Similar results from Table 7.20 obtained for this category suggest that the null hypothesis is accepted, meaning that there is no statistically significant difference regarding lack of measurement and evaluation as an obstacle to the successful and effective application of TQM across various qualification profile groups within the sector as is evident from the estimated *p*-value (0.796), which is significantly higher than the critical *p*-value of 0.05.

$H_{17\text{-}4}$: There is no statistically significant difference regarding lack of measurement and evaluation as an obstacle to the successful and effective application of TQM across various position groups in each organisation within the sector.

According to Table 7.20 the Kruskal-Wallis test yielded an insignificant result (p=0.137), hence the null hypothesis is accepted, which implies that there is no significant difference regarding lack of measurement and evaluation as an obstacle to the successful and effective application of TQM across various position groups in each company within the petro-chemical sector.

$H_{17\text{-}5}$: There is no statistically significant difference regarding lack of measurement and evaluation as an obstacle to the successful and effective application of TQM across various groups with different durations of experience within the sector.

In this category, as the result shown in Table 7.20, the null hypothesis is accepted. Therefore, there is no statistically significant difference regarding lack of measurement and evaluation as an obstacle to the successful and effective application of TQM across various groups with different durations of experience within the sector.

In summary, the findings in this study add additional value to previous similar studies by confirming that a number of Libyan oil and gas managers at different levels considered lack of measurement and evaluation as an actual and important obstacle to the application of TQM within the Libyan oil and gas sector. As for the sub-hypotheses, the findings demonstrated that four out of the five null hypotheses related to age, qualification, position and experience categories are accepted. The results from the testing (see Table 7.20) show that the opinions and perceptions of those aged between 20-30 years, secondary certificate or equivalent qualification holders, wirh administrative positions and less than five years of experience tend to differ regarding whether they consider lack of measurement and evaluation as an existing barrier within their organisation.

In conclusion, Libyan petro-chemical companies must clearly measure and monitor the conformity of their products and human resource performance in order to guarantee that they actually meet all requirements. In addition, at all levels they should promote the use of statistical tools to monitor and measure products and all processes for effectiveness and improvement. Furthermore, they should provide a sufficient and effective measurement system particularly, for quality improvement. This can be successfully implemented after reviewing all activities and operations along with the existing measurement system and also with real intention to enhance petroleum companies' business environments comprehensively.

9.3.12. Government Support: Hypotheses Testing

Hypothesis 18: The majority of Libyan oil and gas organisations' managerial categories considered lack of government support as an obstacle to the successful

and effective application of TQM across the oil and gas sector.

The response for hypothesis 18 was based on the analysis results presented in Table 6.23 in Chapter 6. All the results for the relevant questions, as is evident from the table, suggest that the null hypothesis is accepted. This means that the majority of the Libyan petroleum companies' managerial categories considered lack of government support as an obstacle to the successful and effective application of TQM across the sector, which can have an adverse impact on the performance of selected companies. It is vital to note that, based on the mean test, the lack of government support ranked 14th, the result highlighted that the overall mean for this particular barrier is 2.246 (out of 5) indicating that there was some degree of agreement for this issue.

As there is no clear evidence to support the argument that the Libyan government pays obvious attention to applying TQM within its departments, Tables 8.8 and 8.8.3 in Chapter 8 revealed (regarding the owner NOC) that no government departments imposed TQM, or advised that it be employed within the petroleum sector. In addition, it is also emphasised that the application of TQM mainly comes from personal motivation and stems from the needs of organisations. Furthermore, the laws and regulations in relation to owners of these companies are considered to be barriers rather than facilitators in adapting TQM, as evidenced from Table 8.13 in Chapter 8.

It should also be noted that the results of the survey show that there is no government pressure in terms of regulations and laws to drive oil organisations to implement improvements in their quality management systems. In addition, there is a lack of financial support to help companies to implement TQM despite the petro-chemical sector, as discussed earlier in Chapter 3, being considered the wealthiest sector in the country and also the key pillar of the Libyan economy. In addition, there are also inadequate studies and researches from governmental departments (the owner) to help guide the organisation to develop a TQM system. At the same time the results depicted in Table 6.5 in Chapter 6 and in particular in Table 8.1 in Chapter 8 show that most of the participants have an appropriate education level to enable them to be effective in this regard.

This can be interpreted as an indication of primitive approaches to management in general and quality management in particular. Libyan authorities believe that if a

business is running smoothly and the current situations do not affect the production level there is no need for development activities. In addition, the priority of the owner is production and related issues with less concern regarding managerial matters as indicated by some of the interviewees in Chapter 8. Therefore, the owner must provide real financial and technical support to all their subsidiaries to verify the minimum requirement of TQM, as government financial support is critical and important in order to speed up and drive developments in organisations (Brown *et al*, 1998). Moreover, as the main body responsible for providing an appropriate environment in particular across developing countries (Curry *et al.,* 2002), the government should establish a co-operation and coordination system between organisations in addition to encouraging them to exchange best practises

The following sub-hypotheses are further developed in order to investigate the position of the control on subject matter. All results of the hypothesis testing are presented in Tables 7.15 and 7.20 in Chapter 7. The hypotheses are as follows:

$H_{18\text{-}1}$*: There is no statistically significant difference regarding lack of government support as an obstacle to the successful and effective application of TQM across participants from oil and gas organisations.*

As for the first category in this cluster, the results in Table 7.20 with the estimated p=0.847 show that there is no statistically-significant difference regarding lack of government support as an obstacle to the successful and effective application of TQM across participants from petroleum organisations.

$H_{18\text{-}2}$*: There is no statistically significant difference regarding lack of government support as an obstacle to the successful and effective application of TQM across various age groups within the sector.*

Similarly, for this category the results in Table 7.20 suggest that the null hypothesis is accepted, which implies that there is no significant difference regarding lack of government support as an obstacle to the successful and effective application of TQM across various age groups within the sector.

$H_{18\text{-}3}$: There is no statistically significant difference regarding lack of government support as an obstacle to the successful and effective application of TQM across various qualification profile groups within the sector.

As for the qualification profile category, the statistical results in Table 7.20 again failed to reject the null hypothesis, which suggests that there is no statistically significant difference regarding lack of government support as an obstacle to the successful and effective application of TQM across various qualification profile groups within the sector.

$H_{18\text{-}4}$: There is no statistically significant difference regarding lack of government support as an obstacle to the successful and effective application of TQM across various position groups in each organisation within the sector.

The statistical analysis in Table 7.20 in Chapter 7 does not support the null hypothesis, suggesting that there is a statistically significant difference regarding lack of government support as an obstacle to the successful and effective application of TQM across various position groups in each organisation within the sector. The results further show that the respondents from top management positions have a higher mean value among others, which reflects the significant differences of their opinions and perceptions in relation to the investigated issue.

$H_{18\text{-}5}$: There is no statistically significant difference regarding lack of government support as an obstacle to the successful and effective application of TQM across various groups with different years' experience within the sector.

The statistical result in Table 7.20 supports the null hypothesis, implying that there is no statistically significant difference regarding lack of government support as an obstacle to the successful and effective application of TQM across various groups with different durations of experience within the sector.

The outcome of the above sub-hypothesis cluster testing demonstrates that only one hypothesis, position category, is statistically significant. The results further imply that the top management category scored the highest mean score, indicating that they have differing opinions in relation to whether there is lack of government support regarding the application of TQM across the oil sector.

It should be noted that the remaining hypotheses are found to be statistically insignificant, meaning that the respondents have similar views on this matter. In summary, as is evidenced from Table 8.13.3 in Chapter 8, management style has to move on to be in line with modern management styles that look to the organisation as a whole rather than as separate parts. In addition, they also consider that further flexibility should be allowed in the relationship between the owner of the oil and gas sector and the subsidiaries in terms of enhancing their management situations, as evidenced Table 8.15.2 in Chapter 8.

9.3.13. Resources and Requirement for TQM: Hypotheses Testing

Hypothesis 19: The majority of Libyan oil and gas organisations' managerial categories considered lack of resources and requirements of TQM as an obstacle to the successful and effective application of TQM across the oil and gas sector.

The results in Table 6.24 in Chapter 6 show that the majority of the respondents indicated that lack of TQM resources and requirements are considered to be an obstacle to the successful and effective application of TQM across the petroleum sector. This suggests that the null hypothesis is accepted. In fact, the result supports the argument that there are no comprehensive and effective resources and requirements to help the organisations in question to carry out their activities. It is important to note that, based on the mean ranking, lack of resources and requirements ranked 9th with 2.458 (out of 5). This indicates that there is an obvious acceptance concerning the existence of this particular issue as a problem.

As discussed by Juran (1986), not all organisations provide resources to achieve significant change as expected by TQM. In relation to this study, the results in Table 8.15.1 in Chapter 8 show that the owner of NOC must provide all the necessary resources to its subsidiary organisations to be able to ensure TQM. Furthermore, the high management level in many petro-chemical companies asked for clear independence for all petrochemical organisations in order to deal directly with suppliers and clients and to have the right to improve their managerial and operation activities freely and continuously as can be evidenced from Table 8.15.2 in Chapter 8.

It should be noted that the period of sanctions in Libya, as discussed earlier in section 4.5.1 in Chapter 4 influenced the organisational strategies within the Libyan business

environment, especially across the oil sector, as the focus was on how to maintain a business in terms of tools, equipment *etc.* for about 10 years, which in turn, affected the efficient running of organisations and their management. Working under sanctions led to a particular organisational culture, which can be considered as an important factor which impacted many variables as studied by this research, which is not limited to the availability of resources for TQM. The organisational culture was based on coping on a day-to-day basis rather than being proactive, and this culture still exists in some form in some state departments.

As discussed in the literature review, TQM requires resources to be available in order to sustain the organisation over the full period of implementation and beyond (Nwabueze, 2001). Therefore, TQM needs to be effectively offered and proper organisational structure needs also to be developed for the efficient implementation of TQM. In addition, sufficient technology, statistical tools, and positive quality management practices have to be offered to support TQM. This confirms the results presented in Table 8.14.4 in Chapter 8. Furthermore, a review of the entire organisational system, with the purpose of providing all the required resources is essential to in order to overcome the observed deficiencies.

With the objective of exploring whether there are any statistically significant differences in the opinions across the groups in each of the organisations selected, the following hypotheses were formulated. In order to respond to the hypotheses, again the Kruskal- Wallis test was used. The results of the analysis are presented in Tables 7.16 and 7.20 in Chapter 7.

$H_{19\text{-}1}$: There is no statistically significant difference regarding lack of resources and requirements of TQM as an obstacle to the successful and effective application of TQM across participants from oil and gas organisations.

The findings presented in Table 7.20 at $\alpha = 0.10$ and with the estimated *p*-value = 0.096 show that statistically there is a significant difference regarding lack of resources and requirement of TQM as an obstacle to its successful and effective application across participants from petroleum organisations. Consequently, the null hypothesis is rejected. The results further show that the respondents from RASCO have a higher mean value in comparison with the other sampled organisations, which

reflected the significant differences in their opinions and perceptions in relation to the investigated issue. The significant differences can be attributed to the fact that each of these organisations has their unique management personnel, who in turn have different concerns and priorities and possibly a similar lack of resources and requirements.

$H_{19\text{-}2}$: There is no statistically significant difference regarding lack of resources and requirements of TQM as an obstacle to its successful and effective application across various age groups within the sector.

The results in Table 7.20 suggest that the null hypothesis is accepted, implying that there is no statistically significant difference regarding lack of resources and requirements of TQM as an obstacle to its successful and effective application across various age groups within the sector.

$H_{19\text{-}3}$: There is no statistically significant difference regarding lack of resources and requirements of TQM as an obstacle to its successful and effective application across various qualification profile groups within the sector.

The result in Table 7.20 with the estimated p=0.821 also indicates that the null hypothesis is accepted which suggests that there is no statistically significant difference regarding the lack of resources and requirements of TQM as an obstacle to its successful and effective application across various qualification profile groups within the sector. The results further show that those respondents with high school diplomas are more likely to state that there are significant differences.

$H_{19\text{-}4}$: There is no statistically significant difference regarding resources and requirements of TQM as an obstacle its successful and effective application across various position groups in each organisation within the sector.

For the fourth hypothesis, the test results in Table 7.2 are unable to reject the null hypothesis, suggesting that there is no statistically significant difference regarding the lack of resources and requirements of TQM, as an obstacle to its successful and effective application across various position groups in each organisation within the sector.

$H_{19\text{-}5}$: There is no statistically significant difference regarding lack of resources and requirements of TQM as an obstacle to its successful and effective application across various groups with different durations of experience within the sector.

Similarly, the result in Table 7.20 of the Kruskal Wallis test with the estimated p=0.463 confirms the null hypothesis that there is no statistically-significant difference regarding lack of resources and requirements of TQM as an obstacle to its successful and effective application across various groups with different durations of experience within the sector.

In brief, regardless of reaching the significant differences level in sub-hypotheses cluster, the results gathered more or less indicated that serious efforts from the owner of national oil companies and their subsidiaries need to be made towards addressing the current situations through extensive and deep research with the objective of providing the necessary resources effectively and efficiently to help carry out the process of the application smoothly.

9.3.14. Management Attitude: Hypotheses Testing

Hypothesis 20: The majority of Libyan oil and gas organisations' managerial categories considered poor management style as an obstacle to successful and effective application of TQM across the oil and gas sector.

The results in Table 6.25 in Chapter 6 validate the null hypothesis in this section that in general, the majority of the Libyan petrochemical organisations' managerial categories considered poor management style as an obstacle to the successful and effective application of TQM across the sector. It should be noted that based on the mean value ranking, the management style ranked 3rd with 2.64 (out of 5). This indicates that there is a considerable agreement concerning the existence of the identified obstacle. As discussed in the literature, in order for successful implementation of TQM and in order to accomplish the desired results, the structure of the organisation, management style, promotion and compensation systems, communications, procedures, processes and systems must reflect the values and principles of TQM (Rad, 2006).

In this regard, this study found that there are, to some extent, excessive layers of management in the sampled organisations. Furthermore, there is a high frequent turnover of employees (especially professionals) within the Libyan petroleum companies as can be seen from Table 6.25 in Chapter 6. It should be noted that this result is in line with the discussion in Chapter 4. In addition, management style within the organisation perhaps does not encourage and motivate individuals to be innovative and efficient. Overall, this finding is more or less in line with Hickson and Pugh's (1995) findings that in many Arabic organisations, the management culture features constant changes within the staff and high levels of uncertainty at work where social formalities are considered important. Furthermore, decision-making processes are affected by the prevalence of familial patterns and paternalistic attitudes with a clear absence of western-style democratic systems.

Hence, if the organisations studied need to bridge the existing gap, they must integrate the quality information system with the existing traditional management information system at management level. In addition, ability and performance should significantly outweigh position and seniority in importance. The company should not be centrally controlled with a high level of delegation; authoritarian management style must not predominate within organisations. Besides, decision-making is constantly pushed upwards in the organisation. It is worth considering that the promotion of directors and managers has to be based on qualifications and high experience together with high efficiency. In short, the TQM implementation and development process must be thought about as a feature of the economic development programme.

Taking all of these into consideration, in order to identify whether there are any significant differences across various groups of the control variables, the following sub-hypotheses were constructed. The results of the hypothesis testing can be referred to in Tables 7.16 and 7.20 in Chapter 7.

$H_{20\text{-}1}$: There is no statistically significant difference regarding poor management style as an obstacle to the successful and effective application of TQM across participants from oil and gas organisations.

The statistical test result in Table 7.20 suggests that the null hypothesis is accepted, which confirms that there is no statistically significant difference regarding poor

management style as an obstacle to the successful and effective application of TQM across participants from oil and gas organisations.

$H_{20\text{-}2}$: There is no statistically significant difference regarding poor management style as an obstacle to the successful and effective application of TQM across various age groups within the sector.

Based on the results depicted in Table 7.20 in Chapter 7, which is the product of the Kruskal Wallis test, the null hypothesis has to be rejected due to estimated *p*-value =0.024% is lesser than the critical value of 0.05. Therefore, the alternative hypothesis is accepted implying that there is a statistically significant difference regarding poor management style as an obstacle to the successful and effective application of TQM across various age groups within the sector. The group, which is the 20-30 year age group, seems to have significant differences in their opinions regarding lack of management attitude.

$H_{20\text{-}3}$: There is no statistically significant difference regarding poor management style as an obstacle to the successful and effective application of TQM across various qualification profile groups within the sector.

The statistical test in Table 7.20 reveals that there is no statistically significant difference regarding poor management style as an obstacle to the successful and effective application of TQM across various qualification profile groups within the sector.

$H_{20\text{-}4}$: There is no statistically significant difference regarding poor management style as an obstacle to the successful and effective application of TQM across various position groups in each organisation within the sector.

Based on the results in Table 7.20 in Chapter 7, there is no statistically significant difference regarding poor management style as an obstacle to the successful and effective application of TQM across various position groups in each organisation within the sector.

$H_{20\text{-}5}$: There is no statistically significant difference regarding poor management style as an obstacle to the successful and effective application of TQM across various groups with different durations of experience within the sector.

For the final category, again the testing results according to Table 7.20 confirmed that the null hypothesis is to be accepted, which means that there is no statistically significant difference regarding poor management style as an obstacle to the successful and effective application of TQM across various groups with different durations of experience within the sector.

In summary, in relation to the above sub-hypotheses, only four out of five null hypotheses are accepted and the remaining one is rejected. The rejected hypothesis category is the age category, whereas the accepted null hypotheses are related to the organisation, qualification, position and experience categories. As discussed earlier in Chapter 7, the high mean score which reflects significant difference level can be seen in favour of the 20-30 years of age group. It is normally expected that the age category would be the most effective contributor, as can be gathered from Table 7.19 in Chapter 7.

Lastly, regarding the results obtained from above hypotheses, it is obvious that no TQM studies or research have been provided by the government to help guide state companies in applying and developing a TQM system, with a high-trust atmosphere and a transparent information system alongside high levels of organisational disclosure. In addition, efficient implementation of TQM requires delegation of power rather than centralisation. These perhaps can be considered to help to bridge the observed shortcomings in the implementation of TQM and can address the surrounding difficulties, which occur from the lack of an efficient management style in the sampled oil and gas organisations in Libya.

The preceding findings suggest that the examined barriers or obstacles facing the efficient implementation of TQM exist within the questioned organisations. Therefore, the following section intends to determine what other important obstacles may exist to prevent the potential successful and effective implementation of TQM across the petro-chemical sector.

9.4. CONCLUSION

This chapter has aimed at providing an interpretative discussion through hypothesis testing by developing an integrated approach in relation to various aspects of TQM implementation in Libyan oil and gas organisations. As discussed in this chapter a number of barriers have been encountered in the implementation process of TQM across the petro-chemical sector with different degrees of impact. However, it is difficult to single out the impact of each of these obstacles or barriers facing the effective implementation of TQM.

In discussing these issues, this chapter tested 20 main hypotheses, most of which were accepted indicating the statistical significance of the respective hypothesis. This does not imply that the rejected hypotheses do not have any meaning for the issues discussed in this chapter, simply that they have not been proved by statistical norms or by the majority of the respondents. The similar pattern could not be reached in the sub-hypotheses, however.

In summarising all of the hypotheses and the decisions made in relation to each one of them, Table 9.1 illustrates the results and decisions for all the hypotheses together.

Table 9.1: Summary of the Hypotheses Testing and Decisions

No	Hypothesis	Decision
1	H_0: The majority of Libyan oil and gas organisations' managerial categories have appropriate level of awareness about quality.	Accept H_0:
2	H_0: The majority of Libyan oil and gas organisations' managerial categories have appropriate and fair level of knowledge about quality management techniques.	Accept H_0:
3	H_0: The majority of Libyan oil and gas organisations' managerial categories have appropriate and fair level of awareness of the concept of TQM.	Accept H_0:
4	H_0: The majority of Libyan oil and gas organisations' managerial categories have appropriate and fair level of awareness and understanding regarding the reason behind employing TQM within their organisation	Accept H_0:
5	H_0: The majority of Libyan oil and gas organisations' managerial categories have appropriate and fair level of understanding and knowledge regarding TQM.	Reject H0:
6	H_0: there are many possible obstacles and barriers which prevent successful and effective application of TQM from the majority of the Libyan oil and gas organisations' managerial categories perspectives.	Accept H_0:
7	H_0: The majority of Libyan oil and gas organisations' managerial categories considered top management and leadership commitment as an obstacle to the successful and effective application of TQM across oil and gas sector.	Reject H0:
8	H_0: The majority of Libyan oil and gas organisations' managerial categories considered organisational culture as an obstacle to the successful and effective application of TQM across the oil and gas sector.	Accept H_0:
9	H_0: The majority of Libyan oil and gas organisations' managerial categories	Reject

	considered lack of employee involvement and empowerment as an obstacle to the successful and effective application of TQM across the oil and gas sector.	H_0:
10	H_0: The majority of Libyan oil and gas organisations' managerial categories considered employee resistance to change as an obstacle to the successful and effective application of TQM across oil the and gas sector.	Reject H_0:
11	H_0: The majority of Libyan oil and gas organisations' managerial categories considered quality strategic plan as an obstacle to the successful and effective application of TQM across the oil and gas sector.	Accept H_0:
12	H_0: The majority of Libyan oil and gas organisations' managerial categories considered lack of employee training, development and education as an obstacle to the successful and effective application of TQM across the oil and gas sector.	Accept H_0:
13	H_0: The majority of Libyan oil and gas organisations' managerial categories considered lack of information and communication as an obstacle to the successful and effective application of TQM across the oil and gas sector.	Accept H_0:
14	H_0: The majority of Libyan oil and gas organisations' managerial categories considered lack of continuous improvement and innovation as an obstacle to the successful and effective application of TQM across the oil and gas sector.	Accept H_0:
15	H_0: The majority of Libyan oil and gas organisations' managerial categories considered lack of teamwork as an obstacle to the successful and effective application of TQM across the oil and gas sector.	Accept H_0:
16	H_0: The majority of Libyan oil and gas organisations' managerial categories considered lack of internal and external customer satisfaction as an obstacle to the successful and effective application of TQM across the oil and gas sector.	Accept H_0:
17	H_0: The majority of Libyan oil and gas organisations' managerial categories considered lack of measurement and evaluation as an obstacle to the successful and effective application of TQM across the oil and gas sector.	Accept H_0:
18	H_0: The majority of Libyan oil and gas organisations' managerial categories considered lack of government support as an obstacle to the successful and effective application of TQM across the oil and gas sector.	Accept H_0:
19	H0: The majority of Libyan oil and gas organisations' managerial categories considered lack of resources and requirements of TQM as an obstacle to the successful and effective application of TQM across the oil and gas sector.	Accept H0:
20	H0: The majority of Libyan oil and gas organisations' managerial categories considered poor management style as an obstacle to the successful and effective application of TQM across the oil and gas sector.	Accept H0:
21	H0: There are further possible obstacles and barriers which prevent successful and effective application of TQM from the majority of the Libyan oil and gas organisations' managerial categories ' perspective.	Reject H_0:

As can be seen from Table 9.1, regarding the 21 hypotheses, 16 null-hypotheses were accepted and for the remaining 5 hypotheses, the alternative hypotheses were accepted. Indeed, all the tested hypotheses (whether accepted or rejected) confirmed the fact that the tested barriers truly exist. However, in the 'rejection cases' statistical evidence within the given confidence level could not be established.

After presenting the main discussion, the following chapter is the conclusion chapter, which summarises the entire research and also provides some further reflection on the results.

Chapter 10

CONCLUSION AND RECOMMENDATIONS

10.1. INTRODUCTION

As stated at the outset, the present study aims to explore the current TQM practices within government-owned petrochemical companies (RASCO, AGOCO and COS) in Libya. After the foundational, empirical chapters and the discussion chapter, this chapter aims to bring the research to a conclusion.

This chapter begins with the conclusions relating to the research questions which were derived from the research aim and objectives through to the findings. This is followed by a summary of the major results of the research. Then, recommendations emerging from the study are presented. The significant contribution of this work to the existing literature is also noted. Finally, it draws attention and suggestions to areas for future research that arise from it and ends with the chapter epilogue.

10.2. REFLECTING ON THE FINDINGS THROUGH THE RESEARCH QUESTIONS

This research aims to explore and analyse the application of TQM in Libyan oil and gas organisations by examining the reasons for the failure of effective application of TQM according to the perceptions of various levels of staff in those organisations. This study also aims to identify factors, which are considered preventing the effective implementation of TQM in Libyan oil and gas organisations. Chapter 1 provided the detailed research aims and objectives, while Chapter 5 presented the hypotheses as part of the operationalization of the research.

Overall, the research attempted to answer the main research question regarding the state of the application of TQM across the Libyan oil and gas organisations. In order to investigate this main question, the following specific research questions had to be answered, as identified in Chapter One:

(i) What has been the general development of quality initiatives throughout the managerial history? How does TQM generally work? What are the benefits that TQM can offer?

(ii) What are the possible barriers that restrict the continued effective application of TQM in Libyan petroleum organisations?

(iii) What are the reasons for the barriers and how did they emerge in the Libyan oil and gas organisations?

(iv) What methods can be offered for the successful application of TQM from the perspective of practitioners in the petro-chemical organisations?

In consideration of the first question, the first part of this study (see Chapter 2) focuses on the first question with a thorough review of the existing literature. The important quality issues of implementation were related referring to the literature.

In search of an answer to the second question, Chapter 3, as a further literature review, is focused on the possible barriers to the continued effective application of TQM by reviewing, gathering and comparing empirical studies on the common issues or obstacles affecting the application of TQM through cases from all over the world with particular attention being paid to developing countries. Through such a critical review of the existing body of empirical material, 'fourteen' potential barriers were identified as being critical for the successful and effective application of TQM in Libyan petrochemical companies. In addition, these barriers were examined through the questionnaire process and the analysis results, as presented in Chapters 6 and 7, proved the existence of the determined obstacles in the organisations in question, as presented in Chapter 9. Thus, empirical evidence from these chapters provided the answers to this research question thereby fulfilling this particular objective.

In relation to the third question, it was answered through the primary data collected through semi-structured interview method in Chapter Eight with the help of the empirical evidence presented in Chapters 6 and 7. The results helped to conclude that the selected oil and gas organisations still have a long way to go establish the culture and the environment necessary for TQM.

With regard to the fourth research question, this was also answered through the analysis of the semi-structured interviews in Chapter 8 and questionnaire survey analysis in Chapter 6 and 7, which identified the constituents of a potential strategy to bring about success in the future.

10.3. REFLECTING ON THE KEY RESEARCH RESULTS

This study established that the awareness level of 'quality' within the Libyan petroleum sector was considered to be acceptable in terms of the theoretical aspect. In addition, the empirical evidence also showed that the awareness and understanding of quality management techniques were limited to one or more ISO certificates (9001/2000-2008, 14001,18001) and the research highlighted that other types of quality techniques, as can be seen from Section 6.3.2 in Chapter 6, were known by a very limited number of managerial categories . Some Libyan organisations in various sectors have embarked on the journey of quality, in particular oil companies, by achieving ISO 9001 certified status. It should be noted that despite the fact that the ISO certificate 9001: 2000/2008 would be beneficial and indeed essential for embracing the philosophy of TQM. However, the simplistic notion that obtaining this certification would automatically result in the development of the performance of the companies is completely wrong.

In relation to the awareness and understanding of TQM theory and concept, the empirical evidence presented in this research demonstrate that the awareness level of TQM is generally rising, as the surveyed individuals in the study identified the importance and the possible benefits of establishing an effective TQM approach. However, current management style in Libyan petrochemical companies would prove to be a difficult challenge for implementing the quality management approach. In other words, it is a very hard task to employ the philosophy of TQM with the existing management structures and cultures. Furthermore, it was clear from the sampled companies that managerial categories have an acceptable level of awareness in relation to the importance and necessity of TQM to their companies, as is evident from the findings presented from Section 6.3.4 in Chapter 6 and Tables 8.7 - 8.7.7 in Chapter 8. However, chronic management difficulties such as an old/traditional management approach and 'socialism' which dominated most Libyan organisations

have had a long-lasting adverse impact, and these factors cannot all be addressed at once.

As the results evidence, there is, to some extent, theoretical awareness concerning the concept of TQM across the sector. However, the study also revealed that the level of understanding of the exact meaning of TQM is still insufficient. This led to the conclusion that effective TQM implementation has been hindered due to lack of understanding the real principles of TQM. In addition, quality models (such as: Malcolm Baldrige Model, EFQM Business Excellence Model and Deming prize) are not well known among the staff, and hence these models do not exist in management practices as indicated by the interviewees (see Table 8.9 in Chapter 8).

The core aim of this research was also to identify the state of the application of TQM within the petrochemical industry in Libya. In considering this, the current research assessed the level of TQM implementation according to the findings from the oil and gas companies in the study. The results provided evidence that these organisations have a low level of TQM implementation. In addition, the study therefore revealed that quality initiatives, in particular TQM and its practices, are deemed to be in the early stages across the sampled organisations.

The study, through empirical evidence, has also explored a set of barriers or obstacles, which were considered to have prevented the sampled companies from the effective and successful implementation of TQM. The following list presents these barriers according to the ranking produced by this study based on the importance and the strength of their impact upon the application of TQM as perceived and articulated by the participants:

Lack of information and communication: As the study revealed, there is a lack of integration between existing management information systems and quality information systems. In addition, there is insufficient communication between top management levels and lower management levels, as communication with employees, according to the perceptions of managers, are perhaps deemed as first step to the loss of superiority and respect. Furthermore, the communication channels that provide information about customer and market expectations are also not effective in

delivering the required information for improving quality generally, resulting in ineffective and inefficient mechanisms.

The problem of employee resistance to change: The findings from the overall analyses show that the majority of the respondents identified that there is no clear acceptance from the workers regarding managerial improvement programmes. This, coupled with fear stemming from real lack of understanding, results in the problem of resistance to change.

Ineffective management style: As the evidence produced from the empirical analysis shows, the organisational structure in the sampled Libyan oil and gas companies is still centralised, which in practice inhibits the management from involving and engaging employees in decision making and other activities. In addition, most management levels feel that they have to follow the hierarchical structure in dealing with lower level employees. Moreover, it seems that there are, to some extent, excessive layers of management according to the respondents. In addition, the management style within the sector does not encourage or motivate individuals to be innovative and efficient.

The absence of real teamwork: The findings show that there is no real utilisation of cross-functional teams within the selected oil and gas companies, as the study illustrated that the companies involved do not clearly and explicitly identify and train their best employees to work together as a team.

Lack of internal and external customer satisfaction: As the empirical evidence presented in this study show there is no real customer feedback system in place. In addition, there is no obvious assessment system, which determines current and future customer requirements and expectations, which may also be related to the lack of cooperation from clients. In addition, there is a considerable degree of turnover of the workforce, in particular the migration of professionals and qualified and skilled workers in various departments/units in most oil companies. This is due to the lack of internal satisfaction and also to the lack of an evaluation and feedback system.

Unsatisfactory measurement and evaluation: The study revealed that there is an inadequacy of measurement and evaluation of quality within the sector generally. In

addition, the study found that quality is not effectively measured. Therefore, the measurement and evaluation system needs to be amended to meet the purpose.

Insufficient organisational culture: The insufficiency of organisational culture can mainly be explained through bureaucratic culture, which is prevalent across Libyan petrochemical companies. In addition, the existence of external and internal intervention from other state departments is also a source of this process. Importantly, the action of moving people across some oil and gas organisations to different position and jobs without any rationale is an indication of an ineffective organisational culture, which results in a negative social environment. Furthermore, 'socialist organisational culture', which until recently has dominated the Libyan economic policy is deemed to be a reason for the existing undesirable culture.

The absence of a culture of continuous improvement and innovation: The study revealed that there is no actual indication in relation to effectiveness of promotion of innovation across the companies in the study. In addition, this study also showed that the role of the R&D department for innovative developments within the sector is insignificant if not non-existing at all. This is perhaps due to the fact that most managers are not convinced that such activities and theories of TQM are worthy of effectively working within the oil business environment. Furthermore, in most cases, the R&D department was not working. Moreover, the results indicate that serious attention has not been effectively paid to the activities of continuous improvement across the sector.

Lack of resources and requirements of TQM: As discussed in the empirical chapters there is no comprehensive and effective resource deployment to help the organisation to carry out its TQM activities as would be requested by an effective and efficient organisation.

Inadequacy of top management and leadership commitment: Although there is, to some extent, a degree of commitment, oil and gas companies still lack some commitment to TQM from top management, which should be considered responsible for the failures in implementing TQM in its entirety. The findings demonstrate that almost half of the respondents agreed that lack of management and leaders' commitment is one of the reasons for the failure of TQM efforts.

Insufficient employee training, development and education: The study stressed that a high percentage of managerial categories agreed that employees were not trained in problem identification and problem solving techniques. In addition, there are no group discussions or communication techniques and training sessions in place. Moreover, employees do not receive enough training in quality improvement skills, and there is no real concentration on the ongoing development of personnel by establishing training programs to cover all aspects of TQM. As the results show, there is an obvious lack of staff training in petroleum companies regarding TQM techniques.

The absence of quality strategic planning: The findings from the overall analyses show that most management level personnel in the Libyan oil sector are less concerned with long-term vision, which in turn, results in the ineffective implementation of TQM.

Lack of employee involvement and empowerment: As discussed in the empirical chapters, there is no comprehensive, effective and clear involvement for all employees to be a part of the organisational activities and tasks. The findings further confirmed that there is a lack of participation by employees and also the empowerment level of employees is very limited.

Lack of government support: As the results indicated, no government departments (the owner NOC) have imposed or advised that TQM be employed within the oil sector. In addition, it is also emphasised that the application process of TQM is mainly due to personal motivation and stems from the needs of organisations. In addition, the laws and regulations imposed by the state are considered to be barriers rather than facilitators to adapting the philosophy. Furthermore, there have been inadequate studies from governmental departments to help guide the organisations in developing a TQM system. The study also revealed that the government is only concerned with the level of productions and not with the operation of the organisations.

As indicated by empirical analyses, this study identified a long list of factors, which are considered to be hindering the effective and efficient implementation of TQM in Libyan petrochemical organisations. Based on these results, the following section

presents a set of recommendations aimed at improving the situation in the Libyan petrochemical industry.

10.4. SIGNIFICANT CONTRIBUTION OF THE STUDY

As mentioned before, Chapters 6, 7, 8 and 9 highlighted the contributions of the research in terms of providing empirical evidence through primary data on the case study. Thus, this research has contributed to the literature by providing evidence related to a particular case study, namely that of Libyan oil and gas companies, for which there has been nothing available to date in the body of knowledge in terms of quality and TQM implementation. It definitely contributes to the understanding and knowledge of TQM and its related issues in the case of the three Libyan oil and gas companies: RASCO, AGACO and SOC. In addition, the empirical analyses and the findings inform the recommendations that this study developed for the companies in question, to the government and Libyan policy makers, and to other NOC.

Another significant contribution of this study is the identification of a number of barriers which was found affecting the implementation of TQM in oil and gas companies. After the process of analysis carried out in the empirical Chapters 6, 7 and 8 and the interpretative discussions in Chapter 9, this research categorised the obstacles that affected the three companies or organisations covered by this study. the findings established by this study could be utilised by these companies and others in the form of a tool to assist in the evaluation of the current situations of the companies.

As an important contribution, it should be noted that the quality and TQM studies presented in the literature review chapters mostly relate to the cases from developed countries. Therefore, there has been, to some extent, a shortage in the literature of empirical studies/research on the subject matter related to developing countries in general and Libya in particular. Thus, this study has filled a particular part of the knowledge gap regarding Libyan oil and gas companies but also in relation to other developing countries that have similar business environments. Thus, the novelty of this study stems from the fact that it is a unique case study on a particular topic (TQM implementation) specifically relating to Libyan oil and gas organisations. Therefore, the present research makes a modest contribution to addressing this matter across the petrochemical industry in Libya.

This research, in addition, provides a common language for academics, researchers and other related parties to discuss the factors influencing the adoption of TQM and its aspects across the Libyan oil and gas sector. It also offers valuable and vital contributions to the understanding of the relevant issues of the practitioners within this field. Furthermore, the research reinforces recent calls for Libya to develop a research environment. Hence the researcher recommends adopting suitable and valuable research and development programmes across Libyan petrochemical companies in order to facilitate and ease the process of any adopted managerial initiatives such as TQM philosophy.

The present research additionally contributes by presenting useful recommendations for the management of RASCO, AGACO and SOC to properly apply the techniques, models and tools of quality which will assist the companies in developing overall performance. In addition, the study provides detailed findings and evidence to assist the companies involved to develop their internal business environment to allow such management initiatives to be performed well.

In fact, the lessons learnt from this study could be applied to other companies with a similar work environment. Furthermore, the barriers highlighted in this study will definitely help other Libyan companies to conduct self-assessment for their TQM culture. Moreover, the current study comprehensively focussed on exploring, identifying and investigating the obstacles that prevent the effective implementation of TQM in the three case organisations (RASCO, AGACO and SOC), which may be relevant to public sector companies generally. Since the main obstacles preventing an efficient application of the TQM were identified in this study, most Libyan companies can consider them when starting to implement the philosophy of TQM successfully and effectively from the beginning point. Thus, it may provide them with an effective way as to what type of obstacles need to be addressed in order to assist the companies to implement the right form of TQM.

Generally, the recommendations as contributions of the current study can be considered useful for many parties, for instance NOC, in their orientation and efforts to stimulate and support oil and gas companies to adopt TQM philosophy. In addition, the results of the study may assist the Libyan policy-makers in setting plans, instructions, procedures, standards and rules in this area. They can, moreover, be used

by NOC and other related parties in Libya to better coordinate and redirect and amend their work efforts and targets, as well as to increase their productivity, efficiency and effectiveness.

The results of the current research are expected to stimulate and encourage others to undertake follow-up research on quality, particularly in the area of TQM. Indeed, the current study perhaps opens the doors for researchers and academics to undertake further research to explore and identify additional elements affecting the adoption of TQM, since it is becoming an increasingly important and critical part of the business world.

Lastly, the study has made an important contribution to the researcher's personal development. As a result of the PhD process, the researcher has gathered a wide range of research skills as well as a deep understanding regarding quality and TQM. The personal development will perhaps make it easier for the researcher to capitalise his experience and knowledge to provide effective and appropriate input in the future to assist in deploying the TQM culture and concept across Libya, aiming at developing the country as a whole in various aspects.

10.5. RECOMMENDATIONS

In line with the findings established in this study, and considering that oil and gas companies are in search of achieving successful and effective implementation of TQM, the following critical recommendations have been developed with the objective of improving the quality initiatives within the Libyan petrochemical organisations sampled by this study:

(i) The transition to TQM philosophy is essential in impacting the overall operations of the organisations in question, including the employees who are constrained by the old managerial practices. This, however, requires managerial categories to be effective and successful agents of such change; they should be active agents of change in terms of educating themselves and their personnel and become effective role models in leading quality initiatives. Managers should be aware of the global changes by noting the international paradigms of management that cross national boundaries, the changes sweeping the world, the new information revolution, the introduction of new technologies, the creation of the global market and the shift towards customer

focused strategies. Maintaining the old approaches and policies will not bring about change and all efforts to implement the philosophy of TQM will be merely a waste of time and resources. Thus, step by step improvements must be carefully tailored until the major issues are clearly resolved.

(ii) For effective implementation of TQM, the oil sector should develop a system for all managerial and operational processes to measure improvements in its managerial and operational performance in order to accomplish its objectives and targets to prevent failure or to minimise negative impact on the development programmes. The system should offer a clear idea as to what data and information is needed to allow effective decision-making and ease the flow of important and critical information. In addition, democratic and hence transparent policies should be developed by communicating information to entire workforce and giving fast and direct access to personnel of such information through various communication nets and channels. Therefore, enhancing the base of the information is necessary and critical across petrochemical companies as is investing in the available tools, technology and programmes to provide valuable and vital information in line with the aim that all staff should understand the importance and the criticality of the information and its role in getting managerial tasks done in an efficient and effective manner. As a first step, oil and gas companies' activities must be evaluated and audited, which in turn, should lead to best practice for reaching continual improvement.

(iii) The implementation of most quality initiatives, in particular philosophy of TQM, requires dynamic strategic planning, which necessitates a systematic, consistent, integrated and company-wide approach. Therefore, responsible parties/bodies should regularly and systematically review the status of the strategic plan explicitly with the purpose of adapting to the changing circumstances.

(iv) Orientation towards quality initiatives definitely needs major changes in management philosophy and behaviours; as at the starting point, clear belief and deep commitment towards quality generally from the entire company staff is required, in particular from top management. In addition, developing quality also requires certain resources, clearly-distinguished priorities, time and patience. In fact, quality initiatives as continuous improvement activities are a never-ending process.

Therefore, upper management should understand their critical roles in helping to reach success in any development programmes.

(v) It is important to develop and re-evaluate the efforts of the research and development activities across petrochemical companies within the frame of developing an internal culture which could help to involve all the units/departments of each company.

(vi) Top management must be aware and thoroughly understand the essential concept, principles, methods and tools of TQM philosophy or any other quality management initiatives that they are looking to employ, with commitment being a must. Managerial leaders have to know how to establish a vision and how to inspire the workforce to attain the fulfilment of the company's objectives. Top management and leaders should listen to their employees' suggestions, ideas and requirements and act on key issues raised by them.

(vii) The existing management styles across the Libyan petrochemical companies need urgent revision and a move towards organisational culture that suits the philosophy of TQM. As the current situation will certainly lead to continued failure, a completely different approach is required and a new appropriate culture and style needs to be introduced. In this regard, leaders and managers need to thoroughly and seriously revise their companies' culture and approach to management and compare it to the required TQM culture in order to define the existing gaps; then they should set in place strategies that fill those gaps perfectly.

(viii) Training programmes need actual re-insight and extensive review to lead processes of change. They should include the tools, techniques and methods to create an appropriate environment, where quality initiatives can be introduced and employed successfully. Training must cover the principles/fundamental of TQM and knowledge to be aware of the key role of the system. The barriers faced in most companies regarding the effective implementation of TQM can only be successfully and effectively addressed through the correct, extensive training programmes. Additional and extensive research should be carried out with significant attention to training needs analysis.

(ix) Employee involvement and empowerment is a new way of managing companies towards a more complex and competitive future. Therefore, significant attention and extensive care must be paid to their human resources. Creating the right conditions for change is essential through making employees aware of the pressures for change, providing regular and definite feedback on the performance of individuals and a greater recognition of the saliency of the employees' lives. In addition, reward systems need to be re-designed to show that the importance of the awareness of employees, innovation, productivity and creativity for success is essential. In addition, they must be given support by the companies to solve their problems and difficulties to overcome the barriers that might be expected to prevent them from being involved positively in all company activities. It can be safely stated that TQM strategy is perhaps deemed to fail without the empowerment and involvement of employees. Therefore, to be an effective and successful institution, companies should provide their employees with appropriate information, knowledge, power, rewards and recognition relevant to the business performance environment.

(x) Based on the findings, a comprehensive legislation regarding quality initiatives must be drawn up. In fact, there should be a quality policy with planning and legislation at government level. The government should play an important and critical role in building a quality environment by emphasising the importance and sensitivity of quality for organisations across the country and also by enforcing regulative issues to allow quality and its related activities to be recognised by all sectors. This could take place with the establishment of a central institution concerned with improving quality in all Libyan industrial organisations and the duty of this institution could be identified as follows:

(a) Setting and designing essential regulations, standards, policies and instructions for leading quality assurance;
(b) Emphasising awareness and understanding of the importance and criticality of TQM culture and its practices across the country;
(c) Supporting a culture of learning regarding quality in general and TQM in particular through conferences, seminars and research along with other activities in the field of quality;

(d) Providing consultancy, technical and managerial services in the field of TQM including education and training along with other training programmes aimed at improving skills;

(e) Establishing 'national awards' in terms of achieving quality standards to be given to the organisation(s) that have employed TQM or any quality initiatives effectively and successfully.

(xi) New departments/units should be established in all oil and gas companies to deal with quality and quality initiatives programmes. These departments/units would supervise the implementation of the suggestions that offered from the internal organisation environment and also be responsible for addressing any difficulties that may occur.

(xii) Finally, it is important to adopt the issue of quality in the education and training curriculum of the schools, institutions and universities. In the post-revolution Libya, such matters can perhaps better articulated through developing a participatory society.

10.6. SUGGESTIONS FOR FUTURE RESEARCH

As the current research is exploratory in nature, consequently, there are many areas related to quality initiatives, in particular to TQM, which need to be addressed in future research. This study has focused on the barriers effecting TQM implementation in the Libyan context. Hence, the findings of this research raise many research possibilities related to TQM generally. It investigated a wide range of issues surrounding the practices of quality initiatives. Consequently, it offers avenues and opens up opportunities for more in-depth research related to quality initiatives, particularly in areas such as TQM.

This section therefore puts forward some suggestions for future research which emerged from the findings as follows:

(i) One future research possibility would be to repeat the present research in a few years' time on the same selected companies or to consider other companies in the same sector. In other words, in years to come additional research could consider a longitudinal study. In other words, comparative research could be made on the extent

of TQM implementation. Such research could perhaps provide a better understanding of TQM practices.

(ii) There is a real need for future studies to offer a broad overview of the practices of TQM in Libyan public sectors, such as the education and health sectors and also in private organisations. This could establish the level of quality initiatives in the investigated sectors, and could help to suggest potential developments. The possible findings of those studies would assist in describing the state of TQM in these sectors and perhaps provide an opportunity to compare the findings and identify the similarities and differences in the practices of TQM philosophy between these sectors in Libya. In addition, further extensions to the current study are needed in order to increase our understanding and knowledge in this virtually neglected area.

(iii) The current study illustrated a lack of government pressure on petrochemical companies to adopt quality initiatives such as TQM. Another important and interesting area of research might be to explore and examine in depth the role of the government in leading and encouraging organisations to employ quality initiatives with the help of political economy approach.

(iv) This research examined perceptions and opinions of top managers, middle management and first line management within three oil and gas companies. Further studies could include other external parties and/or gather the opinions of those who are responsible for quality in Libya. It would perhaps be worthwhile and beneficial to further understand this matter from different perspectives such as NOC and government bodies (*e.g.* consultancies and regulatory bodies). In addition, the present research analysed TQM issues from the point of view of internal managerial categories . Further research could analyse TQM issues from both internal and external (regulatory and clients) perceptions.

(v) The influence of the external culture environment could also be studied in order to investigate how the external culture environment influences style of management and ability to implement of TQM. In addition, further research is needed to investigate the role played by policy makers, educational institutions and professional bodies in the development of quality initiatives in Libya. Moreover, an investigation into the way in

which TQM can be implemented successfully and effectively would be valuable and requires the urgent attention of future studies.

(vi) Further studies need to be undertaken concerning the critical and important requirements of adopting TQM in the oil and gas sector and other sectors in the country. In addition, further research is needed to investigate the role of leadership (top, middle and first line management) across a range of industrial companies in Libya in applying TQM. It is also important to find out why there is a lack of commitment and not enough support for the success of quality initiatives generally and TQM specifically.

(vii) This research has studied the influences of particular variables such as management information systems, organisation culture, organisation structure, the availability of TQM resources, involvement of employees in management activities *e.g.* on the successful and effective implementation of TQM across services and industrial companies. Further studies are needed to explore to what extent the strategic thinking that exists across the Libyan oil sector and other sectors corresponds with the required strategic thinking of TQM. In addition, further research could be carried out to compare further quality initiatives in other developing countries with the purpose of learning from their best practices.

(viii) Considering that this study conducted during the previous regime, the responses might have been affected by the political culture of the time. Therefore, re-conducting this research under the new democratic environment of the coming year will be useful to identify the impact of political culture on the perceptions and opinion of the participants. This can also help to locate if there will have been any change in the attitudes towards quality and TQM in the concerned organisations, as the new government has announced its plan to restructure the oil and gas sector through the provision of more autonomy in terms responsibilities and also through formulating new regulations and policies for the efficient operation and effective running of these organisations. In addition, government has also made clear that NOC, which is the umbrella body for oil and gas companies in Libya, will be moved from the current location (Tripoli) to the city of Benghazi to be closer to the field operations. As for the production and export of oil, the new regime is expected to follow OPEC's rules without creating any hurdle in particular ensuring stability in the market.

10.7. EPILOGUE

This research has aimed to explore quality and the implementation of TQM in the Libyan sampled oil and gas organisations by making references to various aspects of the implementation process.

The foundational chapters provided a descriptive but also critical understanding of quality and TQM and also the mechanism of TQM. Based on these chapters, the research methodology chapter detailed the research process and its various aspects and natures. Following the research process through a field study in Libya, this research collected valuable data from Libyan oil and gas organisations through the questionnaire survey. The empirical chapters, using quantitative and qualitative methods, provided the analysis results in the form of empirical findings.

As evidenced from the foundational chapters (literature reviews), operational chapter (research methodology) and empirical chapters, as well as the discussion and contextualisation chapters, this study has fulfilled its aims and objectives. Finally, this current study has made a significant empirical contribution in the field of quality management and in particular in the field of TQM.

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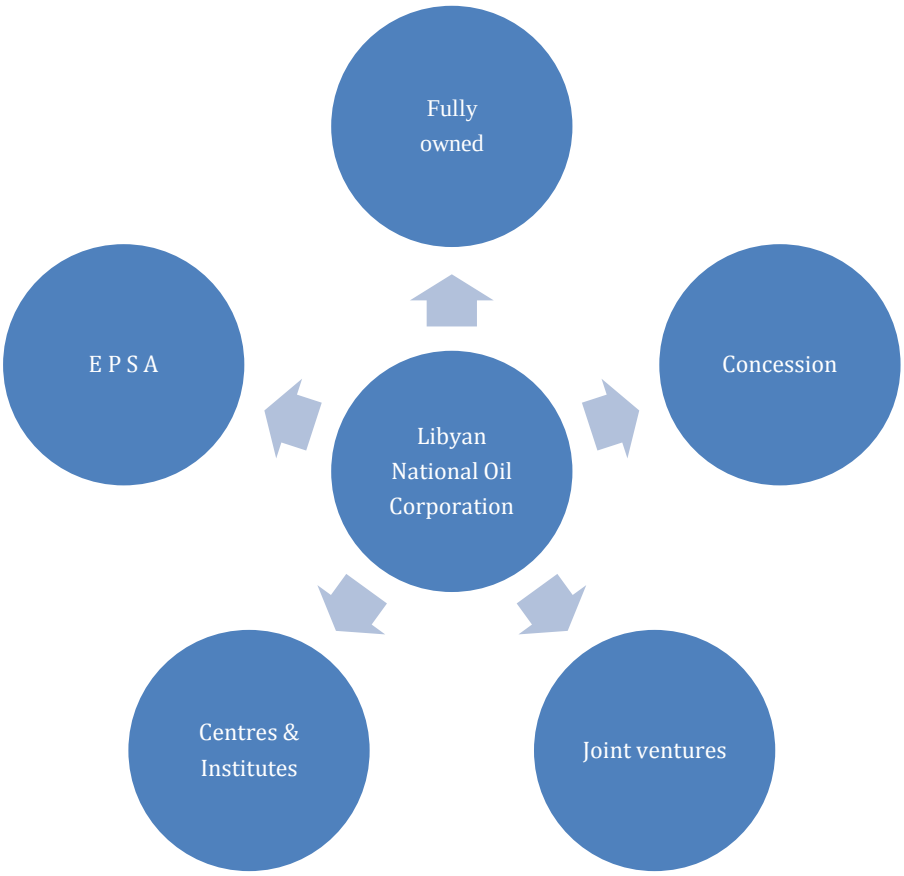
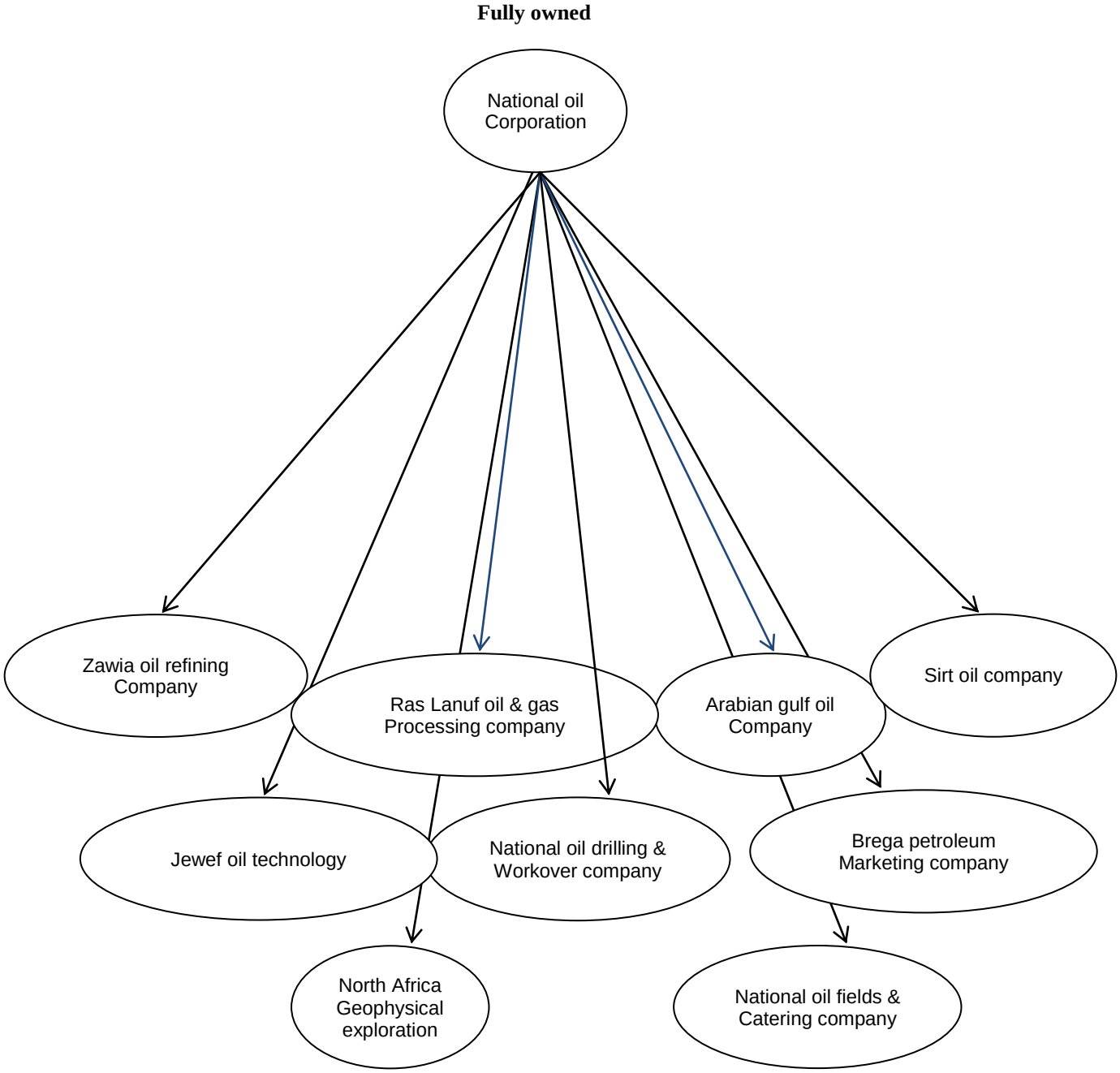
APPENDICES

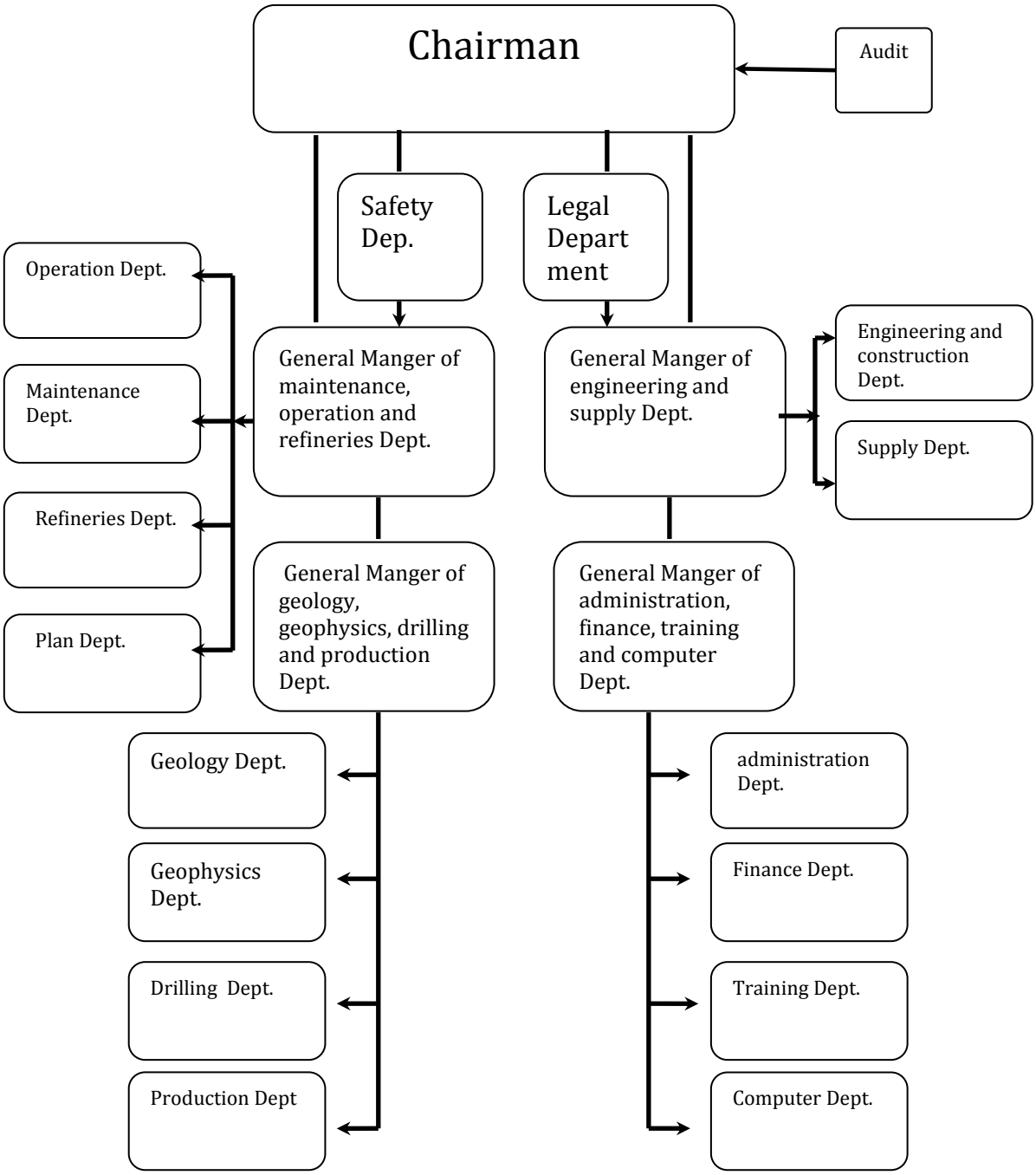
Appendix 4.1: The Organisational Structure of NOC



Appendix 4.2: The Chart of Fully Owned Companies of NOC



Appendix 4.3: The Organisational Structure of AGOCO



Appendix 4.4a: OHSAS 18001:1999

ZERTIFIKAT ◆ CERTIFICATE ◆ 認証書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

TÜV SÜD Management Service

CERTIFICATE

The Certification Body
of TÜV SÜD Management Service GmbH

certifies that

Raslanuf Oil and Gas Processing Company - Rasco
Raslanuf - P.O.Box 1971
Benghazi - Libya

has established and applies
a Safety Management System for

- **Refining of Crude Oil**
- **Production of Ethylene (Naphta Cracking)**
- **Manufacturing of Polyethylene**

An audit was performed, Report No. **70736108**

Proof has been furnished that the requirements according to

OHSAS 18001: 1999
Occupational health and safety management systems - Requirements

are fulfilled. The certificate is valid until **2009-06-30**

Certificate Registration No. **12 116 33654 TMS**

Munich, 2008-05-19

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MSS1-D/09.07

Appendix 4.4b: OHSAS 18001:2008

ZERTIFIKAT ◆ CERTIFICATE ◆ 認証書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

TÜV SÜD Management Service

CERTIFICATE

The Certification Body
of TÜV SÜD Management Service GmbH

certifies that

Raslanuf Oil and Gas Processing Company - Rasco
Raslanuf - P.O.Box 1971
Benghazi - Libya
has established and applies
a Safety Management System for

- **Production of Ethylene (Naphta Cracking)**
- **Manufacturing of Polyethylene**

An audit was performed, Report No. **70736108**

Proof has been furnished that the requirements according to

BS OHSAS 18001: 2007

are fulfilled. The certificate is valid until **2012-06-30**

Certificate Registration No. **12 116 33654 TMS**

Munich, 2009-07-28

TGA-ZM-07-92

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Appendix 4.4c: ISO9001: 2000 andISO14001: 2004

ZERTIFIKAT ◆ CERTIFICATE ◆ 認証書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

TÜV SÜD Management Service

CERTIFICATE

The Certification Body
of TÜV SÜD Management Service GmbH

certifies that

Raslanuf Oil and Gas Processing Company - Rasco
Raslanuf - P.O.Box 1971
Benghazi - Libya

has established and applies a
Quality and Environmental Management System
for the following scope of application:

- **Refining of Crude Oil**
- **Production of Ethylene (Naphta Cracking)**
- **Manufacturing of Polyethylene**

Performance of audits (Report-No. 70736108)
has furnished proof that the requirements under:

ISO 9001: 2000
ISO 14001: 2004

are fulfilled. This certificate is valid until **2011-05-01**

Certificate Registration No. **12 100/104 33654 TMS**

Munich, 2008-05-19

QMS/EMS-TGA-ZM-07-92

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MS01/09.07

Appendix 4.4d: RASCO's Company Policy of Quality

	سياسة الشركة للجودة والبيئة والسلامة والصحة المهنية **Company Policy of Quality, Environment, Occupational health and safety** RASCO-DC-01	شركة راس لانوف لتصنيع النفط والغاز

RASLANUF is a leading company, specializing in Petrochemical industry and is committed to do the following :-

- Applying the international standards for
  1. Quality management system ISO9001
  2. Environment management system ISO14001
  3. Occupational health and safety management system OHSAS18001
- Provide quality, health and safety, environment objectives and make reviews to assure the implementation of these objectives periodically and consider them as a foundation to create new objectives.
- Full commitment to apply the regulations and legislation related to quality, environment, Occupational health and safety.
- Give top priority to applying the (quality, environment and health & safety) systems of the company to all work and activities undertaken by the company especially those relating to the Petrochemical industry and to use the resources and the equipment through state – of – the art methods of technology to cope with the progress in the field and fully satisfying and meeting our Customers requirements and expectations.
- Provide the means of protection, safety and the required precautions for emergency cases, and the company shall define the hazards and harmful effects and provide the required plans and procedures to prevent reoccurrence.
- Make the necessary analysis for any accident whatever its effect to prevent reoccurrence in the future to secure a safe working environment.
- Training the employees to develop their personal skills to perform their work efficiently and to spread preventive awareness among them
- The continuous improvement in applying the (quality, environment and health & safety) management systems through measuring and reviews that are carried out periodically.

Quality manual (RASCO-QMS-01)
Environment manual (RASCO-EMS-01)
Occupational Health and safety manual (RASCO-SMS-01)
Express the implementation of this policy

This policy has been published on 09/03/2010 and declared, understandable and available for all employees and interested parties in the company's affairs at all levels.

راس لانوف لتصنيع النفط والغاز شركة رائدة ومتخصصة في مجال تصنيع البتروكيماويات وتلتزم إلتزاماً كاملاً بالآتي :-

- تطبيق المواصفات القياسية لأنظمة:
  1. إدارة الجودة ISO 9001
  2. إدارة البيئة ISO 14001
  3. إدارة السلامة والصحة المهنية OHSAS 18001
- وضع أهداف نظام الإدارة التكاملي (الجودة و السلامة والصحة المهنية و البيئة)، ومراجعة تحقيق هذه الأهداف دورياً واتخاذها أساساً لصياغة أهداف جديدة.
- تطبيق القوانين والتشريعات الخاصة بـ (الجودة والبيئة والسلامة والصحة المهنية).
- إعطاء الأولوية القصوى لتطبيق هذه الأنظمة على كافة المستويات والأنشطة التي تقوم بها الشركة وخاصة المتعلقة بصناعة البتروكيماويات مع الاستخدام الأمثل للموارد والمعدات من خلال تطبيق أحدث الأساليب التكنولوجية الحديثة لمواكبة التقدم والإرضاء التام للزبائن بما يحقق رغباتهم وتطلعاتهم.
- توفير وسائل الحماية والسلامة وأخذ التحوطات اللازمة لحالات الطوارئ والتعليمات المناسبة ، وتحديد المخاطر والتأثيرات الضارة ووضع الخطط والإجراءات اللازمة لمنعها.
- تحليل الحوادث مهما كان حجمها للتقليل من آثارها ومنع تكرارها حفاظاً على بيئة عمل آمنة.
- الاهتمام بتدريب المستخدمين لتنمية مهاراتهم الشخصية لتنفيذ أعمالهم بكفاءة ، ونشر الوعي والحس الوقائي بينهم.
- التحسين المستمر في أداء نظم الجودة والسلامة والصحة المهنية والبيئة ، وذلك من خلال القياس والمراجعة التي تتم دورياً.

يعتبر دليل الجودة رقم (RASCO-QMS-01)
ودليل البيئة رقم (RASCO-EMS-01)
ودليل السلامة والصحة المهنية رقم (RASCO-SMS-01)
التعبير الحقيقي عن مفهوم التطبيق لهذه السياسة

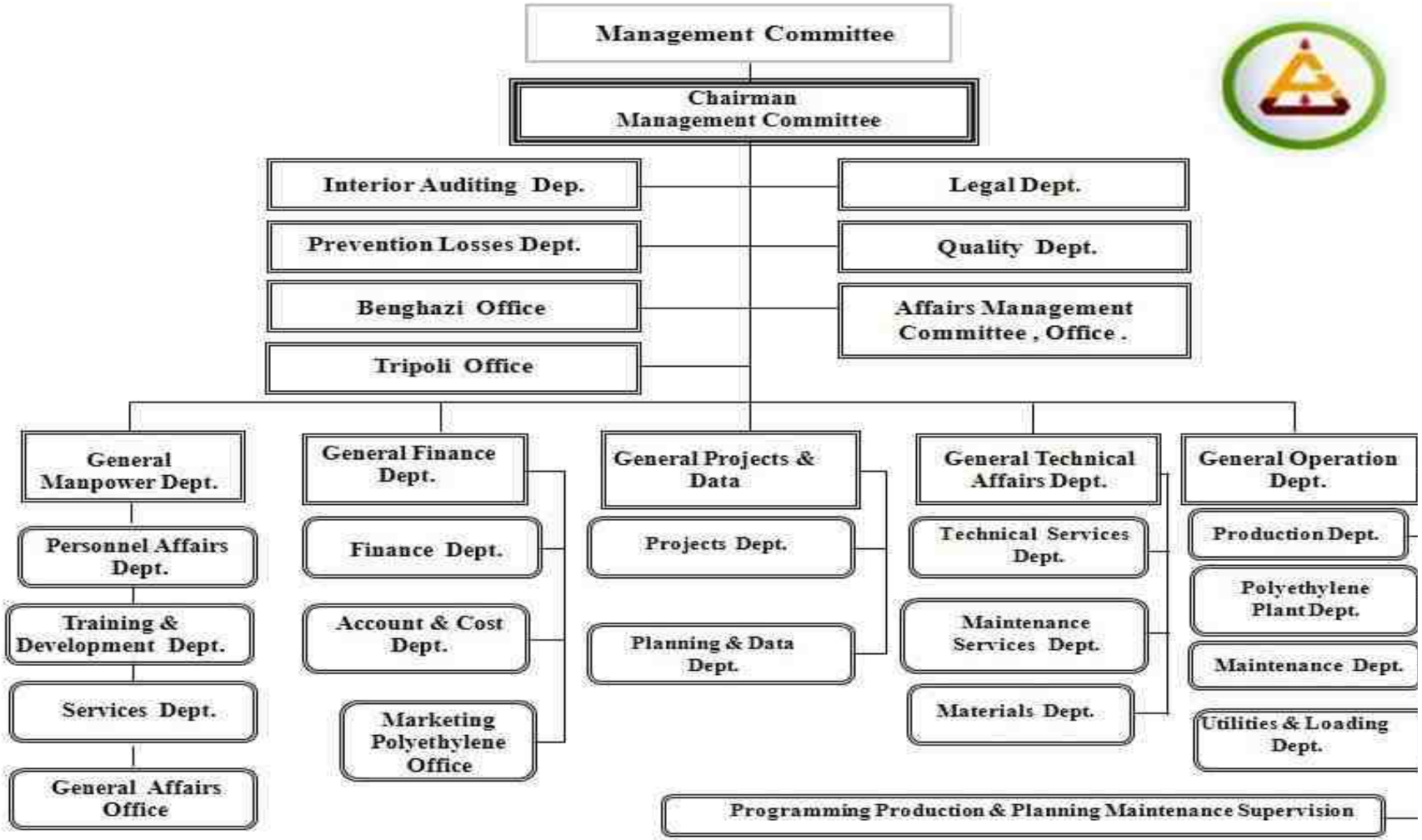
تم نشر هذه السياسة بتاريخ 2010/03/09 ، وهي معلنة ومفهومة ومتاحة لجميع المستخدمين والمهتمين بشؤون الشركة على جميع المستويات.

والله ولي التوفيق
2010/03/15
لجنة الإدارة
Management Committee

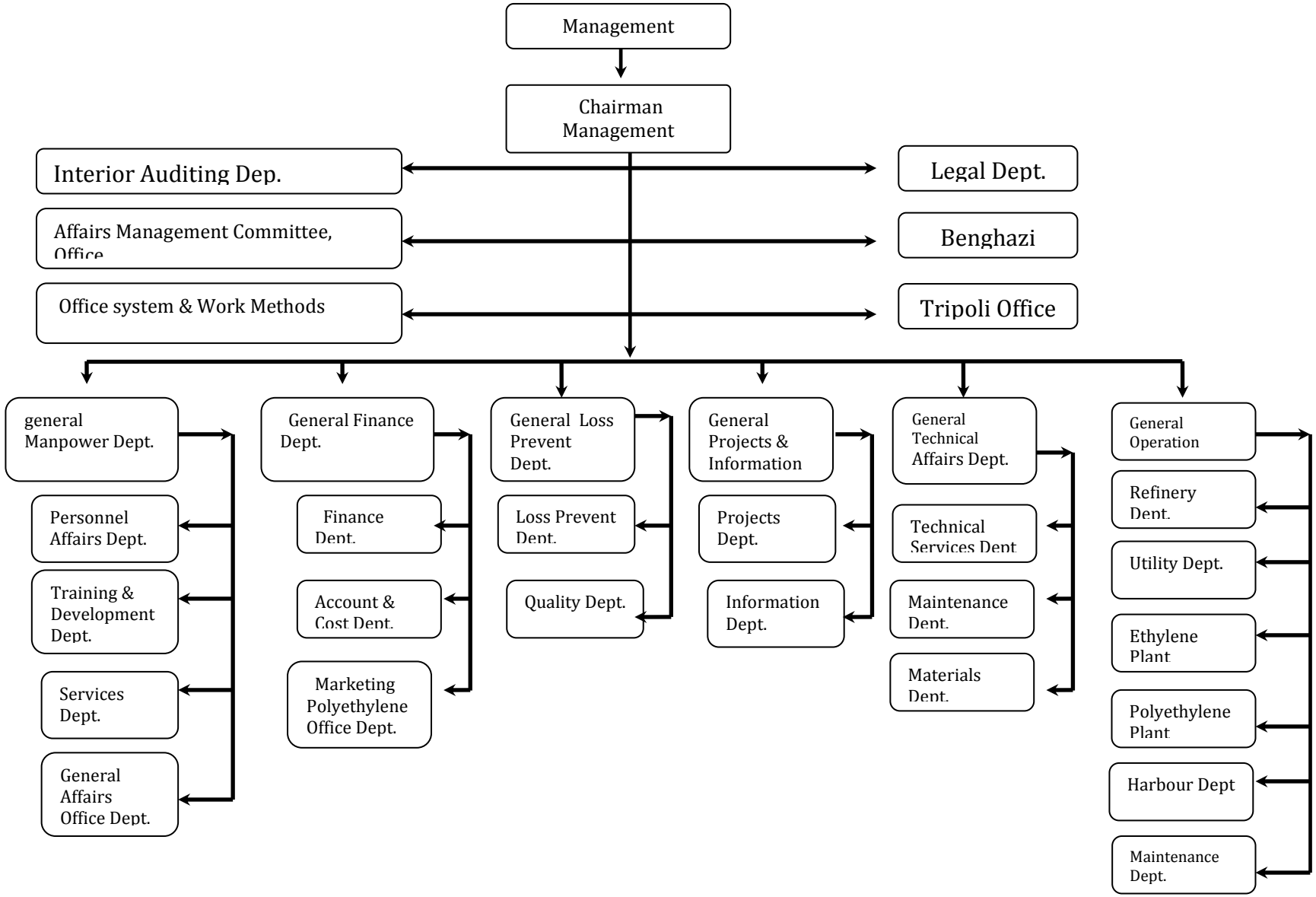
Issue No. (02) Date: 05/01/2010

Page No: 1 of 1

Appendix 4.4e: RASCO's Organisational Structure pre-2008



Appendix 4.4f: RASCO's Organisational Structure in 2010



Appendix 4.5a: ISO 9001:2008 Quality Management System for SOC

Appendix 4.5b: Quality Manual for SOC

1.0 **SCOPE**

General

The Quality Management System described in this Quality Manual is to demonstrate the company's capability to consistently provide products/ services that meet customer and applicable regulatory requirements, and to operate with increased effectiveness and efficiency with the overall aim of enhancing customer satisfaction.

Our QMS utilizes the process approach and quality management principles contained in the international standards ISO 9001:2008 to enhance our ability for continual improvement.

1.1 Application

Our Quality Management System complies with all applicable requirements contained in ISO 9001:2008, and applicable for the two scopes Upstream and Downstream processes, covering the provision of all products, activities and operations at our Exploration, Petroleum Engineering, Drilling and fields development, Oil and Gas production, petrochemical (Methanol) plants, LNG plant, Refinery plant, Naphtha and Gas Transmission & Supply located at Marsa Al-Braga and other locations along the coastal pipeline.
The exception listed below in sub clause 1.2, below

2.0 **REFERENCES & DEFINITIONS:**

2.1 Normative References:

The following references are used:

ISO 9000:2005	Quality management system - Fundamentals and Vocabulary
ISO 9001:2000	Quality management system - Requirements
ISO 9004:2009	Quality management system - Guidelines for performance Improvements.
ISO 9001:2008	Quality management system - Requirements

2.2 Terms and Definitions:

The following definitions are applicable:

Top Management : Management Committee (MC)
Management : Chairman, General Managers and Dept. Managers

2.3 Acronyms & Abbreviations

SOC	:	Sirte Oil Company for Production, Manufacturing of Oil and Gas
NOC	:	National Oil Corporation
CAR	:	Corrective Action Request.
MR.	:	Management Representative
QA	:	Quality Assurance.
QMS	:	Quality Management System.
MC	:	Management Committee

Appendix 4.5c: Quality Policy of SOC

SIRTE
Sirte Oil Company
For Production, Manufacturing Oil Oil & Gas

Quality Policy

Sirte Oil Company is distinguished with the high quality of their products and services according to prescribed international standards due to the Management Committee's commitment for the continuous development and improvement of the Company's performance through daily activities by adopting a Quality Policy to achieve its targets as follows:

- Continuous activation of the Company's role in supporting the Libyan economy, maintaining its distinguished reputation in the oil sector, and working to contribute to fulfilling the Libyan and International market needs of oil and gas products.

- To ensure that all necessary plans and polices are taken and followed-up to achieve its strategic objectives according to International Quality Management System (ISO 9001). To adopt new technological developments in improving its production operations and the participation of all employees and their commitment by quality and safety standards in their work.

SOC Management Committee, Managers and Employees are totally committed to implement this Policy to ensure the continuous development and advancement of the company.

سرت
شركة سرت لإنتاج وتصنيع النفط والغاز

سياسة الجودة

تمتاز شركة سرت بالجودة العالية لمنتجاتها وخدماتها طبقا للمواصفات العالمية من خلال حرص الإدارة العليا المتواصل على إبقاء عملية تطوير وتحسين الاداء بالشركة مستمرة بإتباع سياسة جودة مدروسة ومنظمة بهدف ضمان تسيير العمليات اليومية وتحقيق أهدافها وفقا للآتي :

- التفعيل المستمر لدور الشركة في دعم الاقتصاد الليبي والمحافظة على سمعتها المتميزه بقطاع النفط ، والعمل على المساهمة في تلبية احتياجات السوق الليبي والعالمي من المنتجات النفطية.

- التحقق من اتباع جميع الخطط والسياسات الكفيلة بتحقيق اهدافها الاستراتيجية وفق معايير ومواصفات ومتطلبات نظام إدارة الجودة العالمية (ISO 9001) وذلك من خلال تبني اساليب التقنيات الحديثة في تطوير إدارة عملياتها الإنتاجية ومشاركة جميع العاملين والتزامهم بمعايير الجودة والسلامة المطلوبة في جميع الاعمال التي يقومون بها.

إن الإدارة العليا بالشركة والمسؤولين والعاملين بها ملتزمون تماما بهذه السياسة من أجل استمرار تطور وتقدم الشركة.

TÜVRheinland®
Precisely Right.

Abdulbaset Taher Refaa
Chairman, Management Committee

عبدالباسط الطاهر الرفاعي
رئيس لجنة الإدارة

Date : 2010 / 02 / 04 التاريخ :

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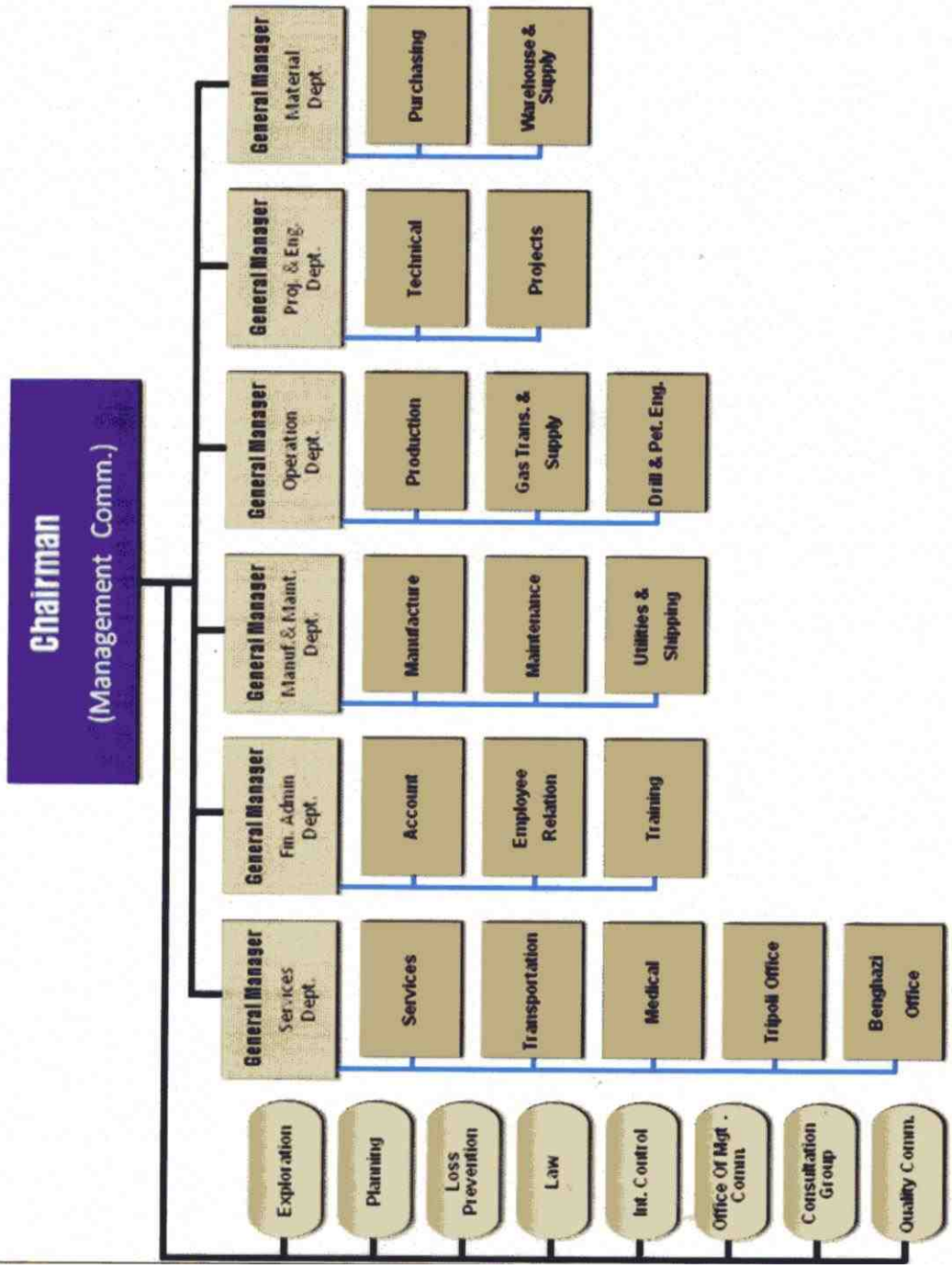
ISSUE (03)

الاصدار (03)

Appendixes 4.5d: The Organisational Structure of SOC

Sirte Oil Company For Production, Manufacturing Of Oil & Gas	Quality Manual	Issue No. : 01 Rev. No. : 01 Date : 29-09-2009 Page No. : 8 of 33

3.3 Organization Chart



Appendix 5.1: The Ethical Approval of the Study

Durham University

School of Government and International Affairs

Shaped by the past, creating the future

11th November 2010

Dear Musbah,

Please accept this letter as formal ethical approval for your project **"Exploring the Application of Total Quality Management in the Libyan Oil Companies: Potentials, Obstacles and Solutions"**. You should print it out and keep it for your records.

Please note that approval relates only to the project proposal submitted. If you wish to change the project, for example to widen the scope of enquiry, then you must reapply to the Ethics Committee for further approval.

If you have any questions relating to your approval, please contact Dr. Lorraine Holmes lorraine.holmes@durham.ac.uk.

We wish you well with your research.

Yours sincerely,

Dr. Lorraine Holmes
Research Administrator

The Al-Qasimi Building Elvet Hill Road Durham DH1 3TU UK
Telephone +44 (0) 191 334 5660 Fax +44 (0) 191 334 5661
www.durham.ac.uk/sgia

Appendix 5. 2a: Questionnaire of the Study

School of Government and International Affairs
Durham University
Elvet Hill Road, DURHAM DH1 3TU, UK
http://www.durham.ac.uk/sgia

Questionnaire Survey

Exploring the Application of Total Quality Management in the Libyan Oil Companies: Potentials, Obstacles and Solutions

Dear Participant,

This survey aims to gather data to explore and also to better understand the issues related to the application of Total Quality Management in the Libyan Oil and Gas Companies by focusing on the implementation phase in terms of potentials, obstacles and also the potential solutions through the perceptions of the managers and employees.

This research is part of a Ph.D. research conducted by myself at the School of Government and International Affairs, Durham University, United Kingdom.

You are kindly requested to spare some of your valuable time to complete this questionnaire survey. Please be assured that the information provided in this questionnaire will be treated with extreme confidentiality, and therefore please note that this questionnaire does not ask your name. Please note that your full cooperation will contribute to the successful completion of this research. Your cooperation, therefore, is very much appreciated.

You should not tick a box for example because the answer sounds more like what you "want" to hear but rather, indicate an answer which in your opinion accurately depicts the present situation in the organisation. Your responses should reflect the overall situation in your company, not just in your particular area of responsibility.
Please put “x” at the appropriate answer. There are no right or wrong answers. Your spontaneous and honest response is important for the success of the study.
Should you have further clarification, please do not hesitate to contact the researcher, by sending email to m.s.m.saleh@durham.ac.uk

Thank you very much for your valuable time and your cooperation.

Best Wishes

Mr Musbah S. M. Al-Amary
Durham University
DH1 3TU
UK
Tel: +44 (0) 7751744968
E-mail: m.s.m.saleh@durham.ac.uk

Part One: General information

1. What is the name of your organization: .....

2. Your job title…….....

3. Size of your organization (No. of employees)

Less than 1000 Employees	1000 to 2000 Employees	2000 to 3000 Employees	3000 to 4000 Employees	More than 4000 Employees
☐	☐	☐	☐	☐

4. Your Age

20-30 ☐ 31- 40 ☐ 41- 50 ☐ 51-60 ☐ more than 60 ☐

5. Your Qualification

Below secondary school ☐
Secondary Certificate or equivalent ☐
Baccalaureate ☐
Higher Studies ☐
Other…..

6. Your position:

Top management ☐ Middle management ☐ Supervision ☐
Controller ☐ Heads of Divisions ☐ Employee ☐
Other… ☐

7. Number of years of experience **in your job:**

Less than 5 years ☐ 5-10 ☐ 11-15 ☐ 16-20 ☐ 21-25 ☐ 26-30 ☐
30-mor ☐

Part Two: Exploring Awareness and Understanding

8. Which of the following statement best describes your understanding of quality?

☐ Quality is conformance to specification.
☐ Quality is performance at an acceptable price.
☐ Quality is the level of fitness for function and purpose.
☐ Quality is strategic approach to survive for firms
☐ Quality is realized when customer satisfaction is maximized because the product/service fits its intended use.
☐ All of the above.
☐ Other (please state): ……..

9. Which of the following main quality management techniques do you know? (You may choose more than one)

☐ Supply chain
☐ 5 Ss or 5 Cs
☐ SPC (Statistical Process Control)
☐ Six Sigma
☐ IS0 9001/2000
☐ Customer focus – Internal Extern

☐ Benchmarking
☐ Management change strategies
☐None of these
☐Other.....

10. Which of the following statement best describes your understanding of TQM?

☐ A system approach to management that aims to enhance value to customers by designing and continually improving organizational processes and systems
☐ Total: everyone in the organization is involved (suppliers and customers); Quality: meet the customer need and requirement; Management: top management are fully committed
☐ TQM is an approach or a philosophy to management focusing on customer focus, supplier partnership, systematic process management, teamwork and continuous improvement.
☐ An approach of managing to enhance the competitiveness, effectiveness, and flexibility of a business as a whole

11. Why do you think TQM is necessary for the organisation? Please choose one of the following statements?

☐ Improving the performance of organization as whole.
☐ Competitive advantage.
☐ Reducing waste and raising profit.
☐ Enhancing company image.
☐ Other.....

Awareness and Understanding of TQM						
Q	**Statement**	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
12	In your organisation quality is treated as a separate initiative.					
13	Most employees in Libyan oil and gas organisations have a full awareness and understanding of the concept of TQM.					
14	There is a lack of understanding of the purposes of TQM in Libyan oil and gas organisations.					
15	There are difficulties to learn and implement					

	TQM systems.					
16	The high costs of implementing total quality management outweigh the benefits.					

Part Three: Exploring Obstacles in the Implementation of TQM

3.1

Top Management and Leadership Commitment						
Q	**Statements**	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
17	Top management of Libyan oil and gas organisations is visibly and explicitly committed to quality.					
18	There is frequent turnover of management.					
19	The top management and leaders of Libyan oil and gas organisations listen to the voice of employees when they raise matters related to quality improvement and show visible commitment and take ownership of improvement processes.					
20	There is a lack of top management commitment to TQM generally within the Libyan oil and gas organisations.					
21	Top management provides financial support to the employees to apply and improve quality programs within the organisations.					
22	There is no leadership on quality issues in the oil and gas organisations.					
23	The top management of oil and gas organisations act on suggestions to improve the quality and					

	services.					
24	Top management shows interest in quality improvement processes.					
25	Top management provides necessary resources to fulfil overall organizational objectives.					
26	leaders in the organisation are committed to quality and lead the employees towards quality management					

Q27. Do you think that there is a lack of management commitment towards TQM in your company?

Yes ☐ No ☐

If you answered 'yes' to Question 27, please state the reason(s):

.....

.....

.....

.....

3.2

Organisational Culture						
	Statement	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
28	The promotion of managers in departments within the oil and gas organisation is not based on qualifications and skills.					
29	A bureaucratic culture is prevalent in the oil and gas organisation.					
30	Many people in the oil and gas organisations are appointed to positions without having the skills to undertake the role effectively.					
31	The Libyan culture and traditions influence quality management, as paying attention to quality is not necessarily a traditional matter					

3.3

Employee involvement and Empowerment						
Q	**Statement**	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
32	Within Libyan oil and gas organisations employees are empowered to implement quality improvement efforts.					
33	Within Libyan oil and gas organisations the employees are encouraged to play an important role in improving the TQM.					
34	There is no employee involvement in management decisions.					
35	Quality objectives within Libyan oil and gas organisations are clearly identified to employees.					
36	Work responsibilities in Libyan oil and gas organisations are delegated to the employees.					

3.4

Employee resistant to change						
Q	**Statement**	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
37	Employees resist changes to total quality management in the Libyan oil and gas organisations.					
38	Employees are not working to improve the future of the organisation.					
39	Employees are resistant to get training to be efficiently working for the betterment of quality					
40	Employees are resistant to understand quality and its aspects					

Q41: Do you agree that employees are resistant to change?
Yes ☐ No ☐
If you answered 'yes' to Question 41, please state the reason(s):
.....
.....
.....

3.5

Quality Strategic Plan						
Q	**Statement**	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
42	Libyan oil and gas organisations do not have strategic plans.					
43	Strategic plans in Libyan oil and gas organisations do not include quality goals.					
44	Quality action plans in the strategic plans are often vague.					
45	The strategic plan should be customer and market driven to achieve expected quality.					
46	Training targets to develop skills for better quality in the organisation are generally not achieved.					

3.6

Employee Training, Development and Education						
Q	**Statement**	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
47	In your organisation employees are trained in problem identification and problem solving techniques.					
48	Employees are not trained in group discussion and communication techniques.					
49	Within Libyan oil and gas organisations employees are trained in quality improvement					

	skills.					
50	The organisation concentrates on ongoing development of personnel by establishing extensive training programs that cover all aspects of Total Quality Management (TQM).					
51	Training in the oil and gas organisations is determined according to actual needs that have to be covered by training.					
52	The employees have appropriate qualifications and experience required for improving their quality of work.					
53	Employees have enough and appropriate educating and training for quality.					
54	There is lack of staff training in the Libyan oil and gas organisation regarding TQM techniques.					

3.7

Information and Communication						
Q	**Statement**	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
55	Communication between departments in the Libyan oil and gas organisations is ineffective.					
56	There is a lack of information on TQM in the Libyan oil and gas organisation					
57	There is a lack of communication from top management levels to employees.					
58	A very good					

	communication process is established in organisation for effective Quality Management (QM) and for clear and effective ways for people within the organisation to communicate.					
59	The communication channels providing information about customer and market expectations are not effective in delivering the required information for improving quality.					

3.8

Continuous Improvement and Innovation						
Q	**Statement**	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
60	The Libyan oil and gas organisations promote innovation.					
61	Libyan oil and gas companies do have R&D departments for innovative developments					
62	Innovation strategies include improving quality in all its dimensions.					
63	Quality improvement culture is prevalent across the Libyan oil and gas organisations.					
64	Libyan oil and gas organisations identify gaps between its training strategy and efficient running of TQM**.**					
65	There is lack of motivation and reward in the organisation system.					
66	Quality improvement efforts in the Libyan oil and gas organisations rarely meet expectations in terms of desired results					

3.9

Team work						
Q	**Statement**	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
67	Within Libyan oil and gas organisations cross-functional teams are not employed.					
68	In Libyan oil and gas organisations there are many cross-functional teams solving quality problems.					
69	The training session of Libyan oil and gas organisations impose personnel to work in team.					
70	Top management of Libyan oil and gas organisations regards team spirit an important factors for improving and encouraging the employees to work in team.					

3.10

Internal and External Customer Satisfaction						
Q	**Statement**	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
71	Each employee in Libyan oil and gas organisations treat colleagues as customers.					
72	There is no customer feedback system.					
73	In your organization there is an assessment system, which determines current and future customer requirements and expectation.					
74	The organization encourages employees to satisfy customers.					
75	The organization uses					

	information from customer services in improving its processes and services.					

3.11

Measurement and Evaluation						
Q	**Statement**	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
76	In your organization quality is not effectively measured.					
77	Within Libyan oil and gas organisations product conformity is measured and monitored to guarantee that organisation actually meet all requirements.					
78	The organisation promotes the use of statistical tools to monitor and measure product and processes for effectiveness and improvement.					
79	The oil and gas organisations have a sufficient measurement system for quality improvement.					

3.12

Government Support						
Q	**Statement**	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
80	There is no government financial support to help the organisation to implement a TQM system.					
81	There are no government pressures in terms of regulations and laws to make the organisation to implement improvements in its quality management systems.					

82	There are inadequate studies from governmental departments to help guide the organisation in developing a TQM system.					

3.13

Recourse and Requirements of TQM						
Q	**Statement**	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
83	Time constraints prohibit effective total quality management implementation.					
84	There are adequate resources to effectively employ total quality management.					
85	No proper organisational structure has been developed to implement TQM.					
86	Insufficient technology and poor quality management practices currently exist in the oil and gas organisation.					
87	There is a lack of local consultants properly qualified in TQM within the oil and gas sector.					
88	The Libyan oil and gas organisations do not generally allow time for TQM.					

3.14

Management Style						
Q	**Statement**	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
89	Within Libyan oil and gas organisations there are excessive layers of management.					
90	The organization uses tactical techniques for					

	process analysis, control and improvement.					
91	There is frequent turnover of employees in the Libyan oil and gas organisations.					
92	Management style does not encourage and motive individuals to be innovative and efficient.					

Q93: Do you think that there are other barriers preventing the successful and effective implementation of TQM in the Libyan oil and gas organisations? Please list:

1)..... 4).....

2)..... 5).....

3)..... 6).....

Q94: Do you have any other comments regarding the implementation of TQM in Libyan oil and gas organisations?.....

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END OF THE SURVEY

Thank you for your participation

Appendix 5.2b: Interview Survey

School of Government and International Affairs
Durham University
Elvet Hill Road, DURHAM DH1 3TU, UK
http://www.durham.ac.uk/sgia

Interview Survey

Exploring the Application of Total Quality Management in the Libyan Oil Companies: Potentials, Obstacles and Solutions

Dear Participant,

This interview survey aims to gather data to explore and also to better understand the issues related to the application of Total Quality Management in the Libyan Oil and Gas Companies by focusing on the implementation phase in terms of potentials, obstacles and also the potential solutions through the perceptions of the managers and employees.

This research is part of a Ph.D. research conducted by myself at the School of Government and International Affairs, Durham University, United Kingdom.

You are kindly requested to spare some of your valuable time to complete this questionnaire survey. Please be assured that the information provided in this questionnaire will be treated with extreme confidentiality. Please note that your full cooperation will contribute to the successful completion of this research. Your cooperation, therefore, is very much appreciated.

There are no right or wrong answers. Your spontaneous and honest response is important for the success of the study.
Should you have further clarification, please do not hesitate to contact the researcher, by sending email to m.s.m.saleh@durham.ac.uk

Thank you very much for your valuable time and for your cooperation

Best Wishes

Mr Musbah S. M. Al-Amary
Durham University
DH1 3TU
UK
Tel: +44 (0) 7751744968
E-mail: m.s.m.saleh@durham.ac.uk

Interview Date: .....
Your age: .....
Your name: .....
Name of your Organisation: .....
Name of the Department: .....
Your Educational Level: .....
Your position and title in the organisation: .....
Years of work: .....
Years in management: .....

Q1: How would you define Quality Management in your organisation?

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Q2: Does your organisation have a quality policy?
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Q3: Do you think that top management is willing to adopt the TOM concept?
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Q4: Do you think that employees have difficulty in understanding and implementing TQM requirements?
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Q5: Do you think that TQM is an additional workload to the established quality management?
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Q6. What benefits do you think TQM delivers for your organisation?
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Q7: Does any of the Libyan government departments impose the implementation of TQM in your company?
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Q8: What TQM models do you use to implement quality management as a guideline in your organisation?

☐ Malcolm Baldrige Model
☐ EFQM Business Excellence Model
☐ Deming prize
☐ None
☐Other.....
.....

Q9: What aspects of the Total Quality Management techniques and process are implemented in your organization?

Components
☐ Supply chain
☐ 5 Ss or 5 Cs
☐ SPC (Statistical Process Control)
☐ Six Sigma
☐ IS0 9001/2000
☐ Customer focus – Internal Extern
☐ Benchmarking
☐ Management change strategies
☐ There is no specific quality approach in place
☐ Other.....
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Q10: What is your opinion about TQM generally?
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Q11: Does your organisation has clear vision of TQM implementation?
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Q12: What the obstacles and difficulties that you encounter in successful and effective application of TQM in the Libyan oil and gas organisations?
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Q13: What are the reasons of the barriers in implementing TQM and how is it emerged in the Libyan oil and gas organisation?
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Q14: From your experience, how these barriers and challenges can be overcome in Libyan oil and gas organisations?

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Q15: Is there any person you think I should talk to about these issues?

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Thank you for your participation...