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An evaluation of the implementation of Total Quality Management (TQM) within the construction sector in the United Kingdom and Jordan

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**An evaluation of the implementation of Total Quality  
Management (TQM) within the construction sector in the  
United Kingdom and Jordan**

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PhD

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**A thesis submitted to the University of Huddersfield in  
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## ABSTRACT

Recognising quality to be a key focus for competitiveness, Total Quality Management (TQM) was established and used in developed countries as a continually evolving philosophy for managing organisations. However, TQM in developing countries has received little attention and little research has been conducted into the successful implementation of TQM system in these countries in comparative with developed countries.

The research described in this thesis assesses the adoption of TQM factors in the Construction industry in the UK and Jordan. This comparative study aimed to investigate if TQM implementation is fundamental for the Construction industry and to identify the critical success factors for successful implementation. In addition this research explores the benefits of applying TQM system and the main impediments to successful adoption, also the impact of TQM in improving competitiveness.

In order to understand the reasons behind low competitiveness level by the Jordanian companies against international construction companies operating in Jordan, and to investigate the reason behind the sudden drop of the quality scale in the Jordanian Construction industry, both questionnaires and face-to-face individual semi-structured interviews were employed to fulfil the study objectives. The semi-structured interviews aimed to gain deep understanding of TQM implementation by targeting general managers, project managers and project supervision team, while the questionnaires aimed to investigate the implementation of TQM implementation, TQM implementation benefits and impediments, and TQM implementation impact on competitiveness (profitability, market share, quality services) from employees, clients, and final users' perspectives in the UK and Jordan.

Analysis of the data revealed that time and cost, juxtaposed with the non-implementation of TQM and learning practices, can further vex quality failure in the Jordanian Construction companies, which in turn manifest themselves as customer dissatisfaction, rework, bad reputation, and reduce turnover. Construction companies have not pro-actively embraced TQM system because it is mistakenly considered to be an extra cost and perceived as programme of change. While in the United Kingdom the results show that TQM system is being increasingly adopted in the Construction companies to solve quality problems. The implementation of a TQM based on cultural change in addition to changing management behaviour, to move the organisations toward TQM culture that focuses on quality as a key strategy to satisfy customers.

The study has made a significant contribution to the knowledge of TQM. This research helps to understand the TQM implementation in the Jordanian Construction companies based on the UK construction companies experience in TQM implementation. Some recommendations for further research have been derived from this research, such as, Contractors need to focus on aspects of performance, time, the establishment of long-term partnerships with subcontractors and maintenance of a well-trained workforce to improve overall performance and quality services, Jordanian construction companies should embrace a degree of transformational change by adopting a customer focus strategy instead of a price focus strategy, Jordanian construction companies need a cultural change which cannot be achieved

without changes to norms, beliefs and values, and more attention is needed in the marketing element within the Jordanian construction as it has a direct impact on improving organisational market share.

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# **Chapter One**

Introduction

## **1.1 Introduction:**

Globalisation, industry growth and technological change interact to create alternative environments with varying levels of dynamism and complexity requiring realignment of operation strategies. Along with quality, cost, delivery, and flexibility, customer focus is another competitive priority to adapt fitting operation strategies proactively in changing environments, Nair and Boulton (2008). Regardless of the effort by managers of such environments to raise their performance, they still face major challenges in how to implement such strategic initiatives for company business excellence. Effective strategy deployment can be assumed as one good way to make such initiatives successful, Saunders and Mann (2008). However, despite all effort made in the different fields in adapting new strategies and implementation procedures, sustainable development in industries has become a major concern in the last decade both in developed and developing countries. It is widely accepted that customer satisfaction is the primary focus in modern business success. Companies must always put the customer needs in first place. This has resulted in the exercise of value creation. Therefore, with the concept of value, customer value has become a source of sustainable competitiveness. Therefore, companies have adopted different platforms for value creation, such as; mass production, streamlined supplier networks, value in design, lean Construction/production, six sigma and, total quality management (TQM). However, TQM represents a platform for marketing potentialities, and synergistic in facilitating efficient management of process for value creation and delivery in the highly dynamic and competitive market, Mele (2007). TQM as a management approach focus on the early involvement of all construction project members at early stage of the procurement process, therefore, taking the right decision at early stage will save a great deal of time effort and money leading to more added-value to the construction project.

TQM has become one of the most successful practices in helping companies enhance competitiveness and prosperity through ensuring sustainable growth, Osayawe and McAndrew, (2005). In another dimension, although there is strong relationship between TQM and market orientation in the perspective of customer satisfaction, TQM is found to have a strong and positive impact on organisational performance, Mehmet and Lenny (2006). Jaworski and Kohli (1993) argued that market orientation is concerned with behaviours and activities in the organization. They have defined

market orientation as the organization-wide generation of market intelligence, disseminating and responding to the market intelligence across departments in the organization. Meanwhile some authors relate the market orientation with cultural perspectives such as Narver and Slater (1990), Deshpande et al. (1993), and Deshpande and Farley (1998) mentioned that market orientation is not a culture but a set of activities in an organization (Farrell, 2000).

However, according to Narver and Slater (1990), market orientation is a basic part of organizational culture and not a set of processes and activities that is aimed to create a market oriented culture. Each employee must understand that the whole purpose of the organization is to create superior value for customers (Farrell, 2000). Meanwhile, Narver and Slater (1990) defined market orientation as the organization culture that most effectively creates the necessary behaviours for the creation of superior value for buyers and, thus, continuous superior performance for the business. Besides, they also argued that the behaviour and culture of an organization are inter-linked in which an organization's behaviour is shaped by its culture and over time culture is shaped by the organization's behaviour and performance. Similarly, it is indicated that the impact of TQM on financial issues such as profits, earning, market share and growth rate is the outcome of the strong and direct impact of TQM on non-financial issues such as changing organisational culture, productivity, employee morale and innovation, Mehmet *et al.* (2006).

Many companies have failed in an attempt to imitate TQM the 'Japanese way' as they have limited themselves to product quality rather than the overall TQM culture. Whereas the Japanese management style has focused on product quality as well as spreading the quality culture in everyday process by focusing in two main dimensions, namely "*Functional rational dimension*" reflecting individual effort and "*groupism-affective dimension*" for team/group-work. Therefore, companies need to strategically find the right Japanese management style to match the local available resources. This explains that Japanese management style might support some methods for Japanese use in Japan, but they are not the right approach for other foreign nations to adopt nor for Japanese companies to practice in their overseas companies (Shaari, 2008).

In an attempt to evolve business excellence, TQM is found to have very strong cultural and behavioural features in priming and feeding managerial and operational processes, Mele and Colurcio (2005).

The total quality management concepts which have been developed to improve quality and the control of quality in manufacturing and process engineering are broadly applicable, Feigenbaum (1989). This includes construction where the concepts are being slowly adopted, as these concepts are recognised by the construction industry. The dynamic global business market, however, is distinguished by the rapid growth in the construction industry sector; globalisation consequences and various world trade agreements have created a revolution in the business environment. In today's world, quality is considered a global phenomenon for organisations seeking customer satisfaction and high output quality worldwide to gain competitive advantage, continuity, and stability which will enable those companies to compete locally and globally within the rapid changes of environmental variables. Due to the appearance of the global market and globalisation, client demands have increased for high quality products and services which are reflected by increasing competition to the highest level, and the need for high quality has become a strategic element to gain competitive advantage. Therefore, firms have adopted various managerial approaches to cope with any current or future challenges and some organisations have adopted TQM as one of the managerial and organisational methods to achieve long term profitability, sustainability and competitiveness.

TQM implementation in the construction industry gained government attention in different countries such as the United Kingdom and the USA. The Latham report, (1994), Egan report (1998) and the Associated General Contractors of America report (1993) were published to help construction companies to implement TQM and tackle controversial issues facing the industry. The previously mentioned government reports emphasised the attitudes of quality in a company as demonstrated by partnering, team building and employee empowerment. However, although this has been a good start, there are still barriers to the successful implementation of TQM in the construction industry.

## 1.2 Background and Need for the Study:

In modern global economics, construction companies in developing countries are facing serious challenges from domestic and international market competition. Such reason is in their limited potential in adopting new managerial methods to cope with the current challenges in the business environment. Thus, it is unlikely to see companies show any sort of progress in the dynamically changing global economics. If such a potential is not ensured in these companies, the domestic economy of these countries will be taken by international companies.

Because of the construction industry's inherent competitive bid process and competitive environment, there has been and still is an emphasis on quick work and short time horizons and a lack of emphasis on long term viability and quality. Millions of pounds of public money are spent each year in the construction industry. The construction industry is dynamic, risky and extremely competitive. The number of companies desiring to be contractors and the competitive bidding process which awards Contracts to the lowest qualified bidder result in emphasising quick work and short time horizons to the detriment of long term viability and quality.

Market globalisation and economic liberalisation lead to more demanding customers and shorter product life-cycles. As a result, firms tend to be more innovative and competitive to survive in such a context. However, to enable firms to improve their operation systems continuously by providing a high standard of products and services, organisations have to provide their employees with the proper tools and techniques, especially those individuals involved in the process of continual improvement. Nevertheless, since managers and experts have not yet agreed on how to apply TQM tools and techniques effectively in their organisations, as stated by Schlenker (1998), the need has emerged to undertake this research in the Jordanian and UK construction sectors to understand the reason behind adopting and applying the TQM Approach.

*Customer satisfaction is the driving force behind quality improvement, others suggest that quality management is achieved by internal productivity or cost improvement programs. In other applications it is considered a means to introduce participative managers.*

(Schlenker, 1998)

In addition, due to the importance of the construction industry to the Jordanian economy and the highly competitive environment in the construction sector in Jordan, firms are required to adopt the TQM approach to compete locally and globally by improving their quality system to facilitate and increase their market share and client retention. Thus, the construction sector has to be developed in different areas starting by adopting a formal quality approach, having a clear understanding of the TQM approach and key business processes, employee training and observation, and performance measurements. The adoption of the TQM approach in the Jordanian market should enhance the project and task quality, increase productivity and profitability, employee and client satisfaction, and augment company reputation by being able to compete globally with high quality standards.

Jordan, being one of the developing countries in the Middle East, is located in the heart of a conflict-ridden and unstable region, a key issue in the business environment. According to a study by the Arab Bank (2005), Jordan suffers from a shortage of financial and natural resources, high unemployment rate, poverty and high public debt which, in turn, have affected TQM implementation in Jordan. Jordan has faced many obstacles during the implementation process and the country has rarely seen any company applying or implementing TQM tools and techniques in a proper way due to the lack of experience in TQM implementation, observation and evaluation by top management and quality departments in the Jordanian market generally and the construction sector specifically.

Moreover, Jordan has seen a rapid growth in the construction sector in the last few years; thus, many organisations have allegedly implemented TQM tools and techniques but, unfortunately, the absence of studies and research in the TQM area in Jordan and the nonexistent quality control system have led these companies to operate locally, devoid of any quality measurements by government. Hence, due to increased client complaints, it has been noticed that the quality scale in the Jordanian construction sector has dropped suddenly to the lowest level, as a result of giving more attention to output instead of quality by contractors to fulfil the high demand in the market, according to the Jordanian Contractors Association (2008).

Due to the lack of TQM studies in Jordan, this study will focus on understanding the process of implementation and examination of TQM in the United Kingdom construction sector and different quality perceptions (clients, contractors, suppliers, employees and final users) to provide recommendations to the Jordanian companies to ensure a proper application of TQM tools and techniques.

### **1.3 Reasons and Interests for Researching Total Quality Management (TQM) in the Jordanian and United Kingdom Construction Industries:**

Construction work is mainly linked to the complexity and simplicity of construction structure in the country context. Jordan has dealt with simple structure construction due to its small population and the unavailability of necessary resources, mainly workforces and raw materials. There have been no huge or complex projects for local companies as they suffer from a lack of skills and workforce management. A number of local investment projects had built in traditional architecture with low quality fittings and design, Al-Momani (1995). There were a few major construction companies operating throughout the country which increased their chance of monopolising most of the private construction work, and over time the construction quality dropped substantially due to this monopoly with very little competition.

In the early 1980's, the Jordanian government decided to control the monopoly by releasing new rules and legislation. The released legislation helped to increase competition to the highest level and open the door to a new era of construction industry in the Jordanian market, which gave many new construction companies the chance to start operating. However, instability in the Middle East, especially wars in Lebanon, Iraq, Palestine and Israel, has resulted in an increased immigration percentage in the last 20 years, particularly for safety issues. This huge number of people has intensified the demand to develop the infrastructure in addition to the basic needs such as, schools, hotels, hospitals, houses and entertainment places, which requires a rapid response from contractors to satisfy demand. Thus, the Jordanian construction sector has become one of the main important contributors considered as a backbone to the Jordanian economy.

Jordanian construction companies have been required to respond quickly to fulfil the high demand concerning humanitarian basic needs. Thus, contractor priority was to fulfil these needs as soon as possible without giving any consideration to project quality, affecting the entire construction industry and company reputations, with a result that caused a rapid drop in the quality scale to the lowest level. The expansion and growth of the construction industry has, however, meant that there are employment opportunities for the new immigrants as they can work in the industry, thus, solving the problem of unemployment but, at the same time, this has created a multicultural business environment which affects the construction industry culture in general and organisational culture in particular.

Quality is an important consideration for today's organisations; the increased awareness of quality as an important strategic issue is reflected as a fundamental element for organisations at all levels which requires defining and implementing critical success factors for quality improvement in the construction industry. Despite a global adoption of the TQM concept, it has not been developed within the Arab region, as a result of low level of organisation' readiness for change, and the lack of basic knowledge of TQM, according to M, Haffar (2010). TQM depends on manager, stakeholder and employee beliefs and understanding of the benefits of TQM implementation, education level and culture, all of which vary hugely from one country to another. Jordan, as a part of the Arab region, has few companies with experience of TQM tools and techniques. However, the construction sector has been one of the few sectors which have experienced the TQM application throughout their managerial systems. Unfortunately, there has been little study and research of TQM within Jordanian construction companies due to the late recognition of TQM in the Jordanian market and the widespread belief by managers and employees that quality management is an extra cost which puts more strain on TQM implementation in Jordan. In addition, the absence of government monitoring of quality and safety issue implementation, the lack of a basic understanding of TQM tools and techniques by top management, innovation teams and people who have direct relations with clients are all elements affecting the execution of TQM in the Jordanian construction sector, JISM (2008), which raised the need for key study in TQM in Jordan, to contribute to the field of quality improvement in Jordan.

Despite the fact that TQM has been successfully implemented in many construction companies in the UK, the construction industry has lagged behind other industries in terms of TQM implementation, Egan (1998), Barrett (2008). Integrating TQM in the construction industry is a relatively new field in the UK, Pheng and Teo (2004). The post-war period meant that many were forced to readdress their opinions regarding the supposed superiority of western goods. The rise of Japanese dominance in terms of quality owes much to the influence of gurus such as Deming and Juran. The development of the North Atlantic Treaty Organisation (NATO) and the United Kingdom Ministry of Defence (MoD) documents led the British Standards Institute to develop BS5750 as a British standard quality system in 1979. Its introduction heralded the promise of great benefit to those using it. Construction became part of this trend, albeit belatedly. However, to a large degree, the initial interest of construction organisations came not so much from their own volition, but as a result of large client requirement. Public sector bodies such as the Property Services Agency (PSA) were particularly influential. They made it mandatory for contractors tendering for work to have Quality Assessment such as BS5750. This meant that many construction firms implemented quality systems not on the basis of long-term improvement, but as a result of their fear that failure to obtain registration would result in removal from tender lists.

Due to the construction project characteristic which depends upon achieving sequence tasks and involves many contractors and subcontractors within limited periods and budgets to finish a construction project, attaining acceptable quality levels has long been a problem because any defect or failure in a construction project can result in a huge cost and even minor defects might require impaired operations to deal with reconstruction. This might be caused as a result of a misunderstanding of TQM implementation tools and techniques before and during projects, poor relations with suppliers and poor planning, which are considered as fundamental issues to attain any project within budget and proper time in a highly competitive, complex, and dynamic environment. Consequently, with inefficient operation management and nonexistent quality tools, significant expenditure of resources, effort, time and money have been wasted on construction projects which required having a clear understanding of the main causes of these problems and an attempt to find out the optimal solution by doing the job right first time and reduce defects to achieve organisational aims.

The purpose of this study is to investigate whether applying a TQM system within an organisation is a fundamental element and whether top management and employees fully understand the TQM tools and techniques to ensure the best implementation and high quality outputs. The research focuses on investigating the reasons behind having good or poor implementation and performance by establishing a comparative study of a highly industrialised country (the United Kingdom) where TQM has received government support and has been investigated in many studies by many researchers, with a developing country (Jordan) which lacks government support and researchers related to TQM, to provide reliable findings to improve TQM implementation in Jordanian firms.

#### **1.4 Defining the Research Question:**

The study's focus is on investigating TQM in large and medium sized construction companies in the United Kingdom and Jordan. Thus, this research began with an extensive literature review. A large number of academic journals, construction industry journals, books, reports and theses were reviewed, documented and analysed. The findings showed that TQM implementation is important for the construction industry in some countries such as the United Kingdom, the USA, Japan, Singapore and Australia but, at the same time, it cannot be generalised to all countries and all construction projects, which led to the following question:

- Is the TQM approach important for all construction companies and to what extent will the successful implementation of TQM improve company competitiveness?
- How can the developed and developing countries use TQM through their managerial and operational processes to improve competitiveness and sustainable growth?

To address these questions, this study reviewed TQM development, gurus, different frameworks in different countries, such as the United Kingdom, Jordan, the European Union, the USA and Australia, in addition to investigating the current trend of TQM in the United Kingdom (developed country) and Jordan (developing country). It was found that TQM is important for improving the construction project performance and quality in the United Kingdom from different perspectives, while Jordan still lagged behind other industries and other countries in terms of TQM implementation.

However, the construction industry has a unique characteristic compared to other industries because it is not a repeated business and each project has a different culture and different characteristics. Therefore, two questions were raised:

1. What are the Critical Success Factors (CSFs) for TQM implementation in the construction sector in the United Kingdom and Jordan?
2. Does TQM implementation influence the construction company competitiveness, and how can it be used to improve competitiveness?

### **1.5 Research Aims:**

The Jordanian Construction industry has been suffering for the last two decades as a result of international firms taking the majority of contracts over Jordanian construction firms because of poor quality levels in the construction projects provided by Jordanian companies. Therefore, this research has been carried out to identify the main reasons behind the poor quality level of the Jordanian construction industry. Thus, the research aims:

- to understand the aspects of TQM implementation in the United Kingdom construction companies,
- to develop a model through studying different TQM frameworks and models to be proposed to the Jordanian construction companies to improve TQM implementation and control, and
- to understand the reason behind the dramatic drop of Jordanian construction companies against international companies operating in the Jordanian market. The proposed model is based upon understanding and analysing existing TQM models and frameworks to avoid any overlap.

However, to do this, the research focuses on studying different quality frameworks such as the Deming Prize, ISO900 series, Malcolm Baldrige National Quality Award (MBNQA) and European Quality Award (EQA) to assess the benefits of acquiring a TQM framework within an organisation and, moreover, to be able to identify the common critical success factors in general and then for the construction industry in

particular by conducting semi-structured interviews and self administered questionnaires to identify the critical success factors for the construction industry.

### **1.6 Research Objectives:**

- To investigate whether all Construction organisations require a TQM approach or should adopt a different system to provide constructive recommendations to support and improve TQM implementation and control in the Jordanian construction sector by investigating TQM practices and implementation in the United Kingdom.
- To define the CSFs for the construction industry as managers and expertise have not yet agreed how to apply TQM tools and techniques to their organisations, in addition to having different CSFs for each construction project.
- To define the external environmental factors and obstacles that affect TQM implementation within the construction industry.
- To explore the benefits of acquiring a TQM approach within an organisation.
- To measure the impact of the independent variable (11) TQM CSFs “top management commitment; quality culture; process planning and strategic quality management; employee empowerment; employee training and education; supplier chain management; customer satisfaction; information and communication technology; continuous improvement; performance management system for benchmarking; and impact on the environment and society”, on the dependent variables (profitability, market share and quality services).

However, to achieve the research aims and objectives, attention has to be given to understanding the development of TQM tools and techniques and establishing a background of the fundamental elements behind using the TQM within an organisation, if applicable. Thus, the study will include a comparison of various TQM frameworks such as ISO 9000 and the Deming Prize, MBNQA and EQA and other scholarly frameworks to understand the most common critical success factors (CSFs) for the construction sector which will be used in the primary data collection methods to investigate which quality model each company implements. After that, the research

will establish a general TQM model to be implemented in the Jordanian construction sector, as shown in the following figure:

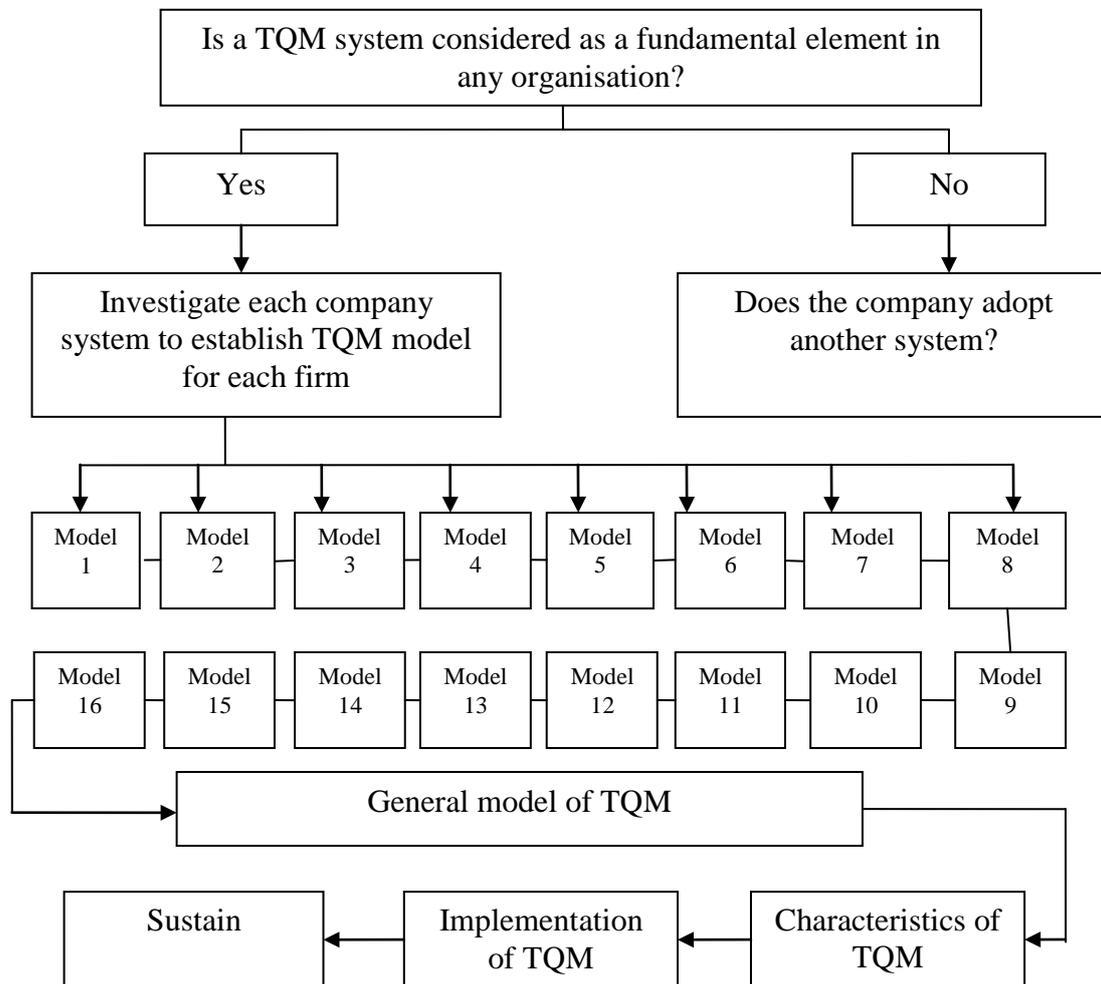


Figure 1.1: New model development

### 1.7 Research Layout:

The research is divided into eight chapters which include sequence tasks to achieve the research aims and objectives by providing reliable and generalisable findings and address the research questions. The Appendix consists of questionnaires and interview answers from the targeted sample, in addition to the terms of reference and the data analysis tables. The thesis layout itself is set out as follows:

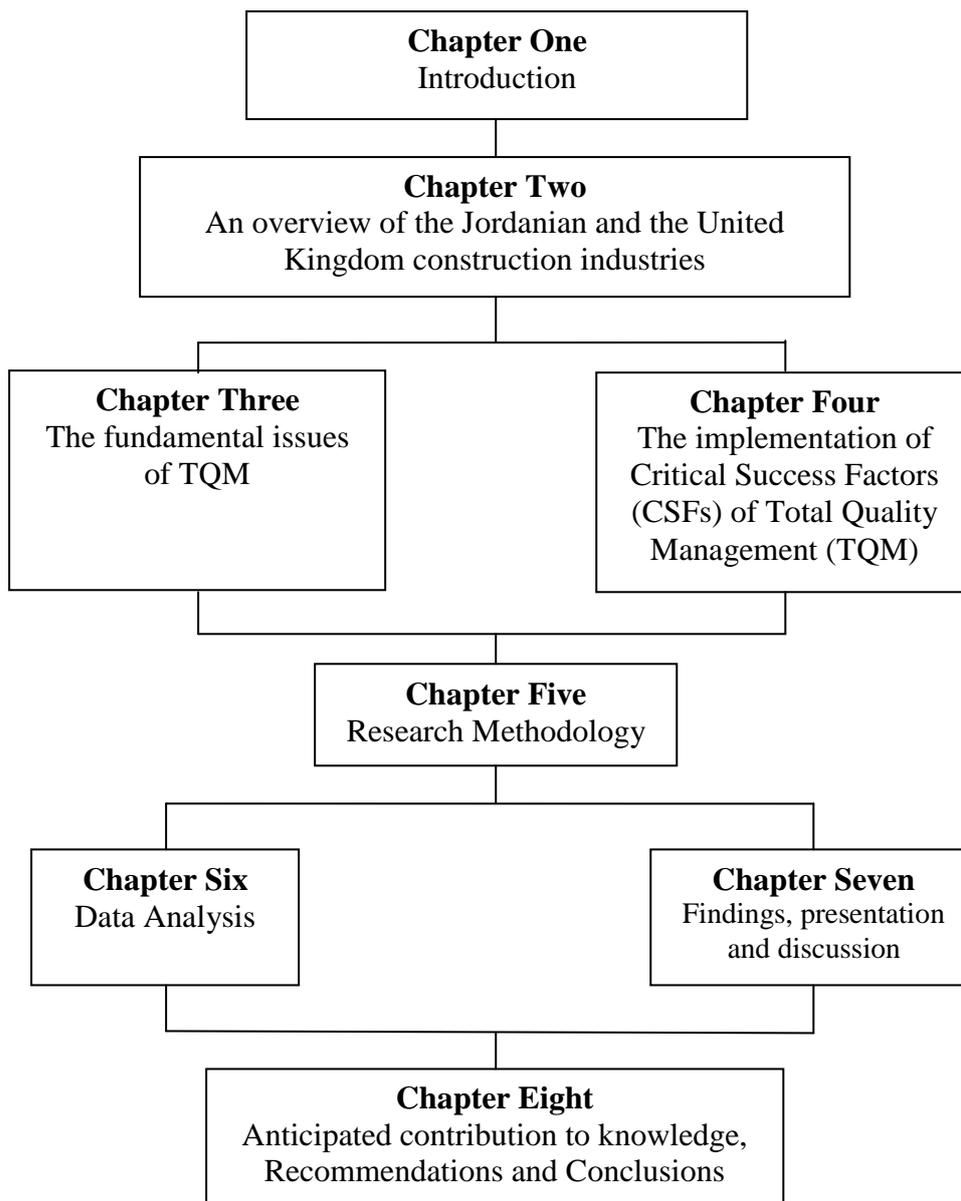


Figure 1.2: Structure of the thesis

## **Chapter One: Introduction**

The first chapter provides an introduction to the thesis including the reasons and interest behind researching TQM in the United Kingdom and the Jordanian construction sectors; the background and an explanation of the need for this study; the problem statement, research questions, aims and objectives are explicitly identified in this chapter.

## **Chapter Two: An Overview of the Jordanian and the United Kingdom Construction Industries**

Because this research is based on a comparative study between the United Kingdom and Jordan, where both countries have different backgrounds, this chapter focuses on a general overview of both countries to understand their economical, cultural, geographical and educational levels using PEST analysis. PEST analysis is used to understand the factors driving changes in the Jordanian and the United Kingdom construction industries.

## **Chapter Three: The Fundamental Issues of TQM**

The third chapter includes an overview of the literature of TQM, going back in time to understand the evolution of the TQM concept through the development stages (since 1750, through the adoption of TQM in 1980, until now) by investigating the TQM adopted in the manufacturing, services and construction industries in many countries such as the United Kingdom, the USA and Japan. Moreover, Six Sigma, as a statistical approach towards cost reduction, and TQM costs are discussed in this chapter to understand the TQM implementation short and long term costs.

A comparison of quality gurus such as Deming, Juran, and Crosby and quality awards (the Deming Prize, MBNQA, EQA, Pride in Job and Charter Mark awards), ISO 9000 Series and Lean Construction are discussed to understand the TQM requirements and critique.

## **Chapter Four: The Implementation of Critical Success Factors (CSFs) of Total Quality Management (TQM)**

This chapter aims to identify the CSFs of TQM implementation in the construction industry. Therefore, different quality management implementation cases are studied to understand the reason standing behind successful or failed implementations of the TQM system within the construction industry. However, it is important to understand TQM implementation in other sectors such as the manufacturing and service sectors as they have seen success in implementing the TQM system. Despite many successful TQM implementation cases, there are also many failures; therefore, this chapter is concerned with the reasons behind these failures by studying project success criteria from client, contractor and designer perspectives, in addition to the benefits an organisation could gain after successful implementation of the TQM system.

## **Chapter Five: Research Methodology**

This chapter discusses the research methodology by specifying the data collection methods used in this research. This chapter is divided into two sections. The first section includes an analysis of secondary data collection methods such as books, internet and company profiles, while the second section involves two types of primary data collection methods: quantitative and qualitative. In addition, it contains a comparison of different quantitative and qualitative methods and clarifies each method's advantages and limitations and the reason behind using or not using a specific method. This research has adopted two commonly used methods: hybrid method (interviewer-administrated and self-administrated) questionnaire as the quantitative method and individual face-to-face semi-structured interviews as the qualitative method. Moreover, this chapter discusses research sampling techniques, methods of negotiating access and ethical issues.

## **Chapter Six: Data Analysis**

This chapter focuses on analysing the collected data from the (self-administrated and interviewer administrated) questionnaires and individual face-to-face semi-structured interviews in relation to the research objectives, respectively. The analysis is divided into two sections; the first is concerned with analysing the questionnaire results using different statistical analysis techniques such as multiple regression, independent sample T-test and ANOVA; the second focuses on analysing the interview results using a thematic approach. This chapter aims to transfer the collected data from numbers, codes and wording to more understandable and usable data by identifying the relation between the dependent and independent variables.

## **Chapter Seven: Findings Presentation and discussion**

This chapter discusses the results of the collected data in relation to the research objectives, respectively. Therefore, this chapter is divided into five sections: the first relates to whether a TQM system is fundamental for all construction companies; the second concerns identifying the TQM CSFs for the construction industry; the third relates to the external factors and obstacles affecting TQM implementation in construction companies; the fourth identifies the TQM benefits; and the fifth section identifies the effect of TQM on improving competitiveness.

## **Chapter Eight: Anticipated Contribution to Knowledge, Recommendations and Conclusions**

This chapter is the final chapter of this study and involves a conclusion of the overall research and presents a new model of TQM, based on the comparison of different TQM models developed according to the research interviews, to be presented to the Jordanian companies. The new TQM model implementation processes are divided into stages, where each stage's requirements and challenges are addressed. Moreover, this chapter involves the research finding's contribution to knowledge which will address the need for the study in the UK and Jordan context, but will be more focus on the Jordanian context due to the lack of studies of TQM implementation in Jordan. Moreover, this chapter also involves the limitations for TQM implementation in the construction industry. Recommendations to improve TQM implementation in Jordan using the United Kingdom experiences and suggestions for further research are

discussed to provide constructive recommendations to Jordanian construction companies.

## **Chapter Two**

An Overview of the Jordanian and the United Kingdom Construction Industries

## 2.1 Introduction:

Following the global financial crisis, which started in the USA and reverberated around the world, business leaders are facing some difficulties within the changing business environment, such as; increasing unemployment rate, shortages and scarcity of vital energy and resources needed in production and distribution, a global talent shortage, customer and communities expecting more ethical behavior and care from business, and increasingly risk-averse leaders and investors, Kantabutra, S & Avery, G., (2011). Today's organisations are facing an unprecedented change in the internal and external business environments and this is characterised by velocity, turbulence, flux and uncertainty Jamali *et al.* (2009). Modern organisations seem to have little choice but to avoid facing the risk of extinction or to adapt to the relentless pace of change in the internal and external business environment to cope with changes in client requirements, as stated by many authors such as Hansford (2009). Hansford states that the external and internal business environment determines a firm's sustainability, opportunity for work and, thereby, potential profits, in addition to organisational need to respond to different fluctuations such as client needs, expectations and attitudes, political, environmental and economic factors, by adopting organisational strategy and future planning systems (2009). As part of company responses to their operation environment, organisations should be regularly restructured and organisational strategies should be regularly redesigned, Jamali *et al.* (2009). However, managers rarely take account of project environmental influences when they configure their organisational structure and management strategies and, thus, projects are controlled and managed according to outdated ideas about management strategies and organisational structure, Ehlers (2009).

The ability of the construction industry to be innovative and manage changes in the external and internal environments has been widely debated worldwide over the years Silas B. Yisa, Issaka Ndekugri, Brian Ambrose, (1996). Many factors within the construction industry have changed over the years in such a way that the combined effect has been to move from traditional modes of management to more flexible, innovative and creative management styles, Senaratne and Sexton (2009). Many changes have occurred in the construction industry worldwide, according to Zeiss (2009), such as methods of placing contracts, experience and innovation, a levelling of trade cycles, increasing competition among firms, increased emphasis on quality

and client buying behaviours, all of which require organisations to understand their operating environment fully to ensure long-term profitability and sustainability.

Studying the United Kingdom and Jordan culture and business environment helps to understand the reasons behind success or failure implementation of TQM in each country and defines the weaknesses and the opportunities to transfer the weaknesses into strengths by the construction companies. Each country has different rules and regulations, culture, history and business environments and, therefore, this chapter is based on a comparative investigation between the United Kingdom and Jordan to understand the construction industry business environment. It investigates whether the successful implementation of TQM in the UK construction companies can be adopted in the Jordan context and examines the factors driving the changes in the Jordanian and the United Kingdom construction industries. However, before asking the question whether TQM is important for the construction industry and before defining the obstacles facing TQM implementation and the benefits of TQM, a PEST analysis is employed to understand the current business environment.

## **2.2 PEST Analysis of the United Kingdom and Jordan business environment:**

### **2.2.1 Political overview:**

The government plays a fundamental role in the construction industry; its involvement in every country is different and it could be direct or indirect, Hansford (2009). However, while the extent of government involvement in the industry is not the same in all countries, the general principles are similar. Many reasons explain the breadth of government involvement in the construction industry; for example, land shortage and increasing pressures on it and population increases have made it necessary for governments to control the use of land everywhere, especially in urban centres, as a result of high densities. Thus, governments find it necessary to formulate new regulations and enforce public health and safety; therefore, countries have formulated building regulations and codes and physical planning statutes, Ball (1998).

In many countries and at various periods, the construction industry widely became an opportunity for investment. Governments endeavour to protect the end purchaser by controlling contractor operations and the items they produce. Moreover, and as the construction industry is an important sector of the economy, developing nations

started to pay more attention to materials provision and development, employee training and utilisation of appropriate technology. Funding of education and training, encouragement of technology development, research funding, control in the importation of certain materials and propagation of local materials are considered as measures to control the construction industry by governments, Lancaster *et al.* (2001).

According to Langford and Murray (2008), the UK faces serious challenges in the construction industry as a result of problems in the financial markets, which hit the industry worldwide after the problems in the US sub-prime mortgage market in 2008 that triggered a catastrophic crash in the US banking sector. The construction industry, as a major contributor to the UK economy, recorded a rise in the total outputs of the industry each year between 2005 and 2008 but, in 2009, the growth of the total outputs of the construction industry slowed to just 1.1% compared to estimated total outputs of £123.24bn in 2008. Furthermore, the individual sectors have their challenges as well; for example, the shortage of buyers in the current market condition is impeding government progress and plans to build more houses and this affects the house building sector. The government has adopted fast-track construction techniques to make house building cost-effective but this still has no effect on the affordability of housing.

As a result of the economic recession's effect on the UK construction industry, the Union of Construction Allied Trades and Technicians, UCATT (2008) announced that the UK government had adopted an improvement plan to improve construction sector efficiency, sustainability and productivity which included:

- cutting the number of work-related deaths by 10% year on year,
- ensuring 25% of materials used in construction projects are responsibly sourced by 2011,
- achieving a 50% reduction in the amount of construction, demolition and excavation waste to landfill, and
- ensuring all construction projects over £1 million have biodiversity surveys carried out and instigating the necessary action by 2010.

However, in the Jordanian context, surprisingly, the Mayor announced in 2009 that economy was stable and that the problems in the US banking sector did not hit the Jordanian economy badly, according to Morgan (2009) in an interview with the Mayor of the Jordanian Capital Amman (Omar Maani). The Mayor announced that the *"Jordan economy was to remain stable in 2009"* and the Mayor added that the *"number of construction licences granted in the first half of 2009 was equal to those issued in the first six months of 2008"*. The National Bank of Kuwait, NBK (2010) supports the Mayoral (or the Jordanian capital Amman) statement. The NBK notes that Jordanian economy had remarkable results in 2008 and 2009 and has begun to reap the fruit of structural adjustment and steady progress with reform. The Jordanian economy has grown by more than 12% per annum over the years 2006-2010, which resulted in a 10% annual improvement in per capita income over the same period 2006-2010. The NBK added that the prospects for the Jordanian economy look promising, though they will not be insulated from the negative effects of the global financial crisis and recession. Therefore, the Jordanian government adopted a new policy to prevent economic adversity by implementing a national investment strategy to simplify restrictions, simplification of employment law and contracts of employment, revamp the tax system and ease the process of starting up business. The Jordanian government proposed a fiscal stimulation package for construction, agriculture and tourism. In 2010, the government created a guarantee of all deposits to protect the banking sector and finally lifted government subsidies on fuel and certain foods to help minimise the budget deficit. Thus, the government has taken action to boost the Jordanian economy in general without giving any priority to certain sectors.

The UK government, however, is taking serious action to boost the construction industry, starting with the compulsory Construction Skills Certification Scheme (CSCS) for local and European workers. Additionally, the UK was one of the three countries, along with Ireland and Sweden, to place no restrictions on workers from the 2004 entrants but after an unexpectedly large influx of workers from Central Europe, with an estimated number of 600,000 in two years (2007 and 2008), the UK government announced that it would impose restrictions on workers from Romania and Bulgaria, BBC (2009). The United Kingdom Olympic Delivery Authority announced in 2011 that the workforce has reached 12,112 and it also published annual figures for British citizenship and nationalities of the Olympic Park and Athletes'

Village workforce, whereby nearly nine out of ten (90%) are EU nationals and two-thirds (64%) are British citizens, ODA (2011). Moreover, the government is taking action against casual employment and the influx of migrant building workers by recruiting migrant workers into UCATT to control the construction gang-masters who introduced such practices as "hot-bedding" to squeeze more workers into shared accommodation and who abuse them by forcing them to accept lower payments and healthcare, UCATT (2009). Although in Jordan the government supports international employment to fill the gap in the Jordanian market, it still cannot control the construction gang-masters, through which international and national employment still suffers from poor working conditions and the non-existence of a health care system for construction workers. During the last decade, the Jordanian government has taken many steps towards developing and controlling the construction industry and signed several international trade agreements such as the Association Agreement with the European Union (EU) in 2001, Free Trade Agreements (FTAs) in 2001 with the USA and for access to the World Trade Organisation (WTO) in 2000, Awadallah (2009).

The United Kingdom and Jordanian governments support and produce several construction materials locally at competitive prices which reduce the exporting costs for construction companies, such as: heavy machinery parts, cement, steel reinforcement bars, stones, ceramic tiles, pipes, air conditioning, sanitary fixtures, wires, glass and elevators. The Jordanian government was supportive of this investment when the door opened to the private sector to benefit from the government's privatisation programme to invest in construction, health, education, water and energy projects and, thus, industrialists can exploit privileges through the Association Agreement with the EU and FTAs with the USA. A new taxation system was presented and some exemptions were given to local and international investors to invest in Jordan, such as lower taxation for land and local material and free import taxation, which gives the private sector an opportunity to play a larger role in economic growth with the public sector, creating jobs for citizens and becoming lucrative enough to attract investors, Sharayri and Ghazi (2008). However, as in the UK, government incentives to support investment are related to specific areas at specific periods and also to the creation of local jobs as part of government commitments to social responsibilities.

Continued volatility in the energy markets will cause extra challenges for the construction sector in the UK and Jordan because energy is a significant factor in the construction industry, material production, specification of building materials and prices. In the UK, extra costs for the construction industry might be caused by government determination to reduce carbon emissions and use of fossil fuels and the government is driving construction material production for a better environment which has still not been adopted by the Jordanian government. However, in terms of the future of the construction industry in the UK, the government is giving priorities to construction and making considerations to the EU norms in the industry, but of most concern is the length and depth of the current recession and how the government is dealing with it. In addition, UK government policy is to become a world leader in sustainable construction to underpin the sector's competitiveness. The UK government set up the Olympic Delivery Authority (ODA) for London in 2012; the ODA is the public body responsible for building new venues for the Olympic Games and their uses after 2012. In Jordan, there is still no clear plan by the government for the construction industry because the government main concern is to support the investment of international companies and, at the same time, the integration by national and international construction companies to cover the gap in the Jordanian market.

At the political level, Jordan was the second Islamic country to sign a peace agreement with Israel (in 1994) after Egypt (in 1979), a result of which the government believes that the conflict in the Middle East is directly affecting the Jordanian economy. In respect of Iraq, Jordan has allowed an influx of one and half million Iraqi refugees into the country, following the war in 2003 until now, which has caused housing shortages and led to an increase in house purchases and rent prices. However, UK (Aggreko, AMEC) and Jordan (Middle East Construction Ltd) construction companies are working internationally on various projects, especially in Iraq, as part of the reconstruction of Iraq plan in collaboration with international firms, Jordanian Ministry of Planning and International Cooperation (2006). The Jordanian government fully supports the Jordanian Contractors' Association in controlling and monitoring the private sector and imported materials and supports education, vocational training and rehabilitation. However, the construction industry in Jordan still faces some problems such as the lack of professionals and expertise,

cartels of some materials, shortages in supply, quality of end project and design as a result of lack of training, Awadallah (2009).

Despite the financial difficulties facing the UK, the Jordanian economy in general and the construction industry in particular, the construction industry business environment indicates that both the UK and Jordanian governments have taken serious action to boost the construction industry and provide a competitive environment for national and international companies; thus, TQM implementation would be possible within the current business environment in the United Kingdom and Jordan.

### **2.2.2 Economic overview:**

The UK was the dominant maritime and industrial power of the 19<sup>th</sup> century. At its zenith, the British Empire stretched over a quarter of the earth's surface and, thus, the UK played a leading role in developing parliamentary democracy and in advancing literature and science worldwide. The British Empire was affected in the first half of the 20<sup>th</sup> century as a result of the two World Wars; the second half of the 20<sup>th</sup> century witnessed the rebuilding of the United Kingdom into a modern and prosperous European Union state. The economic reforms and the process of modern industrialisation started in the 18<sup>th</sup> century in the UK with the influx of surplus rural labour into the urban factories, in addition to the mechanisation of agriculture and the development of the steam engine. During the 19<sup>th</sup> century, the UK economy benefited when the country ruled over a large part of the world and became the dominant maritime power. Nowadays, the UK is a highly industrialised country and a major trading centre, especially with London as the world's first financial centre. In 2008, the UK had an estimated Gross Domestic Product (GDP) of £1.9 trillion with a growth rate 0.7% in 2008, according to the Bank of England (2008), due to the availability of natural resources (such as coal, petroleum, natural gas, lead, zinc, tin, iron ore, gold, tin, salt, silica sand, limestone, chalk, potash, gypsum, slate and arable land) which contributed to the GDP in 2007 at 10%. Moreover, the UK major industrial products include aircraft and motor vehicles, textiles, metals and chemicals, clothing, food processing, paper and paper products and ships building.

Furthermore, as a result of globalisation and the technology revolution, which changed the job composition in advanced economies and increased the skills requirement levels, the UK government noticed the need for more improvement in the education system in being more qualified and standardised to cope with the new challenges. This was to be realised by increasing participation in education beyond the age of 16, expanding the capacity of education and using funding formulas. These steps were the first stage of economic reforms in the United Kingdom from boosting the workforce through an increase of immigrants with different backgrounds and education levels during the last years, according to the Organisation of Economic Co-operation and Development (2008). Moreover, over the past two decades, the UK has had a good record of job creation and reduced the unemployment rate by 0.6% during the years 2006/2007. At the beginning of 2009, unemployment was 7.8% for the three months to June 2009, up 0.7% over the previous quarter and up 2.4% over the year.

Continuing with the UK commitment to reduce greenhouse gas emissions, the UK met the Kyoto Protocol target of a 12.5% reduction from 1990 levels and intends to meet the legally binding target and move towards a domestic goal of a 20% cut in emissions by 2011. By 2005, the UK government had reduced the amount of industrial and commercial waste disposed of in landfill sites to 85% of 1998 levels and recycled or composted at least 25% of household waste, increasing to 33% by 2015. Moreover, the UK has joined several parties to protect the environment and reduce the greenhouse gas emissions such as: Air Pollution-Sulphur 94; Air Pollution-Nitrogen; Antarctic-Environmental Protocol; Environmental Modification; Climate Change Kyoto Protocol; Ship Pollution; Tropical Timber 83; Tropical Timber 94; Whaling; Wetlands; Hazardous Wastes; Law of Sea; Desertification; and Endangered Species, CIA (2009).

In contrast, Jordan's geographic disposition with its inadequate water supply makes it almost landlocked with one sole port (Aqaba) and puts it far from other markets and affects importing and exporting activities. Around 11% of its land is arable; much of Jordan's ground water is not renewable; rainfall is low and highly variable; and it has a small industrial base and few natural resources. Lacking coal, hydroelectric power, forests, and oil, Jordan relied on Iraq for oil until the invasion in 2003. All the previous problems have forced Jordan to rely heavily on external aid, tourism,

phosphates, potash, and service sector and expatriate worker remittances. These are its major sources of hard currency earnings.

In addition to a bureaucratic culture and complicated government procedures in the period between 1980 and 1999, Jordan faced several problems such as slow economic growth (as a result of the two Gulf Wars), unemployment, government levies (on raw materials) and government monopolies (including the Jordan refinery company, where cement and steel imports were limited), all of which translates to higher costs in production and affects foreign investment, local enterprise and productivity, Farawati (2006). Thus, the construction sector has suffered from many managerial and financial problems, according to the Jordanian Ministry of Public Works and Housing (2007).

When King Abdullah ascended the throne in 1999, a comprehensive reform plan was adopted to make real changes in Jordan and Jordanian life and enhance living standards. It started with; enhancing the democratisation process; better education methodologies; hosting educational and environmental conferences; regular meetings with local and international business leaders and investors; tax reduction and exemptions; trade liberalisation; intellectual property protection; signing and supporting new international trade agreements (in 1999); and signing a bilateral FTA (in 2001) with the USA; getting access to the WTO (in 2000); an association agreement with the EU (in 2001). All this effort by the royal family and the Jordanian government have dramatically and positively enhanced the living standards of citizens, improved Jordanian economy integration with the international economy and expanded suppliers' markets for construction, services, health and other sectors. Moreover, regarding the contribution of the construction sector, reports by the Jordan Construction Contractors Association, JCCA (2008) show that the construction sector contribution increased during the last 5 years to 12.4% following the economic reforms and the expansion of the industry to fulfil the high demand in humanitarian basic needs.

However, despite the previous economic reforms and increasing contribution to the GDP in both the UK and Jordan, the construction industry faced some difficulties in 2008 and 2009 as a result of the impact of global factors such as the global recession which affected the health of the economy and forced governments to change the mortgage lending and housing supply policy, thereby affecting interest rates and access to money for capital projects and, thus, affecting the demand for residential and commercial property, increasing unemployment rates and mortgage rates. Figures in the UK show that the recessionary pressure hit the construction industry harder than most, where the construction sector was a large contributor to the fall in the UK economy with activity decreasing by 3.3% in 2010 compared to other industries, according to the Office of National Statistics, ONS (2010). This caused poor confidence in the construction industry, as a result of the impact of a floundering housing market, cuts in capital spending and reduced funding for housing and regeneration. In Jordan, the effects of the world financial crisis were first felt primarily by the construction sector where several resort, residential and commercial projects were delayed or put on hold. The Jordanian construction sector contribution to Jordanian GDP fell to 1.1% in 2010 compared with 4.0% in 2009, according to the Jordanian Ministry of Planning (2010). However, the figures show the current global recession affects the construction industry in the UK and Jordan where economists in both countries forecast a slow return to growth for the construction sector for the 2011 to 2014 period.

### **2.2.3 Social Overview:**

Social behaviour in any country directly affects its economy and industry. The construction sector is one of the largest employers in many countries and it largely employs: managers; suppliers; engineers; construction helpers; consultants; truck drivers; clerical workers; designers; and builders, with many different talents and backgrounds. The social environment is usually affected by education level, corruption and population growth.

The UK educational system was first adopted by the church where students had to start their early learning process. The Victorian era saw the beginning of general reforms in the UK, starting with the recognition of human rights, the abolition of slavery and the practice of child labour. Queen Victoria ascended to the throne on

June 1837 and fully supported the government beginning its moral reform through a strong attempt to introduce literacy to all the people in the UK following the Act of Parliament in 1870 to establish compulsory elementary education.

Furthermore, a new era began in 1901 through the 20<sup>th</sup> century. During this era, the UK saw periods of both calm and instability caused by two world wars and the assimilation of immigrants with diverse backgrounds, particularly in England. Thus, a new national education system was adopted for England and Wales in 1902 under named of LEAs, an abbreviation for local education authorities. During the period from 1902 until 1998, the education system was developed solidly with the increase in population to 58.9 million in 1999. The UK educational system has four stages: primary education, secondary education, further education and higher education. Moreover, UK students who intend to go to university have to finish a general certificate to be qualified for entry to university and there was an increase of 3% in student numbers in the four years prior to 2009, according to the Higher Education Statistics Agency, HESA (2009).

In contrast, the Jordanian education system started in the Mosque in 1921, when the Jordanian government took over the control from the British. Jordan gained independence in May 1956 and started educational and economic reform, enhancing the living standards of Jordanians. Jordanian law and constitution guarantee equal opportunities of education for all Jordanians within its available resources. The education system in Jordan is divided into nursery, primary, secondary and higher education. Schools are divided into public and private schools; the public sector is free for all Jordanians, while the private sector is optional for wealthier families, however. All Jordanians have to attend primary and secondary education at a public or private school from about 5 years old until 15 by law, which means that students still have three years to finish their secondary education. At this stage (age 15), students have the choice of entering further secondary education or leaving school to go into the working world. Students are assessed at the end of each stage to ensure they have the required knowledge and information. The most important assessment occurs at the age of 18 when all students pursue their final certification. Jordanian students planning to go to college or university are required to finish their schooling at the age of 18 or older and once students get their certification, they have the option to

enter higher education or start work, according to the Jordanian Ministry of Education (2009).

However, higher education (university) was not adopted by the Jordanian government until 1967. The government commitment was to provide students with the necessary education until the age of 18. By 1963, the government was committed to providing higher education when the agenda of education was given the highest priority; thus, more schools and universities were launched in Jordan to improve the education level to supply the Jordanian market with more educated students who were able to meet the demand during that period.

The development of the Jordanian education system has improved dramatically compared with the lack of an education system in 1921 and the sequential generation of the current high-quality system in 2011 which has been developed and invested in, since the government believes strongly that people are the most important aspect in any country. Moreover, during the development stages new acts related to human rights were endorsed by the Jordanian government in 1992 to eliminate all kinds of gender discrimination which was wide spread in the country.

Recently, a new cooperation detection scheme between the Ministry of Education, the Ministry of Social Development and other stakeholders was launched to improve the Jordanian education system by opening new schools, colleges, universities and other education centres. Moreover, a new strategy was adopted in 2007 to support people with special needs by opening new centres that include various activities and programmes to integrate people with special needs into their community. However, despite all that, the Jordanian government still faces several challenges concerning unemployment and social behaviour.

The global recession, however, has changed human social lives, and the UK government first priority is to provide more jobs for its people by reducing the international employment rate, especially in the construction sector. The construction sector in the UK employed 1,280,044 in 2008. In total, in all industries, 29.11 million people were in work in April 2008 but this had fallen by 750,000 by June 2009. The unemployment rate rose to 7.2% by 220,000 additional unemployed over the first quarter of 2009 and by 750,000 over the year to reach 2.5 million in November 2010,

as shown in Table 2 below. Youth unemployment in 2009 was at its highest level in the UK since 1994, and this will become far worse when fresh graduates start seeking jobs.

After that, a new expression appeared in Jordan. The "culture of shame" was a result of the social stigma attached to menial jobs and Jordanians started to look down on certain types of jobs such as construction. They referred to it as not receiving a decent salary, one not exceeding JD200 a month (£180), which increased the foreign labourer working in construction and manufacturing by 5% to 400,000 by the end of 2006, according to International Labour Migration (2007). In the UK, meanwhile, construction workers are entitled to be paid at least the national minimum wage, which is £7.87 per hour for workers aged 21 and over, £10.46 per hour for skilled labour wages, according to UCATT (2010). However, this phenomenon is considered the major cause of unemployment in Jordan. *"It is not about attitude when it comes to replacing foreign workers with local ones; it is the salary that matter"*, Jordan Business Magazine (2008).

<b>Unemployment rate in the United Kingdom</b>	<b>Unemployment rate in Jordan</b>	<b>Year</b>
4.9%	16.00 %	2003
4.7%	16.00 %	2004
4.7%	15.00 %	2005
5.1%	12.50 %	2006
5.5%	15.40 %	2007
5.5%	13.50 %	2008
7.9%	12.60 %	2009
7.8%	12.90 %	2010

Table (2.1) Unemployment rate in the United Kingdom and Jordan, Ministry of Planning and International cooperation, Jordan (2010), Eurostat (2011)

Furthermore, Jordan and the United Kingdom face the same problem concerning female employment in the construction industry. While in Jordan it is still not widely accepted for women to work in the industry because of family resistance and cultural issues, in the UK the picture is slightly different. The construction industry was highlighted by the Equal Opportunities Commission in recent years to tackle gender

barriers in the industry, and to give women more opportunity to work in the sector to stop women being put off entry by certain stereotypes about the sector. The percentage is now increasing and more jobs are available for women in the construction sector in the UK.

For many people in the United Kingdom and Jordan, the impact of the recession is a complex interrelation between falling property prices, rising costs and the burden of personal debt. Such complex interrelations affect those mostly on low incomes, which might be sub-divided into the likes of the elderly, the disabled and those with young children, leaving them with no option except spending less on the fundamentals as opposed to reducing expenditure elsewhere. Moreover, as house prices fall and credit becomes much less readily and cheaply available, people learn to live much more within their means, or risk further unsustainable levels of personal debt.

#### **2.2.4 Technology Overview:**

The technology level in the construction process is considered a dynamic element for determining the level of construction activity in any country. Many countries, such as the UK, Malaysia, the USA and France have been trying to increase the technology level within the construction industry by adopting updated methods in construction activity, Rollet (1986). Within the construction industry, technology enhancements increase productivity and reduce the construction costs and, thus, induce more profit for the industry, CIDB (2007). A survey by Agus (1997) shows that the construction industry market is hungry for more quality construction; hence, more and more contractors and key players in the industry are willing to participate in any projects that will meet the high market demand for higher levels of activity and technology uses.

With the enhancement of technology levels in construction activity, the industry can be reshaped, away from what it has been always termed, “Difficult, Dangerous and Dirty”, CIDB (2007). With the technology activities of the construction industry enhanced, the sites will improve dramatically with the result of attracting more labourers to enrol in the industry and a more progressive and more safe-wise environment. Chia and Kiong (2009) state the influences of technological aspect in the construction activity to be enhancing the industry by utilising fewer inputs and

achieving better outputs and, thus, boosting construction activities as a result of gaining more and more investment as confidence among investors strengthens.

Goodrum and Gangwar (2002) clarify that technology adoption within construction activities can affect projects in several ways. Firstly, human energy can be amplified because technology is designed to make activity faster and easier to perform physically. Secondly, it can increase the level of control, especially when facing an inadequate labour force and high demand. Moreover, it can save labour shortage and increase output. Thirdly, it can provide greater and more accurate information regarding organisational internal and external processes, as well as cutting unnecessary costs and maintaining time.

Within the Jordanian construction industry, the uses of technology rarely existed and all construction work and control were done manually by workers in the sector. In 2005, the Jordanian government noticed the increased demand for construction activities and investment in this sector and, thus, promoted new methods of technology in construction by organising international exhibitions to promote construction technology and train managers and construction workers in the use of technology to boost the sector. The first exhibition was a wide success and construction firms responded dramatically to the changes in working methods after feeling the benefits of adopting technology by using new mechanisms and software to control and improve project quality and reduce the overall time and costs.

However, after the noticeable success of the event, the government announced it as an annual event in Jordan for technology uses and construction materials, which attracts building investors and developers' investors and developers, suppliers and manufacturers of building materials from Jordan and other countries which boosts the industry and develops technology in construction activity. Nowadays, the construction industry uses widely different construction technology such as the internet as a selling medium, design of software solutions, document management systems, automation and job control.

The UK construction industry has adopted technology in construction activities for a long time, since construction key players found that technology adoption could save

time, money, effort, reduce error, improve productivity, improve security and utilisation, reduce business risk, improve control of assets and improve project management, Kazi *et al.* (2007). The use of technology in the UK construction industry has developed dramatically due to support and encouragement in innovation, research and design in the industry, which develops new methods to boost and sustain the industry, such as Virtual Reality (VR), Radio Frequency Identification (RFID) and Ground Penetrating Radar (GPR).

VR holds substantial potential benefits for the highway construction industry, in terms of helping the process of highway projects facilitate collaborative decision-making on construction scheduling and traffic planning since it enables designers and planners to sit ‘in the driving seat’ of a virtual project and experience variables of the design such as maintenance of traffic, driver line of sight, traffic flows and other driver experiences. Thus, designers, planners and engineers can experience their design before the actual final decisions are made and construction begins. RFID is a form of wireless transporter which sends data automatically to a transceiver, and the information is then sent to a central server where it is organised and fed into software for inventory management and project management. The data can be from sites, such as quantity or vibration. RFID is used in the UK construction industry in ways such as tracking tools and equipment in where they are, when they need replacing and when they are replaced. It can also be used for hazardous materials and tracking explosives. In addition, it can be used when pouring concrete to track temperatures, especially in cold weather. GPR is ground probing, subsurface, underground, and earth sounding radar, used in the construction industry to locate underground utilities, unexploded land mines, archaeological sites, caves, groundwater, tunnels and other unseen objects without requiring destruction or excavation.

### **2.3 Conclusion:**

Undeniably, the construction industry is an essential part and one of the major contributors to economic development and country GDP. The construction industry, with its backward and forward linkages with various other industries, plays a major role as a catalyst in employment and boosting industrial development. However, the industry is strongly influenced by several factors previously identified (Political, Economical, Social and Technology) and faces important challenges such as the sustainability of resources and skilled employment shortages. Planning consent for construction work is often a major problem, as a result of difficulties in satisfying government planning regulations. Thus, when the majority of challenges and influences cannot be controlled by the industry, key players in the industry should have industrial strategic planning, updated technological construction activities, to manage the industry development, ensure competitiveness and sustainability and to meet the changing requirements and expectations of clients.

The current business environment in the UK and Jordan shows that their governments are supporting the construction industry by signing different world trade agreements, tax reductions and supporting investment. The UK and Jordan are facing some difficulties in the economic context as a result of the world-wide recession affecting both construction industries, but economists believe that the sector will recover very soon due to government investment packages in infrastructure and other public projects. However, the global recession has forced the construction industries to

reduce their workforce which gives them a chance to restructure their operation processes, make the required cultural changes and invest in their human resource management to ensure recruiting the right workers in the future.

Furthermore, Jordan and the UK are facing the same problem with unemployment. In the UK, the unemployment rate is 6.2% (in 2010) which is still much lower than Jordan at 12.9%. In terms of female employment in the construction industry, in Jordan it is still not widely accepted for women to work in the industry because of family resistance and cultural issues, while in the UK the industry was highlighted by the Equal Opportunities Commission to tackle gender barriers to give women more chance to work in the sector. Technology is newly adopted in the Jordanian construction industry, while in the UK Construction it has been adopted for a long time as a result of its effect on saving time, money and effort, reducing error and improving productivity. Therefore, government and key players in the industry are investing in technology and innovation in the sector.

However, in the UK and Jordan, the construction industry faced some difficulties in 2008 and 2009 as a result of the impact of global factors such as the global recession which affected the health of the economy and forced governments to change the mortgage lending and housing supply policy, thereby affecting interest rates and access to money for capital projects and, thus, affecting the demand for residential and commercial property, increasing unemployment rates and mortgage rates. Figures in the UK show that the recessionary pressure hit the construction industry harder than most, where the construction sector was a large contributor to the fall in the UK economy with activity decreasing by 3.3% in 2010 compared to other industries, according to the Office of National Statistics, ONS (2010). This caused poor confidence in the construction industry, as a result of the impact of a floundering housing market, cuts in capital spending and reduced funding for housing and regeneration. In Jordan, the effects of the world financial crisis were first felt primarily by the construction sector where several resort, residential and commercial projects were delayed or put on hold. The Jordanian construction sector contribution to Jordanian GDP fell to 1.1% in 2010 compared with 4.0% in 2009, according to the Jordanian Ministry of Planning (2010). However, the figures show the current global recession affects the construction industry in the UK and Jordan where economists in

both countries forecast a slow return to growth for the construction sector for the 2011 to 2014 period. Furthermore, the individual sectors have their challenges as well; for example, the shortage of buyers in the current market condition is impeding government progress and plans to build more houses and this affects the house building sector. Moreover, the rising cost of oil and other raw materials such as steel, cement, copper, as well as oil derivatives such as plastic, polypropylene, causing higher input prices.

However, despite the current economic recession, the current business environment shows that the construction industry is not facing many external problems in the UK or Jordan. Hence, the TQM implementation impediment might be caused by internal factors in respect of management and employees which will be investigated later in this study.

Jordan and the United Kingdom have different cultures, histories and political and geographical characteristics which shape each country's business environment. Thus, the UK and the Jordan business environments are different to some extent but, despite all the differences, both countries have developed a healthy business environment by supporting the economy, establishing strong political relation, signing different trade agreements worldwide, and supporting research and development in technology adoption. Therefore, to some extent, the business environment is similar as both countries were hardly hit by the global recession in 2008. Nevertheless, Jordan still lags behind the UK in terms of TQM implementation in all industries and this may be as a result of internal rather than external factors. Some of the major factors that might affect TQM in the Jordanian construction industry are: culture, TQM perception from different perspectives; client expectations; and government control over minimum levels of quality and management commitment. Therefore, these factors and others will be investigated in more detail in Chapter 4 to understand the internal factors affecting the construction industry business environment in general and TQM implementation in particular in the UK and Jordan.

# **Chapter Three**

Total Quality Management Fundamental Issues

### **3.1 Introduction:**

To understand the TQM concepts and the necessity of TQM system within any organisation, the TQM roots and development stages should be understood and evaluated. Therefore, this chapter aims to provide a background of the literature on TQM to understand and discuss the different concepts and starts by defining quality and quality management. Moreover, this chapter includes an overview of the TQM transition and development stages and presents the main differences between traditional management and TQM, a comparison of different quality frameworks, contributions of quality gurus, and TQM implementation requirements and critique.

### **3.2 Total Quality Management Concept:**

The quality concept can be a confusing notion due to individual criteria based on roles in the chain of activities which are based on an individual's perspectives within the value chain. Quality is defined by the Oxford Dictionary (2009) as "*the degree of excellence of something as measured against other similar thing*". However, within the business environment, quality is related to product and service characteristics and customer satisfaction. It can vary according to different perspectives such as customer and organisation perspectives, as Feigenbaum (1983) indicates in his definition of quality: "*the characteristics through which the product and services meet the expectations of the customer*". While quality involves product and service features, quality management deals with the operation process and organisation, and the means to achieve quality. It is considered to have three main components, quality assurance, quality control and quality improvement, which are discussed later on in this chapter.

According to Crosby (1979), quality management is based on the Zero Defect philosophy. This philosophy focuses on preventing inadvertent mistakes by understanding the high cost of quality defects and by thinking continually about where mistakes might emerge to prevent these flaws if possible, to provide high quality and quantity products and services within the lowest budget, thereby increasing client satisfaction and enhancing company reputation.

TQM is a management approach that has become popular since the early 1980's when it became a powerful method of competitiveness. Therefore, TQM can be defined, according to Deming (1986), as “*organisation activities involving everyone in a company – managers and workers – in a totally systemic and integrated effort toward improving performance at every level*”. These integrations lead to increased client satisfaction by controlling quality, costs and product developments. Sashkin and Kaiser (1991, p.25) mention that TQM is based upon the constant attainment of customer satisfaction, through incorporating management and employee commitment, training, continuous improvement and great supplier relations. TQM is defined as a “*continuous process of improvement for individuals, groups of people and whole organisations*”, Kanji and Asher (1996). A quality department is based on integrating all organisational functions to focus on fulfilling client needs to achieve organisational objectives, which can be reached by providing employees with the required training towards being self motivated and controlled to come up with new ideas and methods of doing the job and dealing with clients to provide a high quality service.

Pike and Barnes (1996) propose that TQM is associated with the organisation itself and is considered as integration between the technical, social and human systems in any organisation, due to its influence on an organisation's reputation and customer satisfaction. Thus, all departments have to merge together to improve the organisation's effectiveness, competitiveness, and structure. For Dale (2002, p.5), there are many definitions and interpretations of TQM due to the wide perceptions of quality but, according to Dale, TQM is “*the mutual co-operation of everyone in an organisation and associated business process to produce value for money, products and services which meet and hopefully exceed the needs and expectations of*

*customers*” (p.26). He states that TQM involves all aspects of quality management for organisations, including suppliers, customers and employees, and their integration with the key business process. In addition, TQM requires all organisations to apply TQM principles in every branch and at every level, with a balance between technical, people and managerial issues. Therefore, according to many authors in the TQM field, all departments have to integrate together to achieve the required outcome of the TQM implementation system and it is not just a one department job or even top management, but employees and management have to work as a team within all departments to provide value for money and high quality outputs.

Khan (2003) discusses the four basic factors on which the TQM philosophy is based and these factors are: employee involvement, empowerment and ownership, continuous improvement, customer focus and use of management commitment, where TQM is the foundation of several activities, such as management and employee commitment, meeting customer requirements, improvement teams, reducing development cycle time, employee involvement and empowerment and strategic planning.

Oakland (2003) supports Khan’s beliefs and adds that TQM is a management approach aimed at improving effectiveness, competitiveness and flexibility through strategic planning, management and employee participation and process improvement. TQM should be thought of as a way of thinking and doing the job and it involves all people within an organisation, by improving communication and employee participation to influence and improve quality positively. Shahbazipour (2008) defines TQM as “*a method by which management and employees can be involved in the continuous improvement of the production of goods and services*”. TQM is considered a management philosophy, aimed at reducing losses and increasing business. Moreover, TQM based on a combination of management tools and quality seeks to integrate all organisational functions to focus on meeting organisational objectives and customer expectations and needs.

TQM is defined by the International Organisation for Standardisation (ISO), (2009) as a “*management approach for 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*”. Hashmi

(2009) states that TQM views an organisation as a collection of integrated processes which must be continuously improved by incorporating worker knowledge and experiences to achieve organisational objectives, and it must be practised by management and employees in all activities, in Human Resource, Finance, Engineering and Purchasing.

Therefore, there is no single, specific theoretical formalisation of TQM, as stated by Akbar and Awan (2009). However, Ishikawa (1985), Deming (1986), Juran (1999) and others state that organisations need a quality system and quality culture, and they provide the core assumptions of TQM as a discipline and philosophy of management which organises, plans and continuously improves activities in which management and employees have to participate to improve processes and outputs. Thus, TQM is presented differently in different points of view, as there is no general and formal definition of TQM which can fit or be implemented in all organisations within all sectors. TQM definitions are different in each region and each country, based on national and organisational culture and perception of quality, and the requirement of that culture. In general, however, it is preserved as a management philosophy and the majority of authors relate the main role of TQM implementation to the management level of commitment towards quality improvement. Generally, the majority of authors and researchers in the field of TQM agree to the key principles of TQM as described by Hashmi (2006) as follows and which will be examined later in this study:

- Management Commitment; Plan (Drive and Direct Quality); Do (Support, Deploy and Participate); Check (Review and Measure); and Act (Recognise, Communicate and Revise).
- Employee Empowerment; Training; Suggestion Scheme; Excellence Teams; and Recognition.
- Customer Focus; Supplier Partnership; Customer Driven Standards; and Never Compromise Quality
- Continuous Improvement; Attain, Maintain and Improve Standards; Systematic Measurement; and Excellence Teams.

TQM is the shared collaboration in a company aimed at producing value-for-money products and services in order to meet and surpass customer needs and expectations (Dale, 2003). It has been successfully applied in the manufacturing sector to control process and avoid deficiencies, leading not only to savings in terms of money and time, Lahndt, (1999) but also to high levels of customer satisfaction, Oakland, (1994). Few manufacturing process are aimed at the production of single items whereas in construction, the work is consider to be not repetitive (e.g. one design) and normally projects specifications are changed with each project. However, not only are many buildings, such as houses, essentially repeat products which can be continually improved but, more importantly, the process of construction is itself repeated in its essentials from project to project. Therefore, despite the construction project size, 80% of inputs into buildings are repeated. Much repair and maintenance work also uses a repeat process. Thus, the focus is not on building the construction project; it is with designing and planning the production of a new construction project. Therefore, improvement tools that are currently being applied in the manufacturing sector should be adapted and used in the construction industry.

However, problems and errors that arise during the project construction phases, offers opportunities for learning and improvement. One of the main objectives of TQM (part of the philosophy of which is continual improvement) is to increase customer satisfaction (Chua, 2003). It requires a commitment to consider the customer viewpoint in every process. There are many concepts that have been successfully applied in the manufacturing sector to achieve continual improvement and ultimately product quality. One of these is known as the Juran Trilogy (Juran, 1992), which encompasses three aspects: quality planning, quality control and quality improvement. According to Juran (1992), quality planning is the activity of satisfying customers by developing products and processes that meet their demands. To do so, a series of steps are followed: setting up quality goals, identifying customer needs, developing products that meet customer desires, establishing process controls and evaluating quality performance. However, based on Juran quality process, the following are the required tools/techniques, which could support a continual improvement process in the construction industry.

- (a) Planning tools for setting up quality goals.
- (b) Customer needs for identifying customer requirements.

- (c) Formal methods for developing products that meet customer needs.
- (d) Quality control for establishing process controls; and
- (e) Performance measures for evaluating quality performance.

Substantial changes in the culture and structure of the construction industry are required to enable the improvements in the project process that will deliver high quality projects. These include changes in working conditions, skills and training, approaches to design, use of technology and relationships between companies. Moreover, if construction is to share in the benefits of improved performance the objectives and targets that it sets must be directly related to client's perceptions of performance. This means measures of improvement in terms of predictability, cost, time and quality. Clients will then be able to recognise increased value and reward companies that deliver it. Targets must also be set for improving the quality and efficiency of construction processes – in terms of safety and labour productivity for example. In this way corners are not cut and companies and their staff share in the benefits of success in order to deliver continuous improvement.

However, in today's global competitive marketplace, the demands and expectations of customers are increasing as they require improved quality of products and services due to high competition which gives clients more control over the bidding and procurement process. Moreover, as a result of globalisation and increasing competition worldwide, companies are required to keep up with their competitors and increase market share. Consequently, quality is seen as the proper method to improve company competitiveness, sustainability, and performance because it focuses on the entire organisation and creates a relation between all participants and customers in understanding their needs and requirements.

The successful implementation of TQM in manufacturing, service sectors and some construction companies in Europe, USA and Japan have led other companies to implement TQM to improve their performance and customer satisfaction. Therefore, many companies have adopted quality management tools and techniques without even understanding the necessity or benefits of quality management. They believe that having quality management within an organisation may enhance the company's reputation and place in the market and this will be discussed in this research by investigating whether TQM implementation is important for all organisations or

whether they can successfully compete without any quality system. Thus, the definition of quality depends on the role of the people defining it.

However, the construction industry compared to other sectors such as the manufacturing and service sector is viewed as one with poor quality emphasis, Yusoff *et al.* (2006). Total Quality Management is increasingly being adopted within the construction industry as an initiative to solve quality problems within the industry and to meet the continual needs of customers. It has been seen that TQM has the potential to improve business results, worker involvement and fulfilment, greater customer orientation and satisfaction, team working and better management of workers within the organisation but, despite the various benefits of TQM adoption, companies have been continually struggling with its implementation, since it requires long time and culture change, Antony and Desai (2009). This will be discussed later within this study.

According to the previous definitions of TQM, it can be concluded that TQM is first seen as a method to reduce defects and, therefore, to reduce costs and improve profits, while at the same time provide customers with high quality products and services within the lowest budget. Therefore, it is first perceived from financial perspective, rather than a method to improve customer satisfaction. To reduce defects, suppliers, designers, management and employees within all departments have to work together to prevent any defects; therefore, it is perceived as an integration process between all people within all departments to reduce defects, thereby reducing the overall production and operational costs for the organisation and customers. This requires highly committed management to come up with strategic planning supported by providing employees within the required training, teamwork, employee motivation and continuous improvement to provide high quality output within the lowest budget. Therefore, in general, TQM implementation aims to reduce costs to provide quality services to satisfy customers and improve competitiveness. Business organisations in nature are profit driven before being quality or customer satisfaction driven, but the balance between providing high quality services, generating profits and improving customer satisfaction is different between organisations because each firm perceives quality and customer satisfaction differently. Moreover, the difficulty in defining quality exists regardless of products and services. For instance, the quality definition

in manufacturing organisations is often different from that in services. Manufacturing organisations produce a tangible product that can be seen, touched, and directly measured, while in service organisations, they produce a product that is intangible which cannot be seen or touched; rather, it is experienced. Quality, therefore, is more related to management, employees and operational processes rather than to final products and services, though from final user perception, quality is directly related to the final products and services, since quality perceived by customers is the difference between the pre-purchase expectation and after purchase performance.

### **3.3 Total Quality Management Evolution (From Inspection to TQM):**

During the early days of manufacturing, work was inspected and a decision made whether to accept or reject it. As business became larger, so, too, did this role and full time inspection jobs were created. However, accompanying the creation of inspection functions, other problems arose, such as more technical problems occurring requiring specialized skills which were often not possessed by production workers; the inspection lacked training; and inspectors were ordered to accept defective goods to increase output. These changes led to the birth of the separate inspection department with a chief inspector reporting to either the person in charge of manufacturing or the works manager. With the creation of the new department, there came new services and issues, such as standard of training, recording of data and the accuracy of measuring equipment. Thus, it became clear that the responsibility of the chief inspector was more than just product acceptance, and a need to address defect prevention emerged. Hence, the quality control department evolved, in charge of which was a quality control manager with responsibility for the inspection services and quality control engineering.

In the 1920's, statistical theory began to be applied effectively to quality control and, in 1924, Shewhart made the first sketch of a modern control chart. His work was later developed by Deming and the early work of Shewhart, Deming, Dodge and Romig constitutes much of what today comprises the theory of statistical process control (SPC). However, there was little use for these techniques in manufacturing companies until the late 1940's. At that time, Japan's industrial system was virtually destroyed, and it had a reputation of cheap imitation products and an illiterate workforce. The

Japanese recognised these problems and set about solving them with the help of some notable quality gurus: Juran, Deming and Feigenbaum. In the 1950's, quality management practices developed rapidly in Japanese plants and become a major theme in Japanese management philosophy. By the late 1960's and early 1970's, Japan's imports into the USA and Europe increased significantly, due to its cheaper, higher quality products, compared to Western counterparts.

In 1969, the first international conference on quality control sponsored by Japan, America and Europe, was held in Tokyo. Feigenbaum states that the term "total quality" was used for the first time and referred to wider issues such as planning, organisation and management responsibility. Ishikawa (1985) explains how "total quality control" in Japan was different, as it was referred to as "company wider quality control" and describes how all employees and management must study and participate in quality control. However, the quality revolution in the west was slow to follow and did not begin until the early 1980's when companies introduced their own quality programmes and initiatives to counter the Japanese success. According to the UK Department of Trade and Industry (1982), Britain's world trade share was declining and this was having a dramatic effect on the standard of living in the country. There was intense global competition and any country's economic performance and reputation for quality was made up of the reputation and performance of its individual companies and products/services.

The British Standard (BS) 5750 for quality systems had been published in 1979 and in 1983 the National Quality Campaign was launched, using BS5750 as its main theme. The aim was to bring to the attention of industry the importance of quality for competitiveness and survival in the world market place. Since then, the International Standardisation Organisation (ISO) 9000 has become the internationally recognised standard for quality management systems. It comprises a number of standards that specify the requirements for the documentation, implementation and maintenance of quality systems. TQM is now part of a much wider concept that addresses overall organisational performance and recognises the importance of process.

Some researchers have defined different levels of TQM evolution. For instance, Chin *et al.* (2002) identify TQM evolution as five stages: could be better; room for improvement; promising; vulnerable; potential winners; and world class. Lau *et al.* (2004) classify five levels of development: unaware; uncommitted; initiator; improver; and achiever. However, Crosby, Weeb, Bryant and others categorize the TQM evolution into four stages within this progression as: Quality Inspection, Quality Control, Quality Assurance and Total Quality Management, as follows:

### **3.3.1 Quality Inspection (QI):**

Quality Inspection is defined by Dale and Bunney (1999, p.25) as “*activity such as measuring, examining, testing or gauging one or more characteristic of an entity and comparing the results with specified requirements in order to establish whether conformity is achieved for each characteristic*”. Feigbaum (1991) points out that quality inspection was adopted before the First World War and developed after the Second World War as a result of increasing worker numbers and job complexity which made it harder to keep quality at the required level and, thus, it was necessary to develop a quality inspection concept within factories or organisations. However, according to Costin (1994, p.40), at one time products and services were examined, measured or tested under a simple inspection-based system to assess their conformity. Costin adds that inspection was a way of ensuring quality at an appropriate point, which differs between manufacturing, services or commercial types. Moreover, an inspection system was applied as an appraisal point by those responsible for a process of self inspection or by experienced staff employed specifically for this purpose. During that period, any materials, products or components not conforming to specification used to be modified, reworked or passed on concession. In addition, inspection used to grade the final product and not directly involve operation processes, customers or suppliers.

### **3.3.2 Quality Control (QC):**

In (1946), the USA nominated General Douglas MacArthur to lead the re-building process of Japan. During this time, the General invited two key individuals to assist with the re-building process (Joseph Juran and Edward Deming) due to their role in

the development of the modern quality concept. They promoted the quality control process to Japanese business and focused on the upper management rather than giving full attention to quality experts, which encouraged the Japanese to develop the culture of continuous improvement and integrate quality control throughout their organisations, Simpson *et al.* (2002).

Quality Control is defined by the ISO (2009) as “*Operational techniques and activities that are used to fulfill requirement for quality*”. This definition implies that any activity, whether serving the control, management or improvement of quality, is considered as quality control activity involving product design, operation process and outputs. Moreover, quality control is that part of quality management related to achieving quality requirements using statistical methods. It is related to the inspection process of the finished products and services but it is more focused on preventing any defect and monitoring operation processes to check whether they meet the desired requirement, Genasan *et al.* (2009). Ellis *et al.* (2005, p.196) address quality control measures leading to lower defect incidence and greater process control. They add that quality control is not a process for creating standards, but for maintaining them through a method of selection, measurement and defect prevention.

### **3.3.3 Quality Assurance (QA):**

Quality Assurance is defined by the American National Standards (ANS, 1994) as planned and systematic preventive activities that are designed to provide confidence of organisation outputs (products/services) to ensure meeting customer satisfaction. Moreover, quality assurance encompasses all actions and programmes that are designed to ensure that the final product or service will fulfil customer expectations and satisfaction such as design, distribution, development, production and servicing.

Besterfield (2003) states that quality assurance is a set of activities done before the manufacturing or planning process of products and services to assure good quality to the customers. In addition, it emphasises defect prevention by improving production and associated processes to avoid or reduce chances that might cause defects in the first place, whereas quality control is a set of activities done during manufacturing products or delivering services to customers but testing and blocking the release of defective outputs; thus, it emphasises defect detection.

### 3.3.4 Total Quality Management (TQM):

The origin of the phrase Total Quality Management began to emerge by the end of the 1970s by the US Naval Air System Command but, according to the American Society for Quality, the phrase was first adopted as Total Quality Control in 1980 to portray the Japanese style management which was implemented by American companies during that period. In the 1980s, the expression was changed to Total Quality Management, suggested by one of the employees (Nancy Warren) because she noticed that her colleagues did not like the word control. Following that, in 1981, Nancy started to research the philosophy of Edward Deming and the work of Juran, Crosby and Ishikawa to make performance improvement. By 1982, American corporations were in a near panic due to the high productivity of Japanese companies who spread their products throughout America and they gained a high market share as a result of low labour costs in Japan, the Japanese work ethic, conflict between labour and management and burdensome government regulations in the USA, Mele and Colurcio (2006).

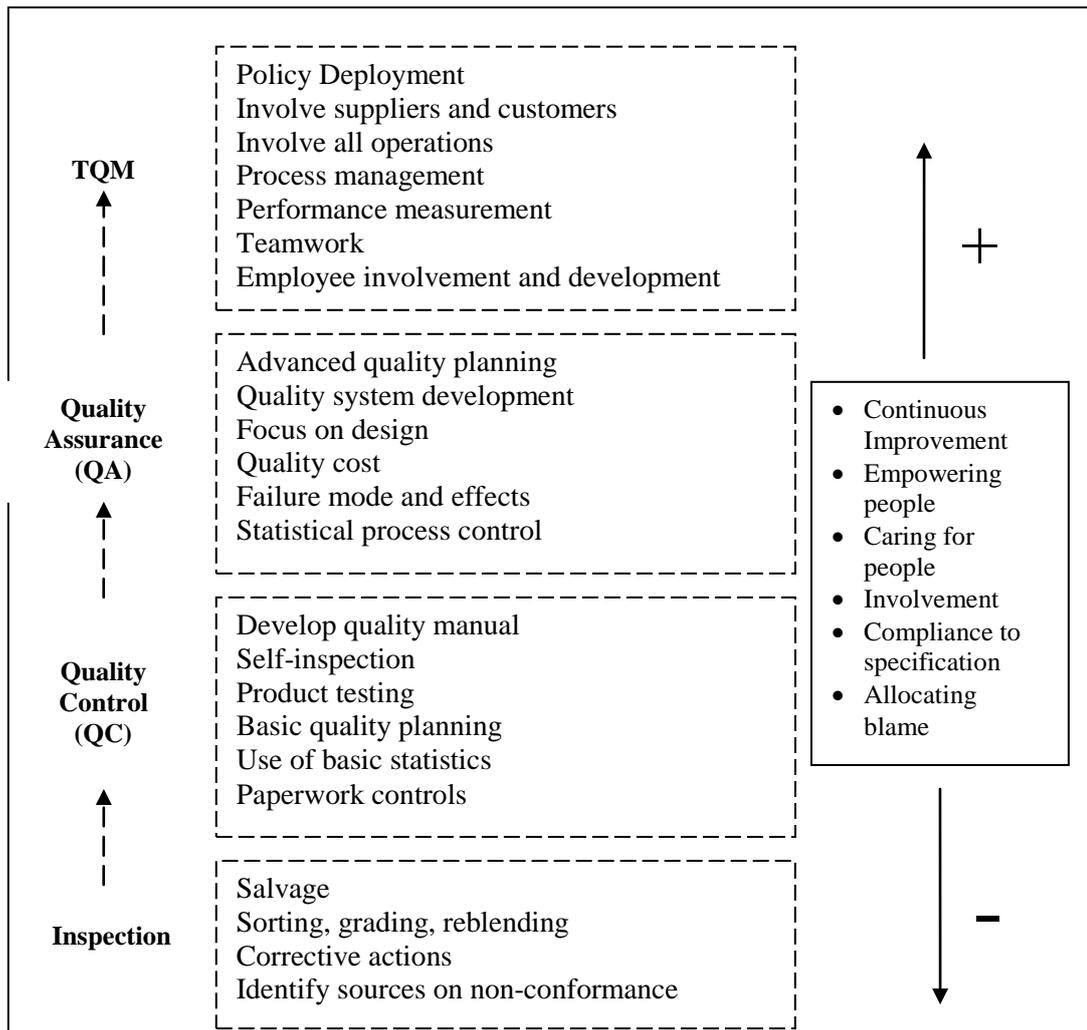
Crosby (1979) mentions that TQM applies the idea of quality assurance to the whole product and service range by emphasising doing the job right first time, every time, on time. In addition, customer views and ideas are sought and fed into the organisation system to ensure achieving customer satisfaction continuously. TQM is defined by Gunasekaran and McGaughey (2003, p.361) as a “*management philosophy that encourages cost reduction, the creation of high quality goods and services, customer satisfaction, employee empowerment, and the measurement of results*”. This idea is supported by Antony (2009) in stating that TQM seeks to fulfil customer needs and expectations continuously by producing and servicing what they desire at the lowest cost and at the right time by emphasising involving the vital mass of human resources. As discussed by Li *et al.* (2006), TQM requires that an organisation has to apply all the principles of quality management at every level and by everyone in the organisation.

Andrew and Tang (2009) mention that the complex and dynamic technology, resources and task environment, and customer expectations and orientation are the primary factors behind adopting TQM in today's organisations. They add that TQM

has shifted management style away from traditional thinking in terms of process control and organisation aims to giving more attention to the organisational culture as the essential driver of process control. There are some differences between TQM and traditional management, for instance:

- TQM emphasises that profits follow quality, not the other way around.
- TQM focuses on customers and their expectations more than profits.
- TQM creates goal-directed connections among managers, suppliers, customers and everyone in the organisation.
- With the TQM system, everyone is motivated to contribute towards quality, while in contrast, traditional management is monolithic; managers just manage and employees just work.
- TQM involves everyone, regardless of level, in improving work patterns and environment.
- TQM is process oriented, not result oriented as in traditional management.
- TQM is against labour division and emphasises job rotation to improve employee performance and pushes them towards being multi-skilled workers.
- TQM stresses continuous improvement; in contrast, traditional management makes improvement when needed.
- TQM favors giving more responsibility and authority at all levels, against short spans of control in traditional management.
- TQM stresses defect prevention rather than detection.

Dale (1994) illustrates the TQM evolution stages as follows:



Figure, 3.1 The four levels in the evolution of TQM  
Dale, (1994)

The Total Quality Management concept has been adopted and implemented in the UK market: for instance, quality is seen as a concept rather than a legal standard by grocery retailers within the UK market such as Tesco. Quality is an increasingly demanded expectation, and health scares over the past five years have led legislative changes relating to the handling of chilled/frozen products. Moreover, the changing customer requirements for more natural unprocessed food with limited additives will reinforce the requirements for stringent standards. The overall objective is to ensure that the right product is delivered on time with high quality and good condition (correctly coded, at the correct temperature and intact), Shittu *et al.* (2008).

UK grocery retailers have adopted TQM as it is designed to achieve profitability through efficient organisation within a company, the emphasis being upon the people aspect, providing the right training and job conditions, in addition to motivating employees to a level of performance that characterise a company's reputation for service quality. The main British grocery retailers are operationally advanced, compared to those in mainland Europe, by utilising the best business practices in the world, which is demonstrated in the retail buying process, by dealing with large suppliers able to distribute products nationally, rather than dealing with small suppliers. British retailers are now well equipped to handle store demands, having developed logistics capabilities to ensure a smooth exchange between the parties in the chain. Furthermore, the focus was in improving their operation efficiency; the UK grocery retailers streamlined their supply chains and logistics innovation to ensure on-shelf availability (OSA) and, thus, having the right products at the right time. The commitment of senior management has been a major element to ensure the success of TQM within the UK market, Jackson-Moore (2007). Tesco saw a chance for more improvement in its quality management system by developing a strong supply chain relation to ensure product availability at the right time and, furthermore, it has invested in its IT system to be able to collect more data on customers through the use of the loyalty card and, thus, getting more of its customers exactly what they want, where and when they want it and at lower prices. Moreover, Tesco's quality management plan has focused on employees as powerful tool to improve profitability by providing them with the required training and by improving the payment scheme to improve their loyalty for better job performance and higher service quality.

In a survey by Heller (2006), five of the UK's famous retail brand quality management and marketing strategies, Tesco, Marks and Spencer (M&S), Sainsbury's, WH Smith and Boots, were compared. The study gave M&S an enormous lead over the competition because customers and employees knew exactly what to expect from the business and found those expectations were largely delivered, not as a result of massive advertising spend and 'starry' promotion, but by the integrity of the quality system and giving customer satisfaction the priority attention by investing in employee training and quality services. Thus, it was a forerunner of the virtual company by delivering the customer greatest desire: Value for Money (VFM).

Within the automotive sector, the manufacturing industry has expanded beyond geographical and cultural boundaries by depending on offshore labour and a worldwide supply chain. The automotive industry, with its complex organisational structure, is required to line up the end-to-end logistics supply chain management, human resources, and customer relations. The adoption of technology within the industry has developed rapidly, not just in the manufacturing process, but also in quality management. Toyota production and quality systems were one of the best production systems in the world until they encountered quality problems with their brake pedal system in their hyper model in 2009. The Toyota quality philosophy is based on the following principles:

- Build a culture of stopping to fix problems, to get quality right the first time.
- Standardised tasks are the foundation for continuous improvement and employee empowerment.
- Use only reliable, thoroughly tested technology that serves the people and process.
- Grow leaders who thoroughly understand the work. Live the philosophy and teach it to others.
- Develop exceptional people and teams who follow the company philosophy and teach it to others.
- Respect the extended network of partners and suppliers by challenging them and helping them to improve.
- Become a learning organization through relentless reflection and continuous improvement.

The Toyota quality and production system was based on “lean production” which means to eliminate anything that does not advance the process and does not increase added value. Thus, it was able to greatly reduce lead time and costs, Emiliani *et al.* (2007). However, despite the quality problems in Toyota’s production system (such as rear gas struts and ball joints) in 2005 and 2006, Toyota was the largest car manufacturer in 2007 but, as the new production problems related to safety, Toyota encountered two millions car recalls as a result of original defects and failure of quality control. Recalls are a powerful measure of performance because they are an

important determinant of customer trust. Customer trust, in turn, is a major factor in quality perception.

The concept Lean referred to the elimination of production waste, activities and processes that absorb resources but create no value to the final project. Lean is about designing and operating the right process and having the right resources, measures and systems to deliver it right first time, Womack and Jones (2003). Thus, the term Lean construction can be defined according to Koskela *et al.* (2002) as a “*way to design production systems to minimize waste of materials, time and effort in order to generate the maximum possible amount of value*”. Koskela adds that designing a production system to achieve the stated ends requires the full collaboration of all project participants (end user, facility manager, constructor and owner) at an early stage of the project.

Moreover, Abdelhamid (2008) states that the primary focus of Lean Construction is on moving closer and closer to satisfy customer expectations and requirements but, at the same time, understanding the production process, identifying the waste within it, and eliminating it step by step. However, waste can include mistakes, waiting for missed/delayed supplies, project delay, working out of sequence, unnecessary storage, and failure to fulfil client expectations. Abdelhamid (2007) defines Lean Construction as a philosophy based on the concept of lean manufacturing principles and practices to the end-to-end design and construction process, and it is concerned with improving the construction process to valuably and profitably deliver customer needs.

Lean manufacturing was initially pioneered and developed by the Japanese car manufacturers and has been widely implemented by European and American manufacturers outside and within the automotive industry with considerable success. It is based on the following principles, as declared by Womack and Jones (2003):

- Eliminate waste.
- Precisely specify value from the ultimate customer perspective.
- Identify the process that delivers high value and eliminate all non value adding steps.
- Manage the interface between different steps to avoid any interruption for the adding value steps.

- Do not make anything until it is needed, then make it quickly.
- Develop strong relations with suppliers, and
- Pursue perfection by continuous improvement.

However, unlike manufacturing, construction is a project based on sequence and relevant production processes and, thus, the lean construction is concerned with the holistic pursuit of continuous improvements in all dimensions of the project and natural environment: design, construction, maintenance and recycling, Womack and Jones (2003). In addition, Lichtig (2005) adds that, within the construction industry, lean construction can only be applied fully and effectively by focusing on improving the whole process which means that all participants have to be involved, work and committed to overcome any obstacles that may arise during the constructing process.

Despite the fact that lean manufacturing has had a significant effect in other sectors such as aerospace and automotive, until now lean construction has not taken-off in the UK construction sector, according to Mossman (2009), for many reasons such as the following:

- Fragmentation: the construction industry characteristics with fragmentation and sub-contracting means that there is a little incentive and it is highly unlikely for a project team to learn from each other and work together again.
- Long-term: long term development is unattractive to many managers.
- Squeezing Middle Management: going lean in construction clearly reflects management benefits as greater production; also this is quite clear to the workforce by enabling them to make money faster. For middle management, the benefits are not so clear and they have not received the required training to culture and thinking changes.
- It is just too big: going lean in construction is likely to take longer than manufacturing where it often takes three to five years just to embed a continual improvement culture.

- All risk and No crisis: “if it’s not broke, don’t fix it”; in the UK construction industry, most companies are making profits around 2%, unless they are working in housing where it is higher at 4.2%.
- Low level literacy and computer literacy: even though the case is changing nowadays, for years, careers advisors and teachers have seen the majority of operatives in the construction industry suffering from low levels of literacy and computer literacy and especially after the influx of workers from different countries with language problems.
- No time to think: the recession has affected the entire economy and, thus, companies have no time to think about new changes; so if there is no time to think, then there will be no time to learn new skills and adopt change.

### **3.4 Total Quality costs:**

The reason quality has gained high prominence during the last decade is that organisations realized the high cost of poor quality because of its dramatic cost implications and effects on all organisational aspects. Poor quality costs occur which lead to dissatisfied customers, reduced market share and, eventually, lost business. However, producing high quality products and services that fulfil customer needs and expectations is not considered a reliable measurement tool to guide management performance and reliability, but there are other tools that have to be taken into consideration, for example, profits, production and servicing costs, and maintenance and quality costs.

There has been a massive change in the idea in what constitutes quality costs, whereas during the 1990s, the cost of quality was perceived as scrap cost, warranty cost, and running the quality assurance department cost where organisations believed that improvements inherently involved higher expenditure. In 1951, Juran categorized quality cost in his quality cost model as conformance and non-conformance cost, where conformance cost refers to improving quality, and non-conformance cost refers to poor quality. In 1961, Feigenbaum built on Juran's quality costs and divided conformance cost into prevention and appraisal costs and the non-conformance cost into internal and external failure costs. These then became the most commonly used

model of quality costs, according to Seokjin and Behnam (2008). Recently, it has become widely accepted that there are other costs incurred in production, operation, maintenance and design due to the current economic recession and high competition which make it necessary for organisations to control their expenditure tightly and review it regularly.

Quality costs emerge from range of activities; for instance; planning, research and development, production, marketing, sales, purchasing, storage, control, delivery, service making, and installation as internal activities. On the other hand, there are some external factors that can directly influence the cost of quality, such as, suppliers, distributors, agents, subcontractors, and especially customers. However, quality has many other costs which can be broken down into two categories. The first is called quality control cost consisting of necessary costs for achieving high quality and it is divided into two types: prevention and appraisal costs. The second is called quality failure cost consisting of cost resulting from poor quality, and it involves internal and external failure costs, as explained below, Laszlo (1997):

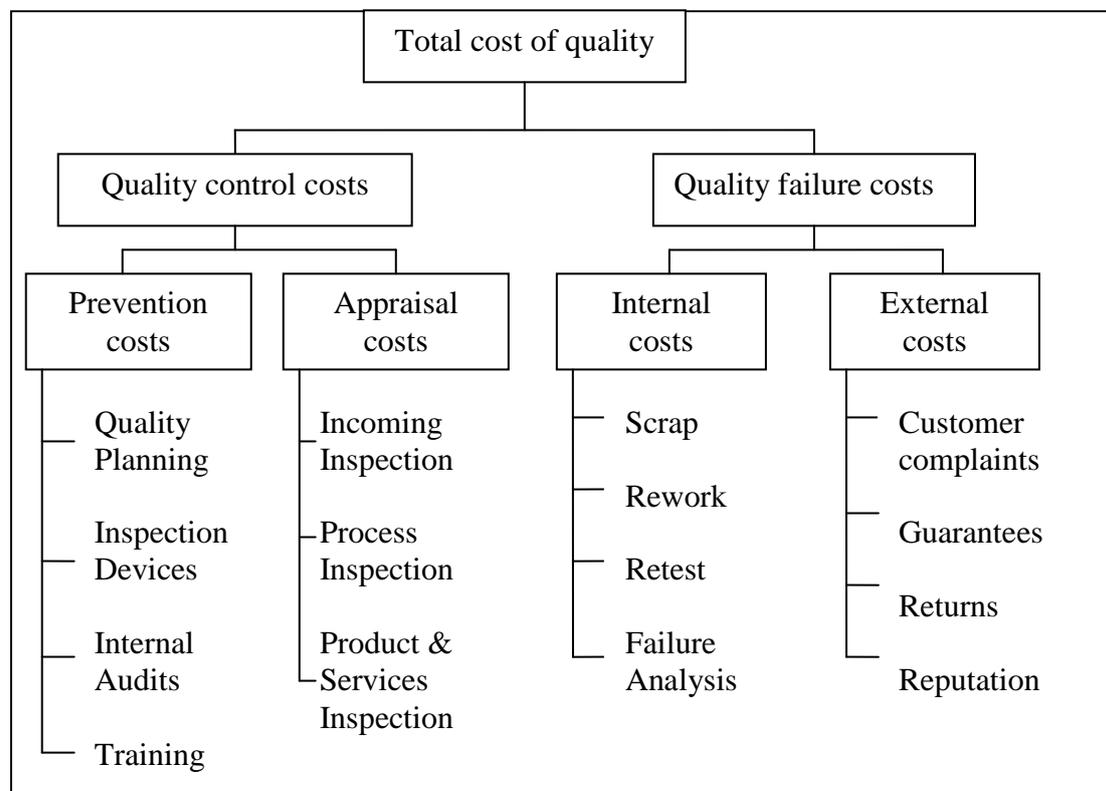


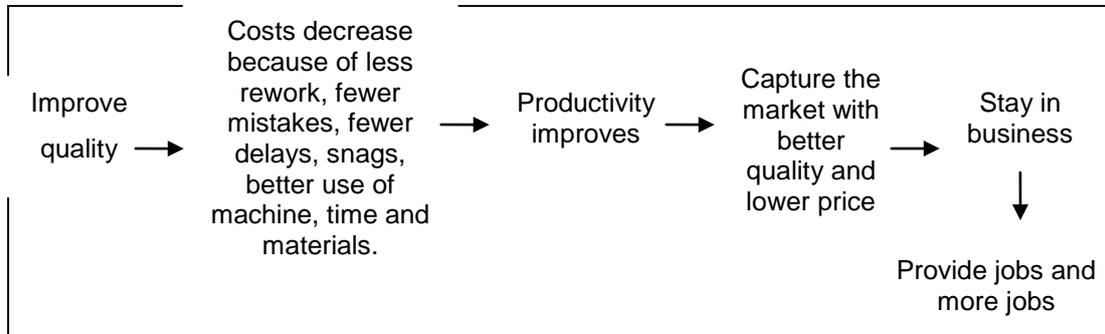
Figure (3.2) Total cost of quality, Laszlo (1997)  
*The role of quality cost in TQM*

Prevention costs are incurred to minimise appraisal and failure (internal and external) costs by having strategic quality planning, regular training and regular internal auditing, to fulfil customer expectations and minimise production and services costs. Appraisal costs include all the costs incurred by input, process and output inspections to ensure that output conforms to specifications. However, while the internal failure costs occur as a result of defective products and services before being received by customers, external costs are associated with product and service quality problems after being received by customers such as warranties, returns, and reputation or business loss due to customer dissatisfaction.

Gryna *et al.* (2007) report that quality cost can be expressed as a percentage, by measuring a firm's quality effectiveness of its quality expenditure, such as measuring total quality cost as percentage of sales turnover, hours of labour, material costs, and total manufacturing costs. Some firms use warranty costs as an average percentage of sales volume, while others compare internal failure costs to average percentage of production costs, or use quality improvement costs as a percentage of quality costs. However, Giakatis *et al.* (2001) mention that quality costs represent a considerable amount of the overall manufacturing or servicing costs. In manufacturing, the annual failure costs range between 5-35% of sales turnover as annual costs, depending on products complexity, whereas in service firms the costs range between 25-40% as annual failure costs depending on the organisation. Nakhai and Kim (2007) declare that there is no universal measure of quality cost due to differentiations of organisation types and operation systems. They add that several researchers in quality costs have given different percentages, such as Burns (1976) who stated that prevention cost accounts for 3.3%, appraisal 40.3%, and internal and external failure costs 56.4% of total quality costs. Moyer and Gilmore (1979) reported 6% for prevention, 14% for appraisal, and 80% for internal and external failure of total quality costs.

Nowadays, total quality management receives enormous international attention and a majority of organisations have started to apply total quality management due to the spread in the belief that it reduces costs and improves productivity. On the other hand, some organisations believe that the higher the quality, the higher the costs; thus, they neglect this approach, according to Lau and Tang (2009). However, different studies

of quality implementation by Ford, Jaguar, and some construction firms found, that there is a direct relation between quality implementation and cost reduction, as mentioned by Chauvel and Andre (1985). Deming (1986) states that “*improving quality always reduces costs*”, as seen in his quality chain, as follows:



*Quality implementation Vs Cost reduction*  
Deming (1986)

Cost reduction is an important approach within an organisation towards improving quality and controlling company expenses. Therefore, all organisations are keen to implement the total quality management approach since it focuses on doing the job right first time, employee training and empowerment, continuous improvement, and supplier relations, all of which leads to cost reduction. Thus, an organisation can achieve cost savings by implementing a strategic and methodical cost reduction approach which, at the same time, can make a contribution to the business by helping an organisation to adopt and monitor the effects of the required changes towards cost reduction by conducting a thorough check of the overall costs involved. However, the cost reduction concepts require fundamental changes and improvement to company strategies and culture to make improvements in product and service design, delivery, employee skills and knowledge, and especially employee attitude towards error prevention by adopting an error prevention culture. Thus, it is important to discuss Six Sigma as a statistical approach leading towards improving quality and cost reduction.

### **3.5 Six Sigma approach:**

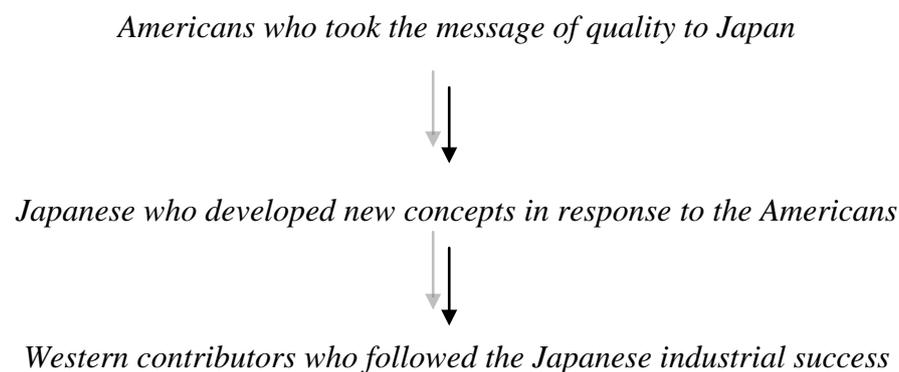
Six Sigma began in 1986 by Motorola Inc in the USA as a statistical method to reduce process variation, and it has evolved over time to become an all-encompassing business methodology. According to Motorola, it can be defined at three different levels: metric, methodology or management system.

Six Sigma as a metric refers to the scale for quality and defect reduction, while "methodology" refers to business improvement methodology that focuses on understanding customer requirements, minimising process variation, improving business processes and cost reduction. It is emphasised by the DMAIC model: Define opportunity, Measure performance, Analyse opportunity, Improve performance, and Control performance, which extended to DMAICT by adding 'Transfer best practice' to share and spread ideas and knowledge throughout the organisation. Moreover, Six Sigma as a management style refers to ensuring that process metric and structured methodology are applied to improve process and quality, and to consider top-down solutions to design business strategies, improve team work, accelerate improvements and ensure sustainability to improve business results and profits.

However, it can be defined, according to the UK Department for Trade and industry (2006) as a statistical method for achieving near perfect quality; by reducing process variation, it can be applied for production or services, and it emphasises the statistical analysis of manufacturing, design and customer-oriented activities to control the production process and employee performance towards reducing final product or service defects to the lowest level, measured by Motorola at 3.4 defects per million opportunities (DPMO).

### **3.6 Major Contributors to Quality:**

There have been three groups of contributors to quality since the 1940's:



### **3.6.1 The Americans who went to Japan:**

#### **3.6.1.1 W. Edwards Deming:**

Deming was an American statistician who travelled to Japan in (1951) to boost the Japanese industry. He was a towering intellect and considered the father of the modern quality evolution. He defines quality in terms of quality of planning, design, conformance, service and, sales as “*satisfying the customer beyond expectations*”. His early work, which reflects his statistical background, broadened the manufacturing emphasis to include non-manufacturing and human variation. He suggested that management by focus on variability should more understand the differences between special causes and common causes. The special causes of product, services or process variation were the assignable causes which prevented constant statistical performance and could often be solved by those undertaking the work itself.

Common causes, however, are those remaining once the special causes have been resolved. They require a higher authority (management) to eliminate them. His work went on to extend considerably beyond statistical methods, focusing on senior management becoming actively involved in quality improvement, estimating that management was accountable for 94% of potential improvement. He also targeted the need to adopt a more systematic approach to problem solving. To achieve all this, he refers to the need to totally transform Western management styles to halt the decline of business organisations. He produced 14 points for management to help the understanding and implementation of the management transformation, which he advocated applies to small and large organisations alike and to both manufacturing and service organisations. In his 14 points, Deming emphasises that an organisation must create and publish its aim and mission, which should focus on quality improvement and competitiveness. Thus, organisations have to make sure that the organisation aims are clear and understood by management, employees, suppliers and customers. The organisation has to focus on defect prevention not detection, and has to improve product and service quality and employee training to eliminate the need for mass inspection. Management needs to take the leadership for change by ensuring that the new philosophy is adopted by all employees at all levels, and the organisation has to emphasise defect prevention by more detection. Moreover, management is obligated to improve the system continually by finding new ways of improving

quality and reducing costs, whereas employees have to receive regular training to keep them up-to-date with new technologies and better and faster ways of working.

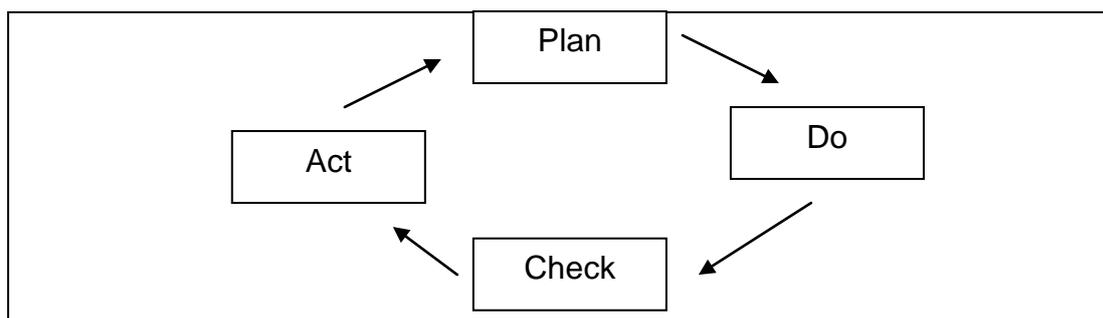
Deming also states that organisations should emphasise helping people to improve their job and instruct them by objective methods; thus, organisations have to adopt a new leadership style to improve quality. Management should develop a culture where all organisation departments work as a team to solve problems and achieve the organisation aims and drive out fear so that everyone may work effectively for the company. Management has to prove their commitment towards quality achievement to employees and give them a chance to formulate their own slogans where they feel more committed to the content.

Management must ensure the removal of all barriers which might stand in the employees' way of good performance such as a misguided supervisor, defective materials and faulty equipment. Additionally, management has to ensure instituting effective educational and self-improvement programmes for both management and employees to understand the new knowledge, new statistical techniques and teamwork to accomplish the quality mission. These points, according to Deming (1986) are:

1. Create constancy of purpose for products and services improvements
2. Adopt the new philosophy
3. Cease dependence on mass inspection
4. Award on quality instead of awarding business on price
5. Improve production and service system constantly
6. Institute quality improvement training
7. Institute effective leadership
8. Drive out fear
9. Optimize the efforts of team and break down the barriers between departments
10. Eliminate slogans for the workforce
11. Eliminate numerical quotas
12. Remove barriers to taking pride in workmanship
13. Institute a vigorous programme of education
14. Take action to accomplish the transformation

Deming points out the seven "Deadly Diseases" which might directly affect an organisation: lack of consistency of purpose; emphasis on short term profits; evaluation by performance, merit rating, or annual review of performance; mobility of management; running a company on visible figures alone; excessive medical costs; and excessive cost of liability. Deming places great importance and responsibility on management, believing management to be responsible for the majority of quality problems. His view is that organisation management should develop a partnership with employees and work together towards quality improvement. Top management must adopt and commit to the new change and lead the drive for improvement by regular training and encourage a reduction in defects and improvements in quality.

In addition, the Deming model of quality improvement activity is the plan, do, check, act cycle (PDCA) which suggests the following sequence of events to improve the end result of the process and then ensure continued improvements. The **Plan phase** begins with a study of the current situation, during which facts are gathered to be used in formulating a suitable set of actions for quality improvements. In the **Do phase**, the planned actions are implemented. During the **Check phase**, results are compared with those specified in the plan stage and techniques and procedures used to identify the extent to which they are really solving the identified problems. Finally, the **Act phase** is used to standardise successful methods so that new techniques introduced are put into continuous action, as shown in the following figure:



*Figure (3.3) Deming Cycle, (PDCA)*  
Deming (1986)

Deming also focuses on motivating senior managers to spend more effort in their organisation towards quality improvement. Moreover, Deming emphasises that an organisation has to think of its customers and insist that consumers are the most important part of the production line, and fulfilling their needs and expectations are

tasks that all employees at all levels need to accomplish. Deming aims to improve productivity, job pattern, quality improvement, competitive position, and ensure company survival in the long term. In addition, Deming describes organisational culture which consists of three elements: joy at work, innovation, and cooperation, Bank (2000).

### **3.6.1.2 Joseph Juran:**

Juran was born in 1904 in Romania and emigrated to the USA in 1909. Juran contributed to the field quality management in several ways. His contribution began in 1941 when he discovered the work of Vilfredo Pareto and how it added several contributions to economics, such as “the vital few and the trivial many”, described later by Juran as “80% of problem is caused by 20% of the causes”. Moreover, Juran is widely credited for adding employees to quality management and focusing on management training and education towards culture change through his belief that resistance to change is the root cause of quality problems. However, Juran's vision and experience of quality extended well outside USA when he was invited to Japan in 1954 to deliver a series of lectures related to quality management.

After his experience in Japan, he learned about the Japanese concept of the quality circle, which he spread devotedly in the west, due to his belief that the west has to learn and adopt principles from the Japanese to reduce the quality gap between Japan and the west. This would be by adopting a structured annual improvement programme for service and product quality improvement, in addition to western organisations having to provide more quality training programmes and an extensive review of organisational approach to quality, Martinez-Lorente, *et al.* (1998).

Juran also added a significant amount of knowledge to the body of quality management and believed that the term quality changed over time. In 1952, he published his handbook of quality control which is considered as one of the most used books when researching quality, and then he published 14 other books related to quality control, improvement and implementation, Martinez-Lorente *et al.* (1998). In the 1980s, his comprehensive approach of total quality management became more adoptable when upper managers believed that quality leadership could not be achieved without adopting quality disciplines throughout the entire company, as

suggested by Juran. Additionally, Juran made a substantial contribution to the field of quality management when he published his Trilogy in 1986. Juran's Trilogy defines three management processes required to improve quality: quality planning, quality control and quality improvement, as follows:

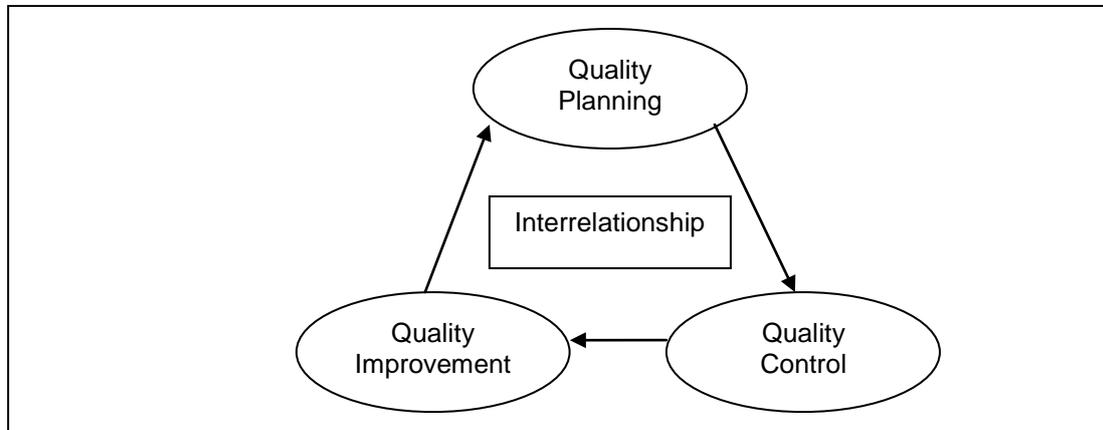


Figure (3.4) Juran's Trilogy  
Juran, (1999)

Juran describes quality from the customer perspective in defining it as “*fitness for use*”: quality should have two aspects, products and services, and should have greater number of features to meet customer expectations. This relates to producing products and services without or with fewer defects, Juran (1999). Consistent with other early writers and an engineering background, he formerly placed an emphasis on the technical aspects of quality control in terms of statistical analysis, engineering methods and the economics of quality. His work also had a strong managerial emphasis on goal setting, planning, organisational procedures and change, in that quality does not just happen but requires planning. He saw planning as part of his quality trilogy.

Juran's distinctive contribution to quality is to emphasise the primary importance of understanding customer needs, as opposed to wants or requirements. The emphasis applies equally to those involved in design, marketing, manufacturing and services. Whilst wants only reflect surface features, he states that identifying customer needs requires a more rigorous analysis and understanding to ensure the product meets the needs and is fit for the intended purpose. His approach places further emphasis on pragmatism rather than perfectionism, such as Zero defects.

### **3.6.1.3 Armand v Feigenbaum:**

Feigenbaum is an American quality management expert who served as President of the American Society for Quality between 1961 and 1963. Feigenbaum devised the concept of Total Quality Control (TQC), later known as Total Quality Management (TQM). He strove to move the quality control concept from being a technical method to a business method; thus, he stresses that human relations is a basic element in quality control activity and he believes that quality has become the most important guide to organisational growth and success, Flood (1993).

His definition of quality is for a systematic or total approach requiring the involvement of all functions in the provision of TQM. His early work concentrated on building in quality rather than checking and controlling quality after the fact; his idea of quality control is as a business method rather than a technical activity. Supporting the use of statistical quality control methods, which he sees as having a profound effect on quality control at the concept level, he propounds such methods as a part of the overall administrative system, not the system itself. He seeks to generate gradual commitment to quality control through complete support by top management, employee involvement and responsibility, through open-communication channels for product/service quality information and procedures for participation in quality programmes.

He emphasises that quality does not just mean best but that it is wider than that. It means better materials, processes, machines, employee skills, outputs and services, to be best for customer use and best for buying price. According to Dale (2003), the word 'control' represents a management tool with four steps;

- Setting quality standards
- Appraising conformance to these standards
- Acting when standards are exceeded
- Planning for improvements in the standards

Feigenbaum (1991) defines ten crucial benchmarks for TQM success as;

- Quality is a company-wide process
- Quality is what the customer says it is

- Quality and cost are a sum, not a difference
- Quality requires both individual and team zealotry.
- Quality is a way of managing.
- Quality and innovation are mutually dependent.
- Quality is an ethic.
- Quality requires continuous improvement.
- Quality is the most cost-effective, least capital-intensive route to productivity.
- Quality is implemented with a total system connected with customers and suppliers.

The aim is to make quality a way of focusing on internal and external customers and suppliers and to provide a base for 'world-class' quality leadership.

### **3.6.2 The Japanese Contributors:**

#### **3.6.2.1 Kaoru Ishikawa:**

Ishikawa was a Japanese professor and quality management innovator, born in 1915 in Japan. He joined the Union of Japanese Scientists and Engineers quality control research group in 1949 to renovate the Japanese industrial sector after the Second World War. He was able to translate, integrate and expand the concepts of Deming and Juran into the Japanese system. Ishikawa was associated with the Company Wide Quality Control approach in 1955 with Deming and Juran, which emphasised that quality is beyond product and service but also for after sales service, management quality, the company itself and human life and relations. In 1960, Ishikawa introduced the cause-and-effect diagram, also called fishbone diagram because of its shape. His diagram is useful for management as a systematic tool for finding and sorting out all possible causes of variation in quality in production and servicing organisations, Evans and Lindsay (2001).

In 1962, he introduced the concept of 'quality circles movement' to identify and solve quality problems within the organization. The aim behind using the Ishikawa quality circles is to improve and develop the production process, empower employees and improve their participation to enhance their satisfaction, Beckford (2002). According to Bank (2000), Ishikawa quality circles are intended to support the development and

improvement of the company, respect human relations in the workplace, increase job satisfaction and draw out employee potential.

To assist with the difficult task of educating everyone towards quality control, Ishikawa produced a 'Quality Analysis Workbook' (later to become the guide to quality control). In it, he pays particular attention to the development of practical statistical techniques and procedures, including 'Pareto Diagrams', to prioritise quality improvements and 'Ishikawa Charts' to identify cause and effect. Using such techniques, he emphasises open team communications as being critical in their construction.

Persico and Rouner-Morris (1997) mention Ishikawa created the concept of the Internal Customer because he realized that many employees, supervisors and managers in an organisation would never see their external customer and, thus, it was merely a symbol that held no meaning for them. He focused on considering an employee as a customer or even supplier which was a breakthrough in organisational thinking. As a result, it provides a mechanism to ensure that all employees are able to focus on 'small things' that really matter to them and, thereby, to the external customers.

### **3.6.2.2 Genichi Taguchi:**

Taguchi is a Japanese engineer and statistician, born in 1924. From the 1950s onwards, he developed a methodology to improve manufacturing goods quality. His main contribution to the quality management is the loss function, based on measuring financial loss to an organisation resulting from poor quality. He defines his concept 'Quality Loss Function' as quality lost to society at large, the internal organisation through rework, scrap, downtime and warranty costs and the external environment in costs to the customer and from it, and further costs to the provider as market share falls. Taking a target value for the quality characteristic under consideration as the best possible value of the characteristic, he associates a simple quadratic loss function with variances from the target. This loss function indicates that a variability reduction around the target leads to lower losses through quality improvement. The loss function can be further used for a comparative analysis of financial design decision to establish the benefits of additional operational costs in terms of the market.

Taguchi emphasises that management and employees have to understand the results of poor quality in various situations and they have to broaden their horizons to consider the cost to society. Moreover, he presents the philosophy of 'off-line quality control' which consists of designing products, services and manufacturing processes because it is affected by uncontrollable outside influences. Thus, his design focuses on making these processes robust and insensitive to parameters outside the design engineer's control. He adds that the best opportunity to eliminate product and service variation is during the design process, according to Dale (2003). Taguchi emphasises teamwork to improve products and service quality due to team ability to increase communications towards quality improvement, participation in decision making, improving relationships and the trust environment, developing problem solving skills, improving morale and sharing knowledge and experiences which, at the same time, would prevent defects and reduce overall costs, Owen (2002).

### **3.6.2.3 Shingo Shingo:**

Shingo was born in 1909 in Japan. He was a Japanese industrial engineer who distinguished himself as one of the world's leading experts on manufacturing practices and the Toyota production system. He encountered the concept of "quality statistical control" in 1951. By 1959, he gained notable fame as an "engineering genius" from his work in developing Just-In-Time (JIT) which focuses on reducing seven types of waste: waste from over production, excess transportation, excess inventory, waiting time, processing waste, wasted motion and waste from production defects. In addition, by focusing on production rather than management alone, he was able to establish himself as a reputable industrial engineer. In 1961, Shingo incorporated his knowledge of quality control to develop the "Zero quality control" concept, which is well known as "poka-yoke" or mistake proofing, realizing that statistical quality control methods alone are not able to reduce defects to zero. In his system, defects are examined, the production system stopped and immediate feedback given so that the root causes of the problem may be identified and prevented from occurring again: "*stopping the process whenever a defect occurred, defining the cause and preventing the recurring source of the defect*". The fundamental idea was to provide people the means to operate 'line-stop': whenever a fault occurs, define the cause and action the prevention of reoccurrence. A key feature was the use of source

inspection in monitoring potential error sources to identify errors before they become defects.

He distinguishes between “errors” which are inevitable and “defects” which result when an error reaches a customer; thus, his system aims to stop errors becoming defects. By 1970, Shingo developed the system of “single minutes exchange in die” (SMED) in which set up times are reduced from hours to minutes, and this was influential in the development of non-stock production methods. Shingo acted as an international consultant to some of the world’s largest companies such as Toyota and Peugeot. However, using his key teachings of JIT, SMED and Zero Defect, many modern day manufacturing companies have realized substantial profits.

### **3.6.3 Western Contributors:**

#### **3.6.3.1 Philip Crosby:**

Crosby was a businessman and author who, in the late 1960s, contributed to quality management practices by initiating the Zero Defects and Quality is Free philosophy, which is considered applicable to any type of enterprise. His philosophy is based upon four major principles:

- 1. Quality is conformance to requirements:** the principle focus is that every product or service has specific requirements to fulfil customer needs and expectations. Thus, when particular products or services have met customer expectations, quality is achieved.

2. **Defect prevention is preferable to quality inspection:** this principle is based on defect prevention instead of detection and is considered less expensive to the organisation and, thus, defect prevention and detection were studied by the Ford Motor Company in 1985 which made the company adopt a new quality management approach, changing from defect detection to prevention to improve quality and reduce costs, as follows:

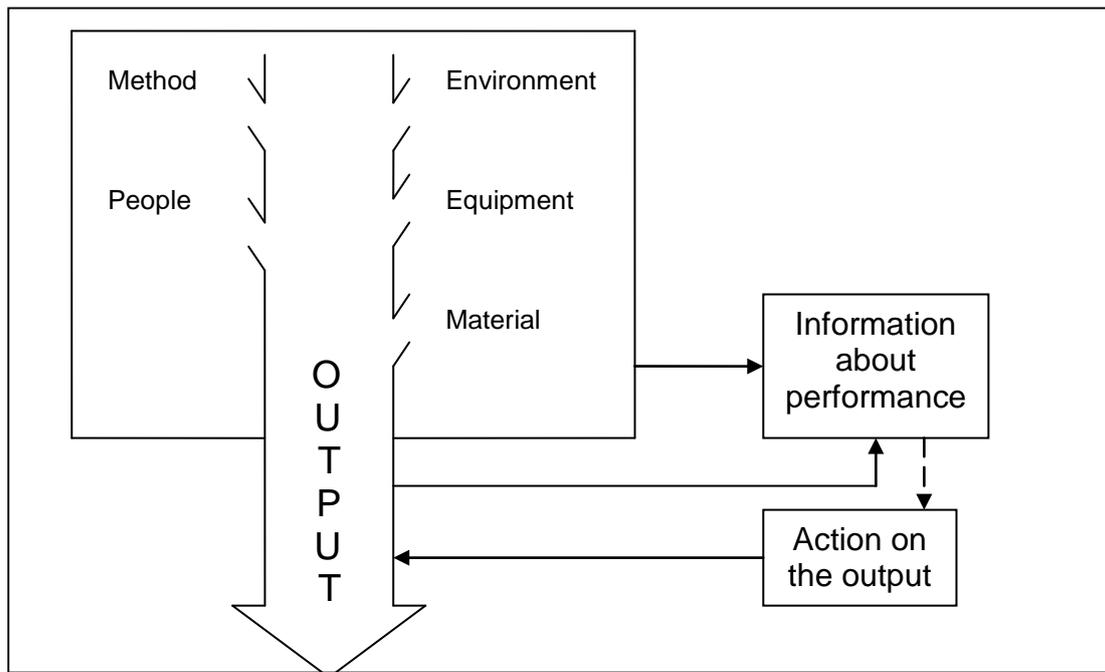


Figure (3.5) A detection-based quality system  
Source: Ford Motor Company (1985)

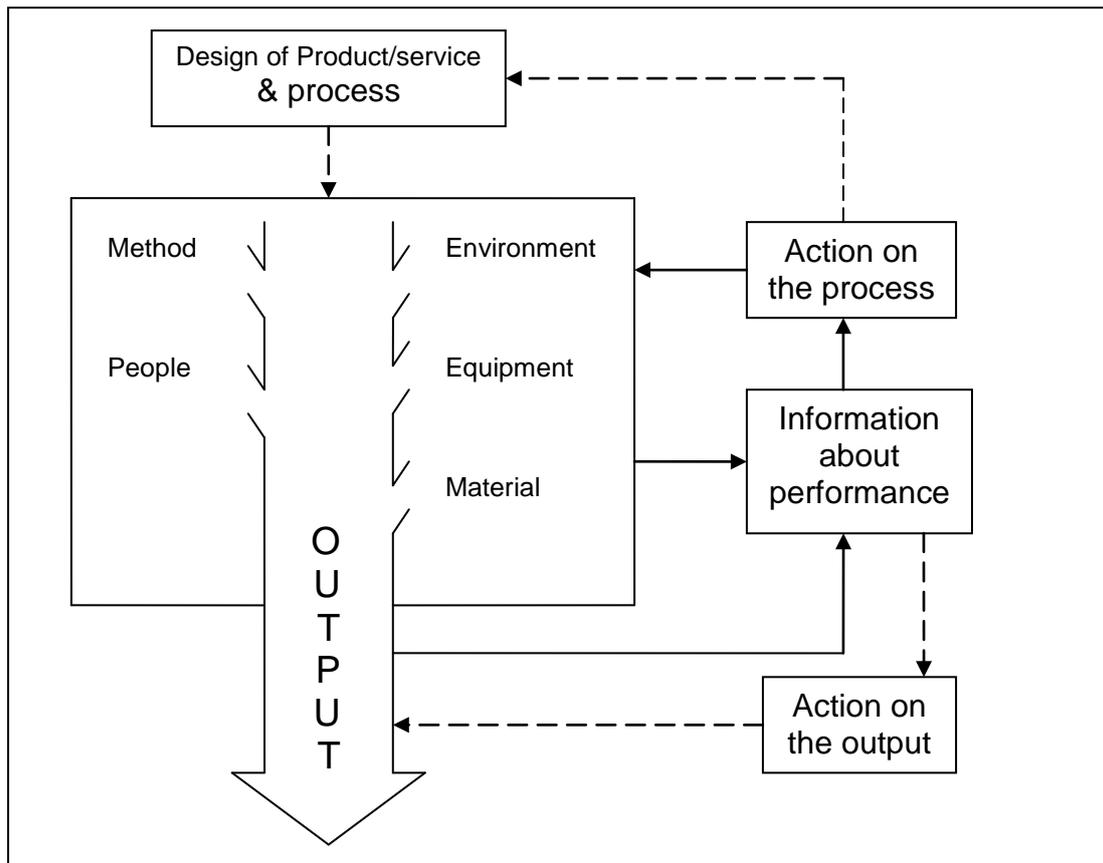


Figure (3.6) A prevention-based quality system  
Source: Ford Motor Company (1985)

3. **Zero defect is the quality standard:** quality standard in the third principle refers to the normative nature of requirements which emphasise that any product or service that does not meet the expressed requirement will not fulfil customer expectations; thus, management has to take action to change the requirement to reflect reality.
4. **Quality is measured in monetary terms:** the final principle of the Crosby Zero Defect philosophy emphasises that every defect represents a cost, which includes rework, wasted material, inspection time, lost reputation and increased customer dissatisfaction. Crosby states, that most of these costs are hidden but when management identifies it and counts it, huge costs will be reflected that will affect quality improvement and provide misleading figures to measure progress.

However, in 1979, Crosby started his own management consulting company to provide courses in quality management. Also in 1979, he published his first business book *Quality is Free* (Crosby 1979) which became popular at the time due to the crisis in the American market because of the high losses in their market share to

Japanese products following their high quality and lower price. Thus, Crosby's response to the quality price was to present a new principle "doing it right first time" to reduce defects and production costs. He emphasised customer needs and expectations, believing that most organisations have a culture, producers and systems which allow deviations from what is actually required. The costs which result from repeated activities can be as high as forty percent of operating costs for service organizations, according to his prediction.

His further emphasis is quality management, in that management drives quality and employees follow this example. This, he notes, is in contrast with many quality approaches where the workers take prime responsibility for poor quality results. Central to many of his ideas is the need for a core of quality specialists within organisations, thus further emphasising his top-down approach where top management is entirely responsible for quality. His goal is to provide management and employees with the training and means for quality improvement so as to ensure the application of prevention management everywhere, viewing work as a process or a series of actions conducted to produce a desired result.

### **3.6.3.2 Tom Peters:**

Peters is a US writer was born in 1942. In 1974, he worked as a management consultant at McKinsey Company, becoming a partner and organisation effectiveness practice leader in 1979. In 1981, he left McKinsey to become an independent consultant. Peters was honored by the British Department of Trade and Industry (DIT) as one of the world's quality gurus, He identifies leadership as being central to the quality improvement process, discarding the word "Management" for "Leadership" (Peters Tom, 2010). The new role is of a facilitator, and the basis is "managing by walking about" (MBWA), enabling the leader to keep in touch with customers, innovations and people, emphasising the importance of leadership as being central to the quality improvement process in which the leader should be an enabler in the process of empowering the employees to take responsibility for continuous change and improvement. His philosophy of the quality improvement process is by continuous change through "Revolution" and "Reinvention".

Peters believes that, as the effective leader walks, at least three major activities are happening: listening, teaching and facilitating (Peters, T J et al, 1982). From his work as a consultant where he has been able to research successful American organisations, he concluded that any intelligent approach to organising has to encompass and treat as interdependent seven variables, in what became known as the McKinsey 7-s framework, designed to force explicit thought in both the hardware and software of an organisation. In later works, he portrays other additional central issues to leadership, namely customers, innovations and people, covering each of them in terms of “prescriptions”, describing tools, key strategies and tactics for the implementation of excellence.

#### **3.6.4 Quality Management Leaders comparison and similarities:**

The early Americans were significant in putting Japan at the centre of quality leadership. In the 1950s, they adopted, developed, adapted and applied distinctive approaches which matched their culture. Much of the increased awareness of the importance of the quality in the West has resulted from the work of the newer western gurus, and they have contributed to the development of the modern TQM concept. MacDonald (1993) draws attention to an ‘intriguing’ aspect of the quality movement in the 1990’s in the relative demise of the quality guru. McDonald states that Crosby, Deming and Juan dominated the subject of quality throughout the 1980s. They each provided wisdom and powerful drivers for thought, but none have provided a complete and final answer in the form of a TQM framework, where their work was rather considered as advice for management to follow. While each guru has his own distinctive approach, however, there is considerable commonality between them.

Like Deming, Ishikawa and Juran, Crosby stressed the role of management in the quality improvement effort and the use of statistical control tools in measuring and monitoring quality. Deming placed great importance and responsibility on management, at individual and company level, believing management to be responsible for 94% of quality problems. His fourteen-point plan is a complete philosophy of management that can be applied to small or large organisations in the public, private or services sectors. While Juran believed that quality is associated with customer satisfaction and dissatisfaction with the product, he emphasised the necessity of ongoing quality improvement through a succession of small improvement

projects carried out throughout the organisation. Feigenbaum emphasises quality development based on the efforts of various groups within an organisation, while Ishikawa emphasises the human side of quality.

Taguchi believes that it is preferable to design a product that is robust or insensitive to variation in the manufacturing process, rather than attempting to control all the many variations during actual manufacture. However, Deming is against the Zero Defects philosophy, while Crosby believes in it, and all but Crosby rely on statistics. Moreover, all emphasise that having a good management philosophy and strategy are important steps for organisations towards quality improvement and aims achievement; customer satisfaction should be an organisation's main objective; the people within the organisation should have full attention as they are considered the main aspect toward quality achievement. They emphasise team work instead of individuality, good relations with suppliers and constant training and improvement.

However, the previously mentioned contributors to quality did not actually develop any implementation frameworks. They devised some improvement steps and advice for management to follow which were more of a prescription for companies to act upon. By taking up the quality contributors' improvement steps and advice on TQM implementation, countries have developed frameworks for their organisations to implement TQM, based on the previously discussed guru contributions. Therefore, their knowledge and contribution to the quality improvement fields helped countries worldwide to establish their own frameworks for quality improvement in different industries, such as the manufacturing and services industry where the major focus was. Companies such as Toyota and Ford established their quality improvement frameworks and measurement tools based on the contribution of TQM gurus. In Jordan and the UK, TQM gurus helped to spread quality throughout all industry and to establish different quality improvement models to help organisations improve their quality performance such as the European Quality Award, Pride in Job Quality Award and King Abdullah II Award for Excellence (KAAE) (Jordan), which are still fundamental for quality improvement for all types of companies and industries. Their ideas have been taken forward by many countries but, despite the availability of these models, many companies in the UK and Jordan still fail to achieve quality improvement due to some internal and external factors, discussed in Chapter Two and

Chapter Four of this study. Some of these awards are discussed in the following section.

### **3.7 Quality Awards:**

In an increasingly global and competitive environment, customer services, productivity and quality improvements are the major factors behind an organisation's survival in the long term. Thus, the pressing needs to improve competitiveness between organisations have resulted in a number of national and transnational quality awards. These awards promote the importance of customer satisfaction, management process, quality and productivity awareness and recognition for the attainment of superior competitive position, Ghobadian and Woo (1996).

The economic success of Japan during the past 40 years has grabbed the attention of Western managers due to the highly successful management strategies and techniques in Japan, Treveor (1986). Therefore, western managers have studied and employed the Japanese superior quality in management techniques to build market share in western corporations, which later became a basic requirement for the continuous existence and competitive advantages in the West. Japanese goods were considered to be unreliable, shoddy, cheap, and poorly designed until four decades ago. In a short time, the Japanese corporations dramatically improved their products and service quality to make a remarkable transformation in Japanese products and services worldwide. A major factor contributed to the Japanese transformation: the embracement of Total Quality Control (TQC) techniques propagated by Deming and Juran. However, to encourage the adoption of TQC among Japanese companies, a quality award was introduced called the Deming Prize to be the first quality prize, in recognition of Deming's contribution to the advances in Japanese industry and the quality revolution in Japan and which later proved to be an effective method of spreading quality throughout Japanese industry, Camp (1989).

Benchmarking is continuous process of comparing an organisation's processes, products and service quality against those organisations renowned as industry leaders or against the toughest competitors, Geber (1990). Benchmarking was pioneered by Xerox Corporation in 1979 and today it is employed by many small, medium and large sized companies to measure their performance against other companies, as well

as to measure organisational profitability performance against its own previous accomplishment. However, it became the key component of the total quality management process within organisations, Whiting (1991).

A number of factors have encouraged many American, Australian and Western countries and companies to introduce national and transnational quality awards. Among these are the contribution of self-assessment and benchmarking techniques to performance improvement, the importance of quality, and the success of the Deming Prize to spread quality in Japan. These factors have encouraged other countries to introduce other quality prizes such as the European Quality Award (Europe); Charter Mark (Customer Service Excellence) (United Kingdom); Pride in the Job Quality Award (United Kingdom); Malcolm Baldrige National Quality Award (America); Australian Quality Award (Australia); and King Abdullah II Award for Excellence (Jordan), which all aims, according to Thomas (1992), to achieve the following:

- Increase awareness of quality due to its role in improving performance and competitiveness
- Encourage systematic self-assessment against other companies and against self established criteria
- Stimulate sharing and dissemination of information on a bases of organisation strategies of quality
- Prompt co-operation between organisations toward sharing experience related to quality achievement and implementation
- Stimulate organisations to improve their production process and management style and commitment towards quality improvement.

To enhance TQM awareness, there must be some encouragement and incentive which comes in the form of quality awards to acknowledge those users with excellent application of the TQM principles and concepts. It is reported that the main reasons encouraging companies to develop their TQM maturity levels are due to the implementation of quality awards and providing information for the decision maker regarding an indication of the strengths and the areas for improvement that are usually provided as an output of the participation in such quality awards, Chung (2001). A quality award is considered to be a catalyst, with the criteria providing the structure for the firm's quality management, Strategic Direction (2006).

Quality awards are the property of the individual countries and represent their host country's effort in promoting quality excellence in organisations, products and services. Such awards provide in their frameworks the essential concepts of TQM for achieving organisational development and long-term business success. Many business organisations use quality awards for self-assessment purposes, as well as for enhancing their competitive position in the global market. The awards provide a framework for identifying a range of processes which influence an organisation's total quality and its business results.

However, each of the previous awards is based on a perceived model of TQM, and they do not focus on traditional quality control methods or product and services perfection; rather, they consider management activities, process and behaviour which directly influence the quality of organisational final offerings. Winning any one of the quality awards is considered the highest honour that any organisation can attain, due to the national and international recognition of the quality awards. These awards are discussed below, starting with the Deming Prize.

### **3.7.1 The Deming Prize (Japan):**

The Japanese Union of Scientists and Engineers (JUSE) created the first major management award, the Deming Prize, to recognize the “contributions to quality and dependability of a product”. The award is still generally held as the most prestigious of all management awards and is generally recognized as the most highly esteemed business award offered in Japan. The JUSE instituted the award in 1950 and began awarding the prize annually in 1951. Interestingly, this most significant of Japan's business awards honours an American, Dr W. Edwards Deming. Many Japanese government and academic leaders credit Deming with revolutionising Japanese postwar industry through his advocacy of quality control and managerial efficiency in Japan.

The JUSE Deming Prize Committee administers two types of award honouring Deming: the Deming Prize and the Deming Application Prize. The Deming Prize is given to a person or group of people who have advanced the practice and furthered the awareness of TQC. The Deming Application Prize, in turn, goes only to companies, based on successes attributable to implementing TQC.

Beginning in 1970, the JUSE began to offer the Japan Quality Control Medal. Only those who have formerly won a Deming Application Prize five or more years earlier are eligible for the Quality Control Medal. The medal is intended to upgrade the quality control of former prize recipients. To this end, the criteria for the Quality Control Medal remain the same as the Deming Application Prize and the Medal is awarded at the same time as the other Deming Prize awards. The current aim of the examination is to find out how well a company implements total quality control by assessing its quality-assurance policies and activities, and by measuring the company's results in the areas of productivity improvement, quality improvement, cost reduction, expanded sales and increased profits.

Non-Japanese companies are allowed to apply for and receive the Deming Prize since 1984. The categories that remain unavailable to non-Japanese companies include the individual prize and the factory award.

The Deming Prize is used to encourage companies to eliminate all the unnecessary patterns in their products and services. Deming emphasises that organisations should have clear policies and strategic planning and it is also important to recognise what the short-term and the long-term plans are. Moreover, the Deming Prize focuses on distinguishing the rules of leadership and employees within all departments, following which organisations have to communicate and explain the structure of the quality control and the role of each department to achieve better quality by working as a team. The Prize gives attention to effective collection and analysis of information to be used in the strategic planning process and setting short and long-term plans and highlighting weaknesses to provide employees with the required training and education to improve quality services.

### **3.7.2 Malcolm Baldrige National Quality Award (USA):**

The productivity of the Japanese manufacturing sector grew dramatically in the USA and globally, whereas the US manufacturing sector slowed dramatically during the 1970s and 1980s. Thus, many American industrial and government leaders felt that quality implementations in American industries were no longer an option but it became a necessity for doing business and competing with the Japanese and other international organisations. At the same time, various American organisations did not

believe that quality mattered to them or that it could improve company performance, while others did not know where to start with implementing quality tools and techniques, Arvinder *et al.* (1997).

The US Congress created the Malcolm Baldrige National Quality Award in 1987 largely as a counterpart to Japan's Deming Prize. The specific goal of the Baldrige Award is to heighten US awareness of TQM and to recognize successful quality management systems formally. The award is named after the US Secretary of Commerce from 1981 to 1987. Baldrige was actually helping in drafting the creation of the award at the time of his accidental death. The US commerce department's National Institute of Standards and Technology (NIST) administers the Baldrige Award. The NIST presents up to two awards each in three divisions: manufacturing, service, and small business. The NIST gave its first awards in 1988.

This model comprises a set of well-designed processes capable of meeting customer requirements and quality performance. The Baldrige Award judges the results companies show through their management practices in seven specific areas: (1) leadership, (2) information and analysis, (3) strategic planning, (4) human resource focus, (5) process management, (6) business results and company performance and, (7) customer focus and satisfaction, as shown in Figure 3.7.

The award is open to any for-profit business in the USA. As the Deming Prize, the award may be won by a foreign-owned company but, unlike the Deming Prize, only those foreign-owned companies with more than 50% of their employees or physical assets located in the USA are eligible. In addition to its more parochial focus, the Baldrige differs from the Deming Prize in three significant ways. First, the Baldrige Award emphasises customer perception with the bottom line emphasising clear-cut results through its seven specific areas. This makes the Baldrige more objective-oriented than the more systemic focus of the Deming Prize. Second, while the NIST is an independent agency, the Baldrige relies on a wide array of professional groups to decide on its winners; from its inception, the Deming Prize has relied solely on the JUSE. The Baldrige is, consequently, able to draw on a wider range of expertise among its judges than the Deming Prize but it may be more open to charges of conflict of interest among the reviewers. Finally, the Baldrige Award has a stated objective of sharing information, while the Deming Prize does not. Consequently, the

Baldrige is more likely to make known to other companies how the winners have achieved their success so that others may emulate them; the Deming Prize is more proprietary, allowing winners more readily to keep company secrets if they wish, thus widening the field of companies which may wish to participate but simultaneously limiting the benefit to other companies and to the dissemination of TQM principles in general.

Thus, in 1987, the necessity occurred for the US congress to pass the Malcolm Baldrige National Quality Improvement Act and, thus, establish a new annual quality award for American companies, National Institute of Standards and Technology (NIST), (1993). The award has four basic elements: driver, system, measure of progress and goal. In addition, there are two key assumptions underpinning the model. The first is that the top management leadership is the primary driver of the business, and the second is that the basic goal of quality process is product and services delivery with constant improvement and value to customers. Thus, this model recognizes the crucial role of top management in creating organisational values, goals and systems that drive the pursuit of continuous performance improvement. Moreover, the Malcolm Baldrige model implicitly assumes that maximising customer satisfaction is a crucial corporate objective and it would translate to improving profitability and market share, thus, it emphasises pursuing customer values and satisfaction, as well as the use of benchmarking, Kathawala and Elmuti (1991).

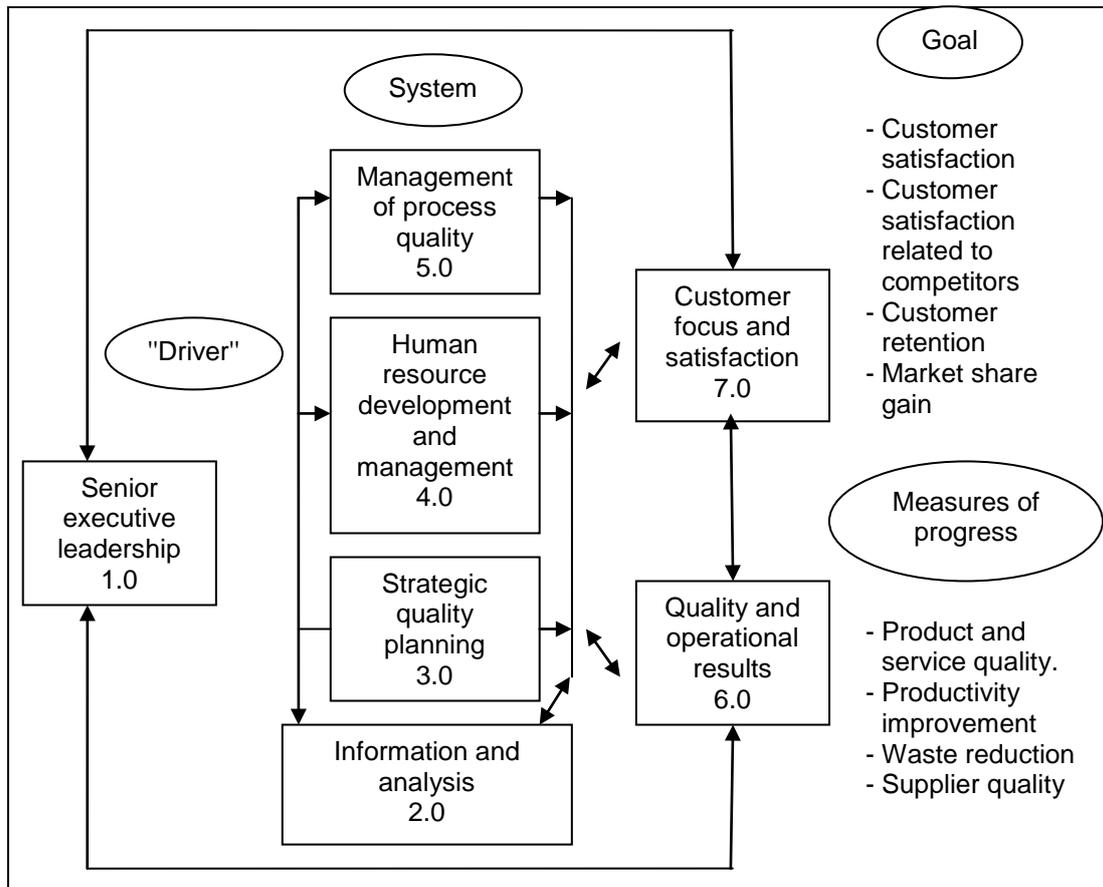


Figure (3.7) Malcolm Baldrige Award framework  
Ghobadian & Woo (1996)

Leadership, according to this framework, is related to leadership involvement and examination of senior executives, to create management for quality and improve public responsibility towards quality achievement. Moreover, it is related to the best use of the available information and performance data to be used with organisation benchmarking to determine organisation future improvement requirements and then a focus on strategic quality planning, in terms of company performance planning process and quality performance plans. The human resource development and management is also perceived as an important element in the Malcolm Baldrige Award, where management has to focus on human resource planning, employee involvement, education, employee performance, recognition and satisfaction. Furthermore, the award focuses on customers by encouraging the organisation to focus on their product and service quality, as well as operational process, to provide quality products and services.

The model aims to help stimulate American companies to improve productivity and quality, to recognise the achievement of those companies to quality improvement, to establish guidelines and criteria that can be used by all organisations and, finally, to provide specific guidance for other American companies interested in quality improvement and implementation process.

### **3.7.3 European Quality Award (EQA):**

By 1990, the European Community (now the European Union) felt that it had fallen behind Japan and the USA in the recognition of quality management. In that year, the European Foundation for Quality Management, with support from the European Organisation for Quality and the European Commission, set about creating its own Deming or Baldrige equivalent: the European Quality Awards. The first winners were announced in October 1992.

The initial awards favoured larger, for-profit companies and so by 1996, the European Commission began to give out additional awards for public sector organisations and for small- to mid-sized enterprises. The awards also have a category for operational units of companies, such as factories, research units, or assembly plants. The European Quality Awards, regardless of category, judges applicants on nine criteria: (1) leadership, (2) people management, (3) policy and strategy, (4) resource management, (5) process management, (6) customer satisfaction, (7) people satisfaction (defined as the perception of people toward the organisation), (8) impact on society and (9) business results.

While the categories essentially copy those of the Baldrige Award, the emphasis on people's perceptions of the organisation and of the organisation's impact on society are unique to the European Quality Awards and add a societal element lacking in either the Deming or Baldrige Awards. The European Quality Awards differ from the Deming and Baldrige, as noted earlier, in the various categories for eligible organisations. The European Quality Awards also differ in the nature of their awards jury which is made up of business leaders as well as academics. Finally, by its nature, the European Union is more international than either Japan or the USA and from the start the award has been open to companies outside the European Union. Still, the

award is limited to those companies that have at least 50% of their activities in Europe.

The objectives of the European Foundation for Quality management (EFQM) are to enhance the position of European industry and commerce by developing and strengthening quality adoption in corporations, to accelerate quality improvement acceptance, and to stimulate and assist the development of quality improvement activities since quality is perceived to be a fundamental contributor to competitiveness and customer satisfaction improvement, Ghobadian and Woo (1996).

Applications to the programme are examined by a team of six assessors, each of whom undergoes training to ensure a high level of consistency in scoring. Assessors include some academics and quality professionals but the majority is drawn from the ranks of experienced practising managers from European countries.

The EFQM has established a model for organisations to assist their performance which is the European Foundation for Quality Management Excellence Model (EFQM MEM). However, the model is used to assess all applicant quality management performance and is divided into two parts: enablers and results. The model recognises that processes are the means by which an organisation harnesses and releases the talents of its people to produce results; they are the “Enablers” that produce the “results”. Hence, customer results, people results and society results are achieved through leadership, driving policy and strategy, people, partnerships, resources and processes which lead to excellence in key performance results, as follows:

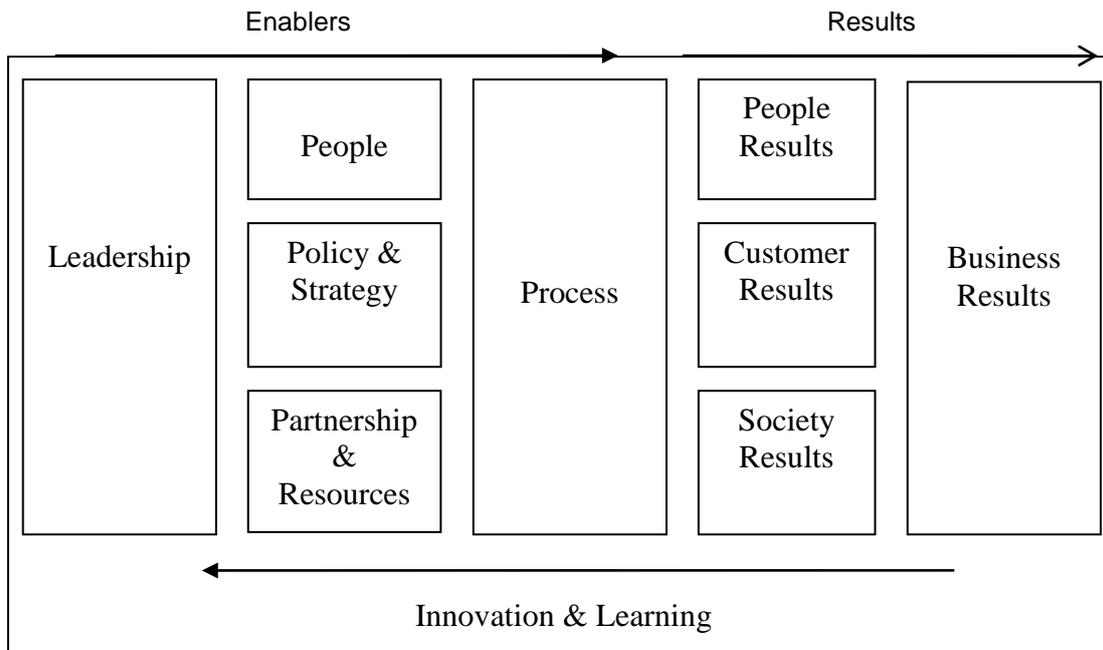


Figure 3.8 The EFQM Excellence Model is a registered trademark of EFQM (1991)

The model attempts to describe the fundamental elements of TQM concepts. It is based on the assumption that the end outputs reflect organisational managerial policies, process and competence, Ghobadian and Woo (1996). Moreover, it recognizes the significance of developing human resources, planning and capability. Furthermore, it emphasises the fact that financial results are not the sole measure of performance and stresses that management has a significance role in the quality improvement process. It assumes that there is a causal relationship between outputs (financial results) and outcomes (customer satisfaction and acceptance by society), Evans and Lindsay (2001).

The model provides organisations with an implementable TQM model, effective benchmarking tool, self-assessment methods and a method for sharing good practice and experience. On the other hand, the model has its shortcomings in terms of missing some fundamental elements in quality improvement such as research and development, innovation, strategic positioning and marketing penchant. However, despite its possible flaws, the EQA model is useful and helps organisations towards quality improvement and competitiveness, Conti (2007).

### **3.7.4 Australian Quality Award (AQA):**

The Australian Quality Award provides a model certified by the Australian Quality Council, an organisation recognized by the Commonwealth Government of Australia as the top organisation for quality management. The Council was formed in 1991 with the merger of Enterprise Australia, the Total Quality Management Institute, the Australian Quality Awards Foundation and the Quality Society of Australia. Six additional organisations later joined the Council, encouraging quality performance in Australian industries. The goal of the award programme is to develop and deploy a comprehensive and contemporary body of quality principles and best practices to encourage indigenous companies to improve their quality performance to world class levels and provide achievement benchmarking, as well as to enable the Australian companies to be more effectively competitive locally and globally with high quality outputs. The Council measures quality performance through six categories of criteria (see Figure 3.9). The people, information and analysis, strategy, policy, and planning categories have the greatest effect on the quality of processes, according to the model. The quality of processes, in turn, affects organisational performance. Customer focus and leadership are key elements, interacting with all the other parts of the model. Although it is similar to the MBNQA, the Australian Quality Award has an increased emphasis on the significance of multicultural management.

The award is not based on competitiveness such as other awards, and there are no restrictions on the number of prizes which may be awarded each year. The AQA's evaluation framework consists of six examination categories: leadership, policy and planning, information and analysis, people, customer focus, and quality of process/product and service. The design is a quality oriented process and procedure, based on the premise that quality improvement requires an influential leadership which leads the quality programme forward and nurtures a creative and innovative workforce capable of improving output quality and meet customer satisfaction. The Australian Quality Award evaluation framework is depicted in the following figure:

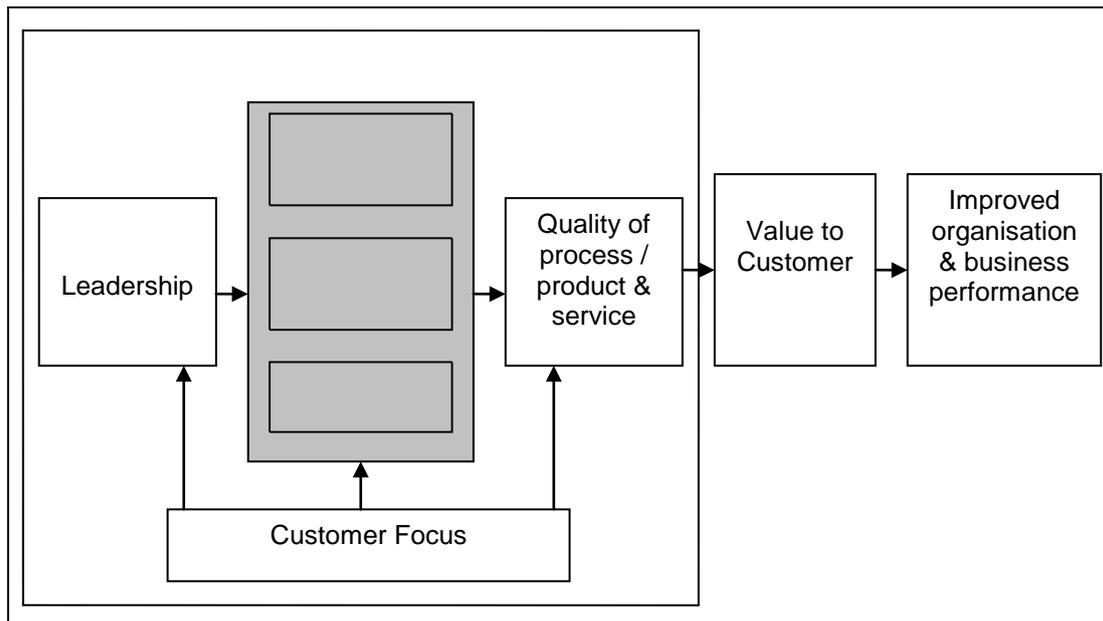


Figure 3.9 *Australian Quality Award Framework, (1993)*

The model emphasises that management has to focus on internal customer satisfaction and workforce motivation to ensure full satisfaction for the external customer. Furthermore, the model implies that customer focus has to be taken into consideration within every activity to assure quality improvement and customer satisfaction. The AQA model core concepts and application assessment are similar to the Baldrige and European Quality Awards including application process, assessment, interviews, site visits and point values, but it neglects the business results in the evaluation process.

### **3.7.5 King Abdullah II Award for Excellence (KAAE) (Jordan):**

The King Abdullah II Award for Excellence was established by a royal decree in 2002. The award aims are: enhance the role of private and public sectors in serving the Jordanian community with all its sectors and the investment community by promoting awareness of the concepts of comprehensive quality administration and distinguished performance; create qualitative transformation and develop the performance of institutions in serving Jordanian citizens and investors, as well as enhancing positive competitiveness among organisational departments through promoting awareness of the concepts of innovation, quality and distinguished performance. It also helps to instil the exchange of exceptional expertise between Jordanian institutions and sharing their success stories in the area of successful administrative practices, productivity, plans, services, programmes and working methods.

The award is open to all sizes of Jordanian company within the public and private sectors with a minimum number of employees of 50 employees, and it is divided into three prizes: private sector award, public sector award and distinguished employee award. While the private sector award is optional for Jordanian organizations, the public sector one is compulsory for governmental institutions. Moreover, the award is given every two years, the assessment carried out in line with objective international standards by national and international experts and supported by workshops, conferences and seminars. The award is based on the five elements: of leadership, operations, individuals, knowledge and finance, as follows:

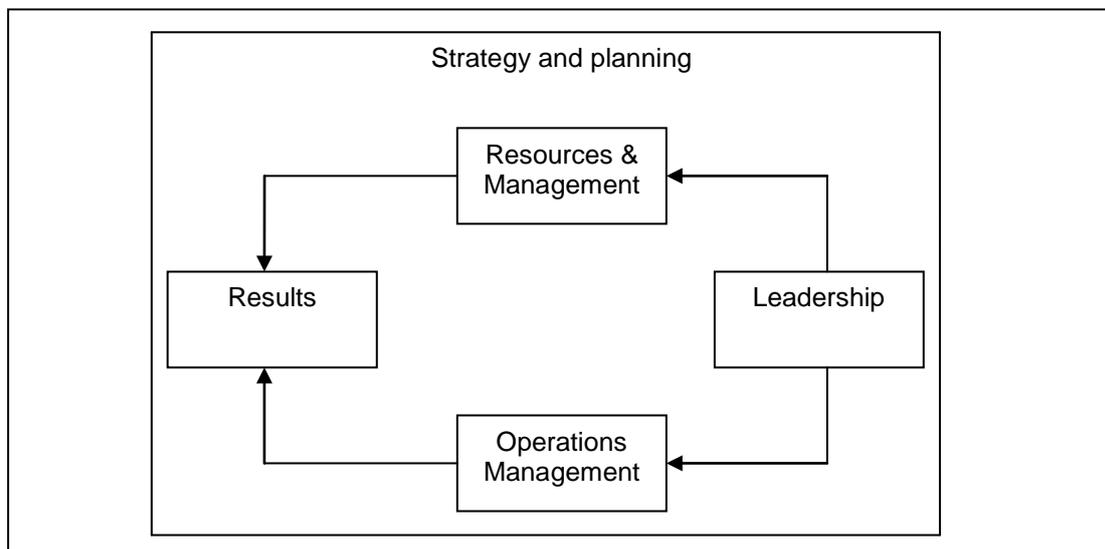


Figure 3.10 *King Abdullah II Award for Excellence Framework (2009)*  
 Jordanian Ministry of Planning & International cooperation

The model examines leadership capacity to direct the organisation effectively to achieve the organisational goals and the provision of necessary resources. In addition, the award focuses on the general framework of the organisation's strategic planning, and examines the relationship between organisational culture and leadership commitment to employee improvement and enhancing organisation core value, achieving missions and strategic goals. The award also examines organisational procedures and policies in the area of predicting and strategic planning in terms of organisational vision, mission and strategies to achieve organisational goals by understanding the external and internal environments. In addition, it examines their ability to transfer these strategies into real work, and also whether the organisations are able to manage their human resource management, finance and information systems.

The model focuses on an organisation's commitment towards providing high quality products and services to customers by having a clear organisation structure and communication system. The result, then, should be measured to measure customer satisfaction, employee satisfaction, product and services quality, environmental effects and supplier relations and satisfaction.

### **3.7.6 Charter Mark Award (Customer Service Excellence) (United Kingdom):**

The Charter Mark was an award demonstrating the achievement of national standards of excellence in customer service in UK public sector organisations. Introduced in 1991, it was replaced in 2008 by the Customer Service Excellence standard. The Award is one of the consequences of a political initiative, the Citizen's Charter, by John Major, Prime Minister in 1991. Accordingly, the Customer Service Excellence standard was launched and a phase transfer was initiated, Customer Service Excellence standard (2009).

The scope of public organisations includes departments of local councils, voluntary organisations having more than 10% public funding and also private subcontractors on public contracts. It also includes public transport operators and gas, electricity and water utilities. However, the assessment of the award, made by one of four certification bodies, is on achievement of goals to set standards and perform well; actively engage with customers, partners and staff; be fair and accessible to everyone and promote choice; continuously develop and improve; use resources effectively and imaginatively; and contribute to improving opportunities and quality of life in the communities served.

The award is valid for three years, after which the organisation must re-apply. However, on 10 March 2008, the then Minister for Transformational Government, Tom Watson, launched the new Customer Service Excellence standard as a practical tool to support and drive public services that are more responsive to people's needs. The aim of the Customer Service Excellence is to encourage, enable and reward organisations that deliver services based on a genuine understanding of the needs and performance of their customers and communities. The foundation of the tool is the government's Customer Service Excellence standard which tests in great depth those areas that research has indicated a priority for customers, with particular focus on

delivery, timeliness, information, professionalism and staff attitude. The Customer Service Excellence is designed to operate on three distinct levels:

1. As a driver for continuous improvement, by allowing organisations to self assess their capability, using the award self assessment tool, in relation to customer focused service delivery, identifying areas and methods for improvement.
2. As a skills development tool, by allowing individuals and teams within the organisation to explore and acquire new skills in the area of customer focus and customer engagement, thus building their capacity for delivering improved services.
3. As an independent validation of achievement, by allowing organisations to seek formal accreditation to the Customer Service Excellence standard, demonstrate their competence, identify key areas for improvement and celebrate their success.

#### **3.7.7 Pride in Job Quality Award (PIJ) (United Kingdom):**

The National House Building Council (NHBC) set up its 'Pride in the Job' competition in 1980 to seek out the UK's best site managers and reward them for creating quality finished homes, at the same time, introducing competition between site managers. The drive for quality is at the heart of NHBC's Pride in the Job and is an integral part of its role in helping to raise standards for new home buyers. The Awards is given to individual site managers, not the house builder that employs them or the development site they are responsible for. The competition is one of the most prestigious in the house-building industry and has, over the years, become synonymous with the quality of new homes.

The reward for excellent site management goes beyond the coveted PIJ trophy, medals, blazers and certificates. Winning an Award helps to build individual careers and professional reputations, For instance, Mark Irving, Story Homes Site Manager for the Birchwood section of the Summerpark development, Dumfriesshire, has won a Quality Award in NHBC's national Pride in the Job competition. Mark was presented with his Quality Award in Glasgow in 2011 where he also learned that he was nominated for a 'Top 100 Seal of Excellence' or Regional Award winner to choose the UK's three Supreme winners. Therefore, winning the pride in job quality award helped Mark to be nominated in Top 100 Seal of Excellence as a result of his

dedication to his company by delivering the highest level of consideration during projects construction. Wining the pride in job quality award hold some benefits for the company by enhancing their reputation, and for individual by promoting self-esteem through getting all kinds of positive feedback which employees to grow and flourish.

According to the NHBC (2009), judging begins in July each year and continues for the next 12 months, enabling NHBC inspectors to fully assess a site manager's work over an extended period of time. To ensure all sites are judged on the same criteria, inspectors look for consistently high standards of site management shown through quality workmanship across all trades on site; excellent leadership skills, reflected by a high level of morale and motivation of site team; the ability to knowledgeable and skillfully resolve any issue on site, for example, problematic ground conditions or access difficulties; the ability to skillfully interpret drawings and specifications and successfully turn the designer's intention into reality; and efficient health and safety controls be in place and evidence that the welfare of all employees on site is considered.

### **3.7.8 Quality awards comparison and similarities:**

After reviewing the quality awards, it becomes clear that all awards are an attempt to help an organisation towards total quality implementation and adoption, by listing some categories for each award, to be followed by all types and different sized organisations, despite whether manufacturing, servicing institution or construction. The total quality management framework for each award can fit any organisation in the world and, even though each award has been specified for different countries, there are still many similarities and common quality management categories. The awards reviewed are compared along two dimensions: the examination categories and the underlying framework.

The Deming Prize, as first quality prize, it is not based on an underlying framework linking organisation, activities, processes, concepts and results together; rather, it simply provides a list of desirable quality management practices. Furthermore, its focus is on policies and plans, plan implementations, data collection, analysis and control, result of policy implementation and future improvement plans. Moreover, it is

a prescriptive model in terms of the practices, tools and techniques such as quality circles, quality control, standardisation and statistical analysis.

On the other hand, the Baldrige Award, EQA, AQA and KAA attempt to model TQM by identifying its constituent parts, and assume that there is a relationship between the different constituents of TQM such as relationship between design and process implementation and the end results, or relationship between management styles and attitudes. Furthermore, they are based on an underlying framework linking organisation, values, process, activities and results together, at the same time providing a checklist of quality management categories.

The AQA and the Baldrige Award are based on the premise that there are two key elements underpinning the efforts of introducing total quality: management leadership and external customer focus, whereas the EQA and KAA emphasise the fundamental role of top management commitment on quality management achievement, but the focus on external customer is explicit and it manifests itself in a number of ways including the sort of examination to deal with customer satisfaction and the requirement for the applicants to provide evidence of benchmarking. However, the Baldrige Award, AQA, EQA and KAA point out that customers play the major role in determining products and services quality and that the goal of quality improvement is improved by enhancing customer satisfaction, whereas with EQA, 'excellence' in service delivery is the underlying philosophy of the Charter Mark Award. However, The Baldrige Award, AQA, EQA and Charter mark awards have placed their objectives toward focusing on customer satisfaction. While the Deming Prize, King Abdullah II Award for Excellence (Jordan) and Pride in Job quality award do not emphasize customer satisfaction for international competitiveness, rather they focus on process appreciation concept. However, the underlying philosophy of today's quality awards is that they provided the fundamental principles that leads companies to achieve high quality standards through emphasizing continues improvement. The following table depicts each award criteria and examination items:

<b>Pride in Job quality award</b> <b>(United Kingdom)</b>	<b>Charter Mark Award</b> <b>(United Kingdom)</b>	<b>King Abdullah II Award for Excellence</b> <b>(Jordan)</b>	<b>The Australian Quality Award</b> <b>(Australia)</b>	<b>The Malcolm Baldrige National Quality Award</b> <b>(USA)</b>	<b>The European Quality Award</b> <b>(Europe)</b>	<b>The Deming Prize</b> <b>(Japan)</b>
Leadership	Commitment to excellence	Leadership	Leadership	Leadership	Leadership	Policy
Consistency	Culture of the organisation	Strategy and planning	Policy and planning	Strategic quality planning	Policy and Strategy	Strategic planning
Technical expertise	Planning	Resources and management	Information and analysis	Information and analysis	Impact on society	Organisation and its management
Interpretation of design and specification	Customer insight	Operations management	People	Human resources development	Business results	Results
Health and safety	Timeliness and quality of services	Results	Customer focus	Management of process quality	Resources	Education and dissemination
	Information and access		Quality of process, products and services	Quality & operational results	Process	Control
	Delivery			Customer focus	People management	Quality Assurance
				Customer satisfaction	People satisfaction	Analysis
					Customer satisfaction	

Table 3.1 Quality awards comparison and similarities

Despite the aims of the previous awards, they appear to be significantly different at first glance in terms of the examination categories, but they share many common areas including:

1. Formulation of managerial quality policies towards improving total quality management implementation and adoption.
2. The important role of top management towards total quality achievement; this involves all managerial levels and the degree of commitment which is expected to display quality behaviour through assisting in provision of training, regular communication and acting as a role model.
3. Managing quality procedures and control.
4. Reviewing the progress of the improvement process.

5. Delegation of authority, recognition of quality behaviour and workforce empowerment.
6. Establishing good relations with suppliers.
7. Internal and external customer satisfaction.
8. Financial control and planning.
9. Customer satisfaction is the primary objective.
10. TQM implementation requires culture change toward quality and continuous improvement.

### **3.8 ISO as Quality Management Standard:**

Standards are important in national and international trade as a result of giving some organisations more competitive advantage in certain areas of the world. Having specific standards provides clear identifiable references that encourage fair competition and being recognized internationally. Standards facilitate trade through creating more competitiveness, enhanced product and services quality, reliability, greater ease of maintenance and cost reductions. The first quality organisation was established in 1926 as the International Federation of National Standardising Association (ISA) and focused on mechanical engineering. It was disbanded during the Second World War in 1942 and then re-organized in October 1946 in London under the current name, International Organisation for Standardisation, generally referred to as ISO, as the world's largest developer and publisher on international quality standards. Between 1946 and the present day, ISO has published more than 17,500 different international standards related to a various range of activities such as construction, mechanical engineering and technology development, Martincic (1997). After several years of work, the ISO published the first version of ISO 9000 series standards for quality management systems in 1987, continually updated (by ISO) as a network of national standards institutes in 158 countries, ISO (2009). These standards are not specific to any industry but universally recognized. Moreover, the ISO 9000 series had the same structure as the British Standard BS5750, introduced in 1979, as stated by Seddon (1994).

### **3.9 ISO 9000 Series:**

ISO 9000 is maintained by the ISO as a family of standards for quality management system focuses in design, development, production, installation and services. The whole purpose behind the development of ISO 9000 was to simplify the international exchange of goods and services by developing a common set of quality standards. It was first published in 1987 and focused on quality control it terms the organisational adoption of continues improvement tools and techniques to meet customer satisfaction and expectations. Thus, attention was given to defect detection more than prevention, ISO (2000). In 1994, the ISO published the second version, ISO 9000: 1994, which focused on quality assurance in terms of defect prevention to ensure customer satisfaction and cost reduction. In 2000, the ISO published another version of the ISO 9000 series which is ISO 9000: 2000 that focused on Quality Management System (QMS), by giving more attention to direction activities towards quality achievement, where the greater focus is given to production process more than product or service quality. The ISO 9000: 2000 series consists of five standards:

- ISO 9000: 2000 Quality Management System (QMS) Fundamentals and Vocabulary, which discusses the underlying concepts and roles of key elements.
- ISO 9001: 2000 Quality Management Systems (QMS) Requirements, which consider actual specification for the (QMS) within any organisation dealing with products and services production from the design process to after sales services.
- ISO 9002: 2000 concern the Quality Management System for organisations dealing with production and servicing without product design or after sales services.
- ISO 9003: 2000 concern organisations dealing with product and services final inspection and checking to ensure fulfillment of customer satisfaction, without dealing with design and production processes.

- ISO 9004: 2000 Quality Management Systems (QMS) Guidance for Performance Improvement, which is a guideline for developing quality management systems.

There are many benefits behind applying ISO 9000 standards such as helping organisations to follow well-documented procedures in the making and delivery of their products and services, in addition to ensuring that organisations give all employees, customers and suppliers the required attention and fulfilling their needs and expectations. Moreover, the ISO 9000 series emphasises quality in all organisational aspects and at all levels by controlling and directing employees during the production process and ensuring defect prevention to satisfy customers and reduce defects and production costs. At the same time, it creates national and international competitiveness which leads to high quality products and services, Wiele *et al.* (2005). However, at the same time, having ISO Certification does not guarantee that an organisation is providing high quality products and services more than other organisation without ISO certification, Singels *et al.* (2001).

In spite of the fact that in the business field the TQM and ISO 9000 systems are considered to offer the same level of quality practices, there are several differences between their principles that place certification far below TQM. ISO 9000 includes elements that are opposite to TQM principles, such as:

(1) Excessive bureaucracy. This bureaucracy may lead to demotivation and uneasiness amongst employees.

(2) Lack of flexibility (Gotzamani and Tsiotras, 2001). The correct execution of the norm may obstruct the critical change of process aimed at continuous improvement.

(3) ISO 9000 may force companies to apply controls on products received from suppliers when TQM upholds the suppression of controls and the set up of a relationship with suppliers based on mutual trust.

(4) ISO 9000 may force companies to apply excessive controls on intermediate and final products. TQM puts emphasis on prevention. not on inspection; however, ISO 9000 gives importance to inspection (Tummala and Tang, 1996).

Nevertheless, in spite of the previous mentioned differences, both systems have some common elements. This is the reason many researchers consider ISO 9000 as a first step towards TQM (Skrabec, 1999; Sun, 2000; Escanciano *et al.*, 2001). Some of the common elements are:

(1) Process flow management. ISO 9000 is basically a list of norms on how to manage the process. (Lee *et al.* , 1999). A good application of ISO 9000 could lead to more controlled processes although statistical process control is not a pre-requisite of ISO.

(2) Information and data gathering. Both models involve the ability to obtain data on quality. The difference lies in the fact that ISO 9000 does not require analysis of the data and TQM only requires the gathering of the data if it is with the aim of analysis use of the results to improve quality. (Gotzamani and Tsiotras, 2001).

(3) Use of statistical tools. ISO 9000 includes this requirement, but a company may receive certification without applying any statistical tool (Lee *et al.* , 1999).

In relation with previous points, it can be accepted that a company certified by ISO 9000 may have gone part of the way towards TQM, but still there is a large number of TQM requirements that ISO 9000 does not satisfy:

(1) Continuous improvement. This is one of the pillars of TQM (Deming, 1982). ISO 9000 introduces improvement only through prevention and correction of non conformities. This is a passive focus, contrary to the pro-activeness of TQM (Lee *et al.* , 1999).

(2) Customer focus. ISO 9000 only requires the application of a set of procedures focused on the fulfilment of design specifications. The customer is king in a TQM environment, everything is done to obtain satisfied customers (Lee *et al.* , 1999).

(3) Workforce development and participation. ISO 9000 does not give special importance to this subject (Gotzamani and Tsiotras, 2001).

### **3.10 Critique of Total Quality Management:**

Despite the existence of several experiences of successful implementation of Total Quality Management in different companies worldwide, the other side of the story still involves some failure or difficulty in fully implementing Total Quality Management and, in some cases, it could be impossible to achieve due to several barriers towards full Total Quality Management. For instance, Wilkinson and Witcher (1991) mention the basic barriers of total quality management application in the UK, according to a survey of 250 UK firms in which the survey showed that few firms appreciate the fact that TQM is a total effort and requires culture change and management behaviour. Despite TQM initiatives being very popular, they add that organisational segmentalism, reluctant managers, industrial relations and short-termism are some of the barriers of TQM implementation in the UK.

Lam and Reshef (1999) point out that TQM is a long-range organisational transformation which requires building new competencies and destroys existing ones; thus it involves high risks and requires high commitment. At the same time, it renders the successes short-term achievements because, once the TQM long-term programme has been launched, the management needs to be updated to avoid sudden shifts with markets in a way that threatens the company's existence. Moreover, practising TQM means that all employees and management are involved in a lot of processes (training, measurements, presentations and team meetings) which are not directly related to a company's core mission and it puts more strain on employees and management towards achieving the TQM programme. Furthermore, having on-site continuous improvement training courses and education programmes are very costly and not feasible in small businesses.

Nwabueze (2001) clarifies some of the barriers of TQM implementation such as it could be hard, and in some cases impossible, to change: organisational culture; lack of management commitment; lack of teamwork; poorly thought out plans; focus on short term profits; poor measurement techniques; lack of education and training programmes; high employee turnover; employee fear of losing their jobs, especially after receiving training programmes which give them more stress to apply what they learn and take responsibility towards TQM achievement; and management does not reward success. Thus, a company must understand some critical points before

implementing a Total Quality Management programme to ensure success implementation. Organisations have to understand that TQM programme adoption is not a phase but permanent and involves continuous improvement. A TQM programme implementation is a long-term plan and it may take up to 5 years or even more to fully become a TQM company. It requires full commitment and cooperation from all employees, line managers, managers and owners, and it also requires culture change; thus management has to deal with resistance and has to vanish the 'old ways' of management because, if the implementation fails, it can have long lasting damage on the company and employee morale.

### **3.11 Conclusion:**

This chapter has explored and evaluated the different definitions of quality and quality management. The TQM concept has changed over the years as a result of focusing on serving customers and giving them priority before, during and after the production process. Moreover, there are four categories of quality costs: the first two categories are appraisal and prevention costs, which are incurred by company in order to improve quality; and other quality costs are external and internal failure costs, which the company tries to prevent. In relation to this, it becomes clear that an organisation must develop its own definition of quality which has to be understood by everyone in the organisation because there is no single and specific theoretical definition of TQM, but some TQM gurus and authors have provided the core assumptions of TQM as a discipline and philosophy of management to organise, plan and continuously improve activities. TQM is first seen as a method to reduce defects and production costs to maximise outputs and improve customer satisfaction. Comparing quality management approaches is difficult due to the number and variety of terms employed but too often TQM strategies are perceived as control strategies. By comparing TQM with other generic categories, quality assurance, quality inspection and quality control, the emphasis of their definition is concerned with a fundamental shift from the past.

The earlier mentioned involvement of the writer with TQM programmes and processes suggests two distinct application levels: the radical approach and the continuous improvement approach. The radical review is emphasised in that TQM is concerned with the radical workings of the organisation as a whole, as a mean for improving effectiveness through goal attainment and efficiency in the utilisation of its resources, by designing the business process to achieve critical improvements in a critical contemporary measure of performance such as cost, quality, service and speed. The problems facing organisations in the radical approach, however, do not result from organisational structures but their process structures, as a result of overlying a new organisation on top of an old process. The continuous improvements approach is emphasised in that TQM is concerned with providing excellence in customer satisfaction through continuous improvement of processes, products and services by continuously increasing customer value simulations with continuously decreasing user sacrifices.

TQM is perceived differently through different points of view because there is no general definition to fit or implement in all organisations within all sectors. Moreover, TQM is perceived from a management perception as a method to reduce defects by improving the operational process through strategic planning, regular training, employee recognition and innovation to improve profits, at the same time as improving customer satisfaction. Customers perceive quality as the difference between pre-purchase expectation and after purchase performance and whether the final products and services meet or exceed their expectations within the available budget.

According to the literature (Wilkinson and Witcher (1991) , Nwabueze (2001) there are many failed cases of TQM implementation as a result of some internal factors such as culture, management commitment. TQM is a long-range organisational transformation with a lack of education and training programmes but, despite that, TQM is perceived as a method to improve company competitiveness, sustainability, performance, customer satisfaction, reputation and market share.

Nwabueze (2001) clarifies some of the barriers of TQM implementation such as it could be hard, and in some cases impossible, to change: organisational culture; lack of management commitment; lack of teamwork; poorly thought out plans; focus on short term profits; poor measurement techniques; lack of education and training programmes; high employee turnover. Lam and Reshef (1999) point out that TQM is a long-range organisational transformation which requires building new competencies and destroys existing ones; thus it involves high risks and requires high commitment. Moreover, Tom Peters (1987) stated that management must have a positive attitude toward making the required quality change and the ability to become champions of TQM to the remainder of the company

However, as businesses become larger, so do production problems such as technical, operational and managerial problems. Therefore, organisations start to look for more effective methods to reduce defects, more than just product and service inspections or prevention based approaches. Thus, organisations tend to adopt more flexible methods which involve everyone in an organisation to contribute to the quality improvement initiative. Therefore, many organisations adopt the TQM method to improve their

performance and quality services, as quality depends on personal responsibility, professionalism and commitment, of every individual in the organisation.

Organisational adoption of TQM was first based on the advice of the major TQM contributors such as Deming, Juran, Ishikawa and others, but none developed any TQM implementation framework. Their contributions focused on providing some improvement steps and advice for management to follow, which have since been used by different countries and organisations to formulate quality awards and frameworks such as the Deming Prize and European Quality Award to improve awareness of quality due to its role in improving performance, and to encourage systematic self-assessment against other companies and against self established criteria.

## **Chapter Four**

The Implementation of Critical Success Factors (CSF's) of Total Quality Management

#### **4.1 Introduction:**

The construction industry is considered to be one of the most important industries in the economy of all countries. It plays an important role in the national economy and its goods are used as factors of production by almost all other sectors of the economy. It also obtains its inputs from several sectors. Thus, the satisfactory performance of the construction industry is vital for the well being of several other parts of the economy and, vice versa, the construction industry is linked with the rest of the economy by a complex set of inter-relationships. It interacts with nearly all fields of human endeavours but, unfortunately, the intrinsic complexity, uncertainty and dynamics of most construction projects create difficulties for even the best project managers. Decision milestones are used to anticipate outcomes, risk management is done to prevent disasters, yet projects still end up with delays, budget overruns and compromised specifications, Nguyen *et al.* (2004). Therefore, the challenge of how to handle a construction project successfully has attracted substantial research attention to effectively implement TQM tools and techniques to improve the overall construction industry.

Despite the fact that construction industry has lagged behind other industries in Total Quality Management implementation, TQM is widely recognised as an enabler for performance in the industry, after being successfully implemented worldwide by many highly competitive organisations to improve performance and productivity, especially within the services and manufacturing industries, Love *et al.* (2004). The success of TQM adoption in manufacturing and other industries has been forcing the construction industry to implement the TQM philosophy to be able to cope with the rapid changes in the business environment, as Abas and Yaacob declare (2006). They add that TQM adoption within an organisation has become a vital strategy for all organisational aspects after being considered an important operational-level element by some firms.

The construction industry has a unique environment which differs for each project; thus, there is still no agreement on the list of success factors for the industry, where every project has unique success factors which may not be transferred to another project such as composition of project team and culture; physical attributes of project; availability of managerial expertise and local technical; project environmental

condition and geographical location; competence of contractors, subcontractors and suppliers; and, finally constraints in resources. Some factors are common in construction projects, for instance, quality standards, time, limited budget, and series of complex and interrelated activities, Belout and Gauvreau (2004) and, thus, those common and different factors within the industry make each project different from other, affecting the quality achievement and management objectives of each project.

However, it is quite difficult to establish a comprehensive list of CSF's for successful implementation of TQM approach in the construction industry. The changes that occur in organizations' TQM programmes over time and in different circumstances (company culture, size, and financial resources), and the diverse objectives of stakeholders that make it difficult to agree upon a comprehensive list of TQM implementation success factors for construction industry, Phua (2004). It is, therefore, recommended that organizations complement the implementation TQM success implementation CSF's by continually seeking out and studying the best implementation practices to understand how others are achieving success in implementing and sustaining TQM (Thiagarajan *et al.*, 2001).

There are diverse objectives of stakeholders that make it difficult to agree upon This viewpoint is also confirmed by Lim and Zairi (1999) when they argue the two viewpoints of construction project success: micro and macro. Micro viewpoints concern the construction project phase and all parties involved in the project (owner, contractor, subcontractor, supplier, designer), where every individual party perceives project success from their own viewpoint. While in the macro viewpoint, project success is the concern of stakeholders and the owner by looking at the original project concept achievement. Thus, it appears fairly complex to develop a comprehensive list of project success factors due to the nature of construction industry characteristics.

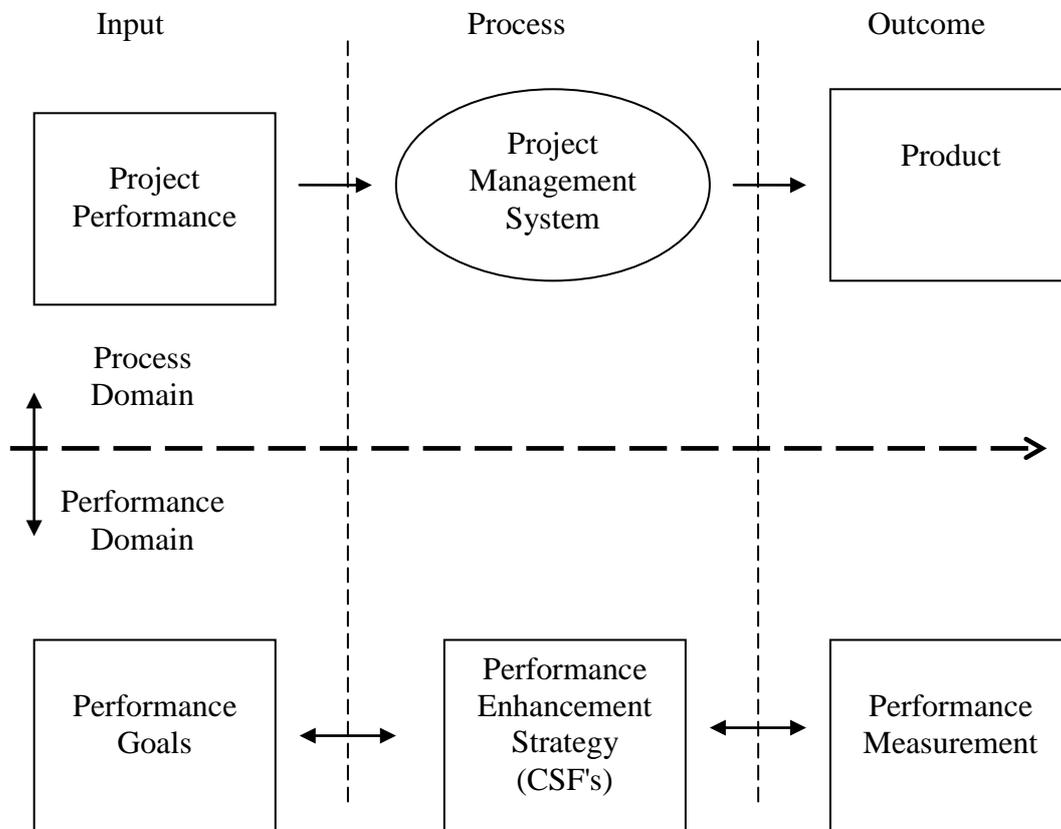
Thiagarajan and Zairi (1998) argue that to study critical quality factors for effective TQM implementation, a descriptive approach is more appropriate than a normative one. The descriptive approach helps to ascertain and describe the detailed variation of a situation from an individual, organisational, industry, or any other perspective, Sekaran (2003). This also involves the selection of the most suitable organisations meeting a set of quality factors critical to successful quality initiatives in those organisations. This approach involves three different levels of inquiry to address the

“what and how” elements of TQM implementation and the issues involved prior to implementation.

#### **4.2 The Critical Success Factors (CSF's) of Total Quality Management:**

Several studies have been conducted since 1960 to explore CSF's considered important for construction projects, Toor and Ogunlana (2009). Ideas of success and failure factors were first introduced by Rubin and Seeling (1967) in the context of project management, but first used by Rockart (1982), as mentioned by Belassi and Tukel (1996). The term critical success factor implies a certain element which is vital and significantly contributes to the success of the construction project and, thus, the CSF's have to be clear to determine the factors standing behind project success or failure.

To understand the role of CSF's in construction industry, Toor and Ogunlana (2008) present a conceptual illustration which shows that construction project management can be categorised into three general phases: input, process and outcome, and two major domains, process and performance, as shown in the following figure:



(Figure 4.1) Input, Process, and outcome of project management  
Toor and Ogunlana (2008)

The project domain concerns setting up construction project objectives during the input stage. During the process phase, the process domain takes account of devising an adequate project management system to achieve the project objectives in the form of constructed facility and this domain ends with the final project delivery as an eventual outcome. In contrast, the performance domain is concerned with setting up performance goals during the input phase and then during the process stage it involves the establishment of the performance enhancement strategy in form of Critical Success Factors (CSF's), considered vital for project success and which can be measured during the outcome stage through key performance indicators.

Identifying construction project CSF's can benefit project management in several ways. First, CSF's provide an underlying decision framework and help management to decide their strategic standing in the project, Songer and Molenaar (1997). Second, it helps with selecting project team members, identification of their development needs,

and forecast of project performance level before its commencement, Chan *et al.* (2001). Third, it can be helpful to analyse the potential reasons of project success or failure, Low and Chuan (2006). Moreover, Nguyen *et al.* (2004) add that construction projects invariably involve a variety of technical variables, budgetary and human and, thus, an appraisal of CSF's enable, the effective allocation of project limited resources such as budget, time and manpower. Therefore, the following are the proposed CSF's for the construction industry from the available literature and comparing several quality management awards and frameworks, as shown in the third chapter of this study. These factors are investigated by conducting face-to-face semi-structured interviews and self-administered and interviewee- administered questionnaires to be confirmed or modified according to the participants in the construction industry in the United Kingdom and Jordan.

#### **4.2.1 Top Management / Leadership Commitment:**

The main concern for clients and contractors within the construction industry is to ensure whether a project achieves satisfactory quality and can be completed within time and cost allocated, Taylor *et al.* (2003). Quality perception might differ among parties, as every party measures quality achievement according to their project success, Low *et al.* (2004). They add that the quality concept can be translated into several dimensions that include conformance, serviceability, reliability, performance, durability and aesthetics, all of which makes quality achievements hard to obtain by organisations and require the highly committed appropriate management of all processes to deliver high quality projects for the final customer.

Consistent with recommendations made by gurus and quality awards, Chapter Three, regarding the need for top management commitment, support leadership and clear direction when introducing TQM, leadership commitment has studied and discussed different researchers based on the quality guru contributions. The National Institute of Standards and Technology (1987), established the Malcolm Baldrige National Quality Improvement Award to improve organisation quality; however, it gives leadership factors priority and recognises leadership as a driver for the quality success system. Deming (1986) published his 14 points to increase job quality within an organisation; his points focus on leadership as the main driver for quality transformation for organisations to improve their competitiveness and market share. Top management

commitment is perceived as a fundamental factor of the successful implementation of quality management, where senior manager understanding, involvement and customer focus are essential elements of TQM management success, as stated by Samson *et al.* (1999). In another study carried by Landin (2000), management commitment into all aspect of organisation, by paying attention to human resource management and being able to influence the lower level within any organisation where almost all of the actual work is carried out, is also perceived as a fundamental predictor of performance of TQM practice because management has to be totally committed towards quality culture, Tsang and Antony (2001).

Top management commitment is described by some authors regarding the level of involvement and commitment in the organisation as being fundamental to TQM implementation. In this concern, Feigenbaum (1989) and Arditi *et al.* (1997) refer to commitment to quality management as leadership participation, monitoring, resources allocation and recognition, while Biggar (1990) and Ahire *et al.* (1998) stress goals, involvement and resource allocation by defining management commitment as providing a full understanding of organisational vision, mission, goals and value, in addition to providing support and active participation. However, in comparison to the TQM gurus, they perceive management commitment as full involvement of management with all organisational aspects, rather than focusing on employees and customers. Therefore, management has to be fully committed in all aspects of the organisation to ensure the successful implementation of TQM. Therefore, measuring the level of management commitment is perceived differently regarding the level of involvement by top management. Rodgers *et al.* (1993) explain that management commitment can be measured regarding the level of support shown by management, while Crosby (1996) measures management commitment in quality management as feedback, participation and having the right attitude.

In the construction industry, Chin *et al.* (2003) emphasise that top management commitment is among the strong predictors of successful TQM implementation in construction firms. Haupt and Whiteman (2004) found that successful ISO 9000 implementation requires high commitment by top management within an organisation. Low and Teo (2004) argue that reducing prevalent problems of TQM

implementation on construction sites compulsorily relates to high levels of management action towards quality.

Despite the fact that management commitment is fundamental for the successful implementation of the TQM programme, a committed management and having the appropriate management style are not enough for successful TQM implementation since all employees and management have to work together and be totally committed to the TQM initiative within the organisation. The word leadership has been described differently regarding different scholars in terms of responsibility, position and personality but most definitions have a common theme of directing a group towards a goal. Therefore, this research focuses on leadership in the form of the ability to influence an organised group of subordinates in an effort towards goal achievement.

As leadership effectiveness is crucial for every construction project, leadership behaviour is a fundamental element has a direct effect on the success of project management, Gharehbaghi and McManus (2003). In practice, many construction projects face problems and the result can be often traced to the project managers. Some of them may use inappropriate leadership styles in dealing with subordinates and, besides this, they may have insufficient competencies or their traits may not fit with the nature of their work and, thus, a proper leadership style for the construction project is necessary to sustain the industry.

The participation of leadership within the pre-contract stage and design are associated with commitment, performance and effectiveness. Moreover, the higher the authority project managers have, the higher the performance and effectiveness level of project outcomes will be provided. Additionally, final project quality is significantly associated with individual consideration, inspiration and motivation provided by leadership to the workforce, all of which increase creativity in problem solving and quality outcomes.

Padhi (2008) defines commitment towards quality as manager requirement to provide an inspiring vision, instil values that guide subordinates and make strategic directions that are understood by all employees. Management commitment involves a full understanding of TQM by top management and supervisors and they have to believe in it to demonstrate their commitment, understanding and beliefs through their daily

practices of TQM. They have to ensure that values, philosophies, goals and strategies are transmitted throughout the organisation to provide direction, clarity and focus. Moreover, leadership commitment must be translated into effective action to improve quality. Such action involves: understanding the external environment (supplier quality management, benchmarking and customer focus); making better use of internal data (internal quality information usage, design quality management); and ensuring that employees clearly understand the best way to use the quality information by giving them the required education, training, participation and involvement.

However, Samson *et al.* (1999), Chin *et al.* (2003), Low and Teo (2004) and others define the different roles of leadership in an organisation seeking successful TQM implementation and consider leadership as the driver for a quality success system. For managers to be committed to the success of a project, however, they have to adopt the appropriate management style for each project and time for each task in relation to different situations; thus, there is no formal management style which can be formalised during the whole project or for all companies. Therefore, leadership style is important when describing management commitment towards successful TQM implementation. Leadership style might be relationship oriented or task oriented. Whereas in the relationship style management tends to focus on relations with their subordinates more than tasks, in the task orientation style management tends to focus on task achievement more than the relationship with their subordinates. However, previous researchers in management style in the construction industry conducted by Rowlinson *et al.* (1993), Enshassi and Burgess (1991) and Mustapha and Naoum (1998) conclude that the high task and high employee orientation style is the most effective style in managing a multi-cultural workforce. The UK and Jordan have high levels of multi-cultural workforces in the construction industry, as mentioned in the second chapter and, therefore, management has to adopt the high task and high employee orientation style by being friendly, accessible and understanding of the subordinates' personalities and requirements. In addition, they have to be task oriented to have control over the process of the work and achieve the target.

Nevertheless, leadership behaviour is culturally determined and different from culture to culture. The national culture can produce a significant effect on leadership style, which might be participative in the pre-contract phase and supportive during the project, or it might be achievement oriented and directive during the project, which is culturally determined by national culture and which is discussed in the following culture factor.

#### **4.2.2 Quality Culture:**

The rapid change in the business environment is becoming a bigger challenge for companies and requires a fast response by organisations to be able to compete and sustain the industry. Changing business strategy, values, and forming an organisation into a new structure does not happen easily but it requires a plan of cultural change to lead employees and the organisation to acquire the new cultural change. Culture is defined as:

*A set of assumptions shared by the group of people.*

Phillips (1994)

*The collective programming of mind, which distinguishes the members of one group or category of people from another.*

Hofstede (1991, p.5)

Culture involves at least three components: what people think, what they do and the materials they produce; and, therefore, knowledge, values, beliefs and mental processes are aspects of culture, Bodley (1994). Quality culture is the main ingredient in a successful TQM programme, where an organisation with a quality culture can be defined as one having clear values and beliefs that foster TQM behaviour. However, the importance of an appropriate quality culture is recognised by most prominent quality experts, as shown in the third chapter, such as Deming, Juran and Crosby. Their work identifies a number of cultural elements that must undergo change so that a continuous quality improvement philosophy can be sustained. They stress the importance of building a quality culture by changing perception of and attitudes towards quality as prerequisite to major quality improvement efforts. Therefore, changing culture is partly the purpose of TQM itself, but it is also in many cases a necessary prerequisite to attempt to implement TQM.

Culture is an important consideration in seeking to improve project delivery in the construction industry and, if improvements are to be achieved within the sector, organisations have to be able to identify the drivers of their culture and the consequences of particular orientation and, thus, strategies can be developed to mitigate any negative orientations, Skitmore *et al.* (2004). The construction industry has an image of having difficult, harsh working conditions, insecure employment prospects, demanding, low esteem and being an unbecoming occupation with an adversarial culture. The masculinity of the industry perpetuates the adversarial and confrontational and this has discouraged women and ethnic minorities, as well as deterring better educated people from considering construction a worthwhile career option, Barthorpe *et al.* (2000). Moreover, Ankrah *et al.* (2009) argue that the construction industry is characterised as a fragmented and hierarchical industry, while a fragmented industry is defined as one in which no company has a significant market share, or there is no market leader able to influence the industry outcomes; it is composed of a large number of privately-owned companies, small or medium sized, and a small number of large companies, in addition to self-employment. The construction industry characteristics separate it from other industries and impact upon its cultural framework such as the physical nature of the product; the product is normally manufactured on the client's premises; many projects are one-off designs and lack available prototype models; the arrangement, where design has normally been separate from construction; the organisation of the construction process; and the methods used for price determination, Ashworth (1993).

Some researchers have conducted studies to understand the relation between organisational culture and leadership style. Lok and Crawford (2004) explain that organisational culture is strongly affected by leadership style and, thus, has an impact on outcomes, organisational commitment, expectation, subordinate performance and job satisfaction as a result of cultural dissimilarity. Several researchers support the idea that leadership behaviour is culturally determined. Limsila and Ogunlana (2008) state leadership style is different between developed and developing countries. In the high power distance countries, leadership is considered to be more autocratic and, thus, most employees are afraid to disagree with their managers, are task orientated, and prefer to receive orders from managers rather than express their own ideas. Other studies such as Euske and Jackson (1980), Savery (1994) and Yukongdi, (2004) were

carried out in the UK, Hong Kong and Middle East construction companies to understand the relation between leaders and their outcomes such as commitment, satisfaction, quality, on time delivery and performance. The results showed a strong relation between leadership style and their results, where the employee orientation and task focus style was found to be the most effective style in managing multi-cultural workforces.

The UK construction industry, like other industries, has witnessed major developments aimed at improving quality, performance and profitability. These developments have occurred in particular phases; for instance, in the 1980s, the construction industry emphasised sales and marketing, followed by organisational design and human resource management in the 1990s. In 1994, with the publication of the Latham report, the industry experienced increasing interest in the subject of partnering between suppliers, clients and main contractors to reduce or eliminate the established culture of the adversarial relationship and replace it with long term relationships towards a greater degree of trust based on mutual trust and mutual benefits. Moreover, the industry called for more femininity to be encouraged to the industry to reduce the role of masculinity, in addition to the adoption of new rules and regulations regarding wages and health and safety issues, Dainty *et al.* (2007). In addition to the development of large national companies (such as BAM-Nuttall – “Dutch owned”, Taylor-Wimpey, the Kier Group) away from regional based companies, such large national groups need different management skills to cope with the fast changing environment and to be able to sustain high competitiveness.

However, each organisation has a unique culture which differs from other organisations but, in general, all organisations within a specific industry are affected by the industry culture over a large scale and, thus, the organisational culture within all industries emerges from the industry culture. The organisational culture is defined by Yin (2007) as social or normative glue that holds the organisation together. Thompson (1993) mentions that culture within organisations is reflected in which way the work is performed, or the way that people perform tasks, set objectives and allocate the necessary resources to achieve objectives. Organisational culture is defined as:

*All the interactions, which take place between people, their relationships and the feeling engendered by their behaviour.*

Jeffries *et al.* (1996, p.78)

Organisational culture defines what is acceptable and what is not, what actions and behaviour are encouraged and discouraged, Fincham (1996). Moreover, several authors such as Purcell, (1999) and Gerhart *et al.* (2000) mention that developing organisational culture towards being more supportive and positive will yield benefits for the project, team, individual and organisational performance. Hofstede (1991) identified five dimensions as being inherent within the organisational culture, as follows:

1. ***Power-distance***: this shows the extent of power distribution within a society and the degree that society accepts this distribution. A low power distance organisation tends to favour autonomy and personal responsibility, while a high power distance organisation prefers hierarchical bureaucracies, high regard of authority and strong leaders.
2. ***Uncertainty-avoidance***: the extent to which individuals require clear structures and set boundaries. A low uncertainty culture emphasises a high level of job security and a high level of standardisation, while a high uncertainty culture gives individuals chance to cope with innovation and risk.
3. ***Individualism - collectivism***: measures individuals' actions whether they based on self interest or on the interest of the group. In the individual culture, personal needs, freedom and decision making are respected, while in collectivism, personal needs are less important compared to the group interests. Thus, this dimension influences the role leadership is expected to play in an organisation.
4. ***Masculinity-femininity***: the degree to which gender roles are defined. This dimension measures employee goal orientation.
5. ***Long-term/short-term orientation***: the extent to which employees do or do not value long-term commitments towards their organisation. However, according to Hofstede (1991), long-term orientation is associated with East Asian countries, while short-term orientation is associated with Western countries.

It is widely accepted that culture can be “organization-specific”, referred to as “the shared meanings or assumptions, beliefs, and understandings held by a particular group or mini-societies”. There are two different approaches in considering the impact of organizational culture on the values and attitudes of members in the society. The first approach regards culture within an organization as homogenous with a uniform set of values derived from common basis of management and motivation. Advocates of this approach argue that a unifying organizational culture motivates a common basis of action. Nevertheless, the problem with this approach lies in its portrayal of culture as consistent within the organization where members are expected to share a similar viewpoint. This approach fails to consider that those members who come from different backgrounds have different viewpoints and are expected to bring in different local cultures to the organization.

Therefore, the second approach argues for a heterogeneous organizational culture, one that portrays organizational culture “as a mix of various local cultures each with their own distinctive values”. This approach accepts that there is a dominant organizational culture, while admitting that various other local cultures may exist within the organization. This is based on the view that the attributes of people, not the organizational structure, “are the fundamental determinants of organizational behaviour”. It is argued that organizations should be viewed as containing patterned behaviour of interdependent parts including interdependent people. This means that on the one hand, within the organization, there are many types of people with different kind of competencies. On the other hand, organizational culture exists when people with different competencies share many common organizational attributes. This approach of organizational culture is favoured, given that it considers the organization as composing people who come from different backgrounds (e.g. lawyers, managers and executives) and therefore exert different local cultures within a given organization.

Diversity may be defined as the variability in the workforce. (Rasmussen, 1996), states that the workforce is comprised of a variety of backgrounds, styles, perspectives, values, and beliefs as assets to the groups and organizations with which they interact. Some of its characteristics are inherited, while others are acquired. Today’s customers have come to expect world-class quality in the goods and services

they purchase. The management of diversity is essential for creating an environment in which people from different backgrounds can come together as a unified team to produce world-class quality. Within such organisational culture, cross-cultural training to project success consider as critical factor for the success of the project, were the physical environment, language, economic environment, labour conditions, and social environment. The nature of socio-cultural interaction appears to have a major impact on the productivity of project personnel; mistakes in this area can be costly, indeed. The management of staff with multiple languages makes integration especially challenging because of the difficulty in translating heavily nuanced and complex technical concepts. The use of bilingual project managers could be one of the best strategies. A thorough understanding of the abilities and availability of foreign labour forces is critical in order to have realistic expectations of their production. Also importantly, the cross-cultural training of project staff should include cognitive studies of the host country population and their social and cultural backgrounds.

However, Construction companies could make the transition to managing diversity through the following:

- The transition must begin with the leadership of design or construction organizations. Leaders must show by their words and actions that they believe in the potential and value of all individuals, regardless of race, ethnicity, gender or other differences.
- Practice tolerance. The opinions and behaviours of other groups must be recognized and respected.
- Communicate a commitment to staff about providing an environment that is conducive to diversity. This fosters cooperation, inclusiveness of all staff, and recognizes value of knowledge, talent and skills from all sources.
- Managers should confront their personal biases and stereotypical attitudes, recognizing that no ethnic group has a monopoly on natural mental ability. They should communicate belief in dignity and respect for all, identify and remove barriers to minority groups in the organization, eliminate judgmental attitudes and learn to listen.

- Leaders in the construction industry need to look for and remove those barriers, both internal and external that inhibits the flow of information that can improve competitiveness.
- Managers must practice employee development in order to make diversity successful: Establish and communicate performance expectations, use appropriate motivational approaches, provide working conditions they appreciate, Provide meaningful feedback, both positive and negative, but respect the individual's dignity.
- For international projects, train management staff on the social and cultural values of the respective host country. Use bilingual, bicultural staff to interface where possible.
- Develop conflict resolution procedures that allow a win-win outcome. Differences in viewpoints and cultural factors must be respected and addressed.
- Recognize that the management of diversity is an ongoing long-term process. Like all quality endeavours, a culture of continuous improvement is the best prescription for a design or construction organization to ascend to world-class performance.

Therefore, it can be assumed that the variations in leadership styles and individual preferences are influences from cultural variations and would lead to differences in outcomes. Organisational culture change consists of changing organisational values, beliefs, processes and structures; individuals will experience a reaction process caused by change, Bovey and Hede (2001). However, Waldersee and Griffiths (1997) investigated a longitudinal study over 500 large organisations which revealed that employee resistance was the most frequently cited problem encountered by leadership when implementing cultural change. Resistance is defined, according to Ankrah *et al.* (2009), as a multifaceted phenomenon which causes unanticipated instabilities, costs and delays in the process of organisational cultural and strategic change. The resistance might occur from employees, middle management or even top management for several reasons, as stated by Schuler and Psy (2003), such as the risk of change is seen as greater than the risk of standing still; they feel connected to other people and their working pattern; they have no role models for the new activities; they fear the lack the competence to change; they feel overloaded and overwhelmed; they feel the proposed change threatens their notions of themselves; they anticipate a loss of status or quality of life.

Thus, TQM can be used to create an organisation where change is considered the norm rather than reactionary response to environmental pressures. TQM is an established framework for organisational change by moving from bureaucratic top-down management to individual empowerment, teamwork and customer focus, Nesan and Holt (1999). There are some factors affecting quality culture implementation within construction organisations such as the degree of empowerment, the distribution of authority, employee resistance to change, leadership style, conflict within the organisation and individual or group mindset, Low and Chan (1998). To implement an effective quality change, therefore, leadership has to adopt learning processes within the organisation within day-to-day working processes and developing the mindset conducive to the success of change, in such a way that employees do not just continuously improve and change their knowledge, but also operate effectively in response to their changing environment; and support, feedback and communication from employees has to engage within the cultural transformation process. Vuppalapati *et al.* (1996) argue that to facilitate change, a strategic plan embracing the organisational managerial, technical, human resources and the services they produce is required. The formulation of such a strategy is primarily dependent upon organisations having the capacity for change.

In practice, many factors within an organisation have a significant correlation with the organisational culture within the construction project, or they have an association with the cultural outcomes, for instance, the relation between project size and organisational culture. This relation implies that the more the project grows in size, the more performance oriented the construction project will be because performance orientation deals with protecting workers on site by giving more attention to health and safety and providing all participants with feedback so continuous improvement can be achieved. Moreover, emphasis is placed on schedule delivery to ensure achieving quality delivery and getting it right first time.

In addition, the more project complexity increases, so does the client orientation. Whereas project complexity affects project objectives of quality, time and cost, thus, client requirements for these objectives tend to be more stringent as complexity grows because project complexity hinders having a clear identification of project goals and objectives. This forces the project management to get closer to the clients to

understand their requirements as client supervision gets tighter. Furthermore, the more complex the project gets, the more people have to work as a team to solve complex problems that individuals might not solve alone and this will improve teamwork, communication, integration and coordination.

As the clients become more influential, the workforce orientation increases. Workforce orientation relates to getting the best out of employees at all levels by developing a contribution culture towards successful project delivery, Moselhi *et al.* (2005). In the construction industry new scenario, greater attention is paid to quality and health and safety, while in the old scenario, attention was given to the cost. Hence, when client emphasis is more on cost, the workforce suffers by poor working conditions and health and safety regulations which results in poor performance, delays and rework. Conversely, giving health and safety regulations the priority by clients and project managers, both team orientation and performance orientation improve significantly.

Choosing the procurement route is an additional factor that affects the construction project culture, as it results in different cultural orientations. There are three common types of procurement in construction according to Sullivan (2006): traditional (design-bid-build); design and build; and management contracting. In the first type of procurement, the contractual arrangement requires a lot of time to start the actual project and involves the snagging process; as a result, late involvement in the procurement process adds extra cost. In the management contracting and design and build procurement routes, the contractors and other stakeholders are engaged early in the project and design which creates a partnering relationship, leading to greater commitment to the project, trust, learning, productivity innovation and collaboration. Thus, different procurement routes will lead to a significant difference in project culture but it cannot be guaranteed that adopting a particular procurement route will automatically affect the project culture, where management needs to work at changing the organisation or project cultures through developing teamwork, training and education.

Ankrah and Langford (2005) argue that the construction industry has witnessed some cultural changes in some developed countries and they have well-established skills specialists, training and educating, all of which contribute to a self-reliant construction culture, as a result of main contractors understanding the need for government support. They ensure this to their own advantage by being too powerful and influential with political leaders and parties for the good of the whole industry; therefore, the power of main contractors and clients is considered an important factor that affects the construction industry culture. For instance, the main contractors in Japan and Hong Kong have powerful positions and have pushed their governments to set their own training organisation, the construction industry training authority, before the governments even thought about it for other industries, and this is still not implemented in the UK and Jordan. However, within the construction industry, classifying clients and understanding their needs is fundamental for the success of the construction project as stated by Walker (2007). Walker classifies potential clients of the construction industry into three groups: individual customers, corporate clients and public clients. Thus, the construction organisation has to understand the requirements and culture of each client, especially when each has a different power and understanding of the construction process.

#### **4.2.3 Process Planning and Strategic Quality Management (SQM):**

The current trend in the construction industry is oriented towards higher quality in all aspects of the projects. Contractors are forced to provide high quality in their projects. The movement towards higher quality has been brought about as a result of increasing competitiveness between contractors to satisfy their clients, increased market-share, better reputation and as a result of improving client knowledge on quality, Green (2005). Quality is a cornerstone of competitive strategies for contractors seeking to secure and widen their client range. Moreover, globalisation has forced contractors to think constantly of new ways to gain a competitive edge and, thus, contractors are forced to think further than physical product innovations which can be easily replicated by competitors. Hence, quality may be the only strategic differentiation factor which cannot be easily copied or duplicated to ensure the competitive edge. To do that, organisations should have strategic quality planning, design quality management, and process management.

Before understanding strategic quality management and process planning, organisations should understand and communicate their quality statement with management and employees to ensure all subordinates understand the quality statements. Quality statements are part of the strategic planning process and, once developed, are occasionally reviewed and updated. Quality statements include vision statement, mission statement and quality policy. The vision statement identifies organisations future plans, while the mission statement concerns what an organisation is all about, such as, identifying the organisational process, customers, suppliers and operation processes. The strategic quality planning based around the belief that customer satisfaction and quality are the base of an organisation's future, in terms of identifying customer needs, fulfilling their expectation, improving market share to reach more customers, through clear process design (schedule and cost estimate, design evaluation and constructability in design). In spite of that, there is still some risk involved in relation to predicting the future conditions that will affect organisation products and services such as demographics and economic forecasts. The previous recession (2008) showed that organisations failed to predict the financial crisis, especially the construction sector which has been hit hard during the last three years (2008-2011).

The construction project process is a way of getting things done and consists of the tasks, procedures and policies necessary to reach internal and external needs. Adrian (1995) states that, according to the total quality management philosophy, if the process is correct, so will the final project be. Thus, organisations should work to improve the process to ensure improvement of the final project. Sarshar *et al.* (2004) mention that organisations have to manage and plan their production and supply chain process, as they lead to improved customer focus and quality performance. The process has to be strategically planned and managed to ensure long term sustainability and competitiveness.

Juran and Gryna (1993) state strategic quality management is the process of creating long-range quality goals and defining the approach to meeting those goals. Moreover, Pheng and Hong (2005) identify seven key principles of TQM as follows: total commitment; customer driven services; eliminate rework; teamwork; training; empowering and respecting people; and ongoing process. They argue that top

management must emphasise the commitment from all staff members, and management also has to allocate all resources to TQM to reflect the TQM commitment in the organisation's mission statement. Moreover, management must emphasise 'doing things right first time' to satisfy customers and eliminate rework to reduce cost, by empowering and respecting employees and providing them with the required training and education to ensure high quality work flows.

Quality gurus and writers such as Deming (1986), Oakland (1993) and others (Chapter Three) emphasise the importance of the strategic planning process based on total quality. Crosby (1979) views quality policy and planning as standards for practice that set priorities of what to do and what to avoid; he declares that without a formal policy, individuals will develop their own view of quality and differing standards of practice. Olian (1991) points out that strategic quality management is a critical factor for success in quality management implementation, as the best organisations use the process of quality development to ensure employee understanding of the organisation objectives. Strategic quality planning requires the integration of customer satisfaction and quality issues into strategic and operational plans, Rao *et al.* (1999).

The construction industry has numerous problems in achieving high quality performance as a result of the complicated nature of the industry, but it still requires strategic quality planning and top management support through commitment. Quality planning has to start from the top management towards every person within the organisation, involving subcontractors and suppliers and creating better ways to integrate with them to establish partnering relationships to provide higher quality services to clients. Moreover, the construction industry has to provide their employees with regular training and education, in addition to changing the organisational culture towards total quality management practices, Calingo (1996). Moreover, top management has to regularly conduct market research on quality to gain information on clients and competitors, followed by feedback to evaluate organisation processes and make the required corrections; and, thus, an organisation has to plan a quality policy to ensure performance improvement and meeting client requirements, McGrath (1994).

#### **4.2.4 Employee Empowerment:**

The construction business environment has changed over the last 50 years. These changes emanate from two principal sources, sector-specific changes and global/macroeconomic changes which, in some cases, caused the fortunes of the construction industry to decline. However, some construction organisations have excelled throughout this period as a result of appropriate reactions to their changing environment by their adoption of continuous improvement, new strategic quality management and optimal design of both people and their processes, which both requires simultaneous and adequate improvement, Holt *et al.* (2000). Process improvement is governed in the main by people who react to individual team process improvement which autonomously leads to employee empowerment in terms of: giving employees more authority, greater control, and freedom to encourage self efficacy. However, empowerment can be defined differently according to different perceptions; for management, it is giving up some control and the sharing additional knowledge, while for employees, empowerment is considered as acceptance of more risk and responsibility.

Employee empowerment is a necessary condition for the successful implementation of TQM within an organisation, and it is a critical element because it galvanises employees to provide better job quality and participate more in the new business process. Moreover, it has been shown that employee empowerment results in increased productivity, customer satisfaction and increased employee satisfaction, according to Handfield *et al.* (1998). Some writers, such as Blanchard, Carlos and Randolph (1996), indicate that empowerment is to give authority, power and innovation; others define it as sharing information and having power to take decisions which gives employees full control over their jobs, Freedman (1998).

Employee empowerment, according to Fox (1998), takes many different forms and can be a confusing notion because each organisation has its own methods and boundaries of empowerment. Tulloch (1993) argues that giving employees more control over their job markedly contrasts with traditional management techniques that strongly emphasise control, hierarchy and rigidity. Mondros and Wilson (1994) emphasise the fact that employee empowerment requires management to move to a modern management style to implement empowerment. They define empowerment as

providing employees with a greater degree of freedom to make decisions and have more flexibility related to their work.

Legge (1995) argues that empowerment should be seen by management as a redistributive model, whereby authority, power and control equalisation are promoted for trust and collaboration, while Pastor (1996, p.5) defines empowerment in terms of its dynamic interaction as:

*part of a process or an evolution – an evolution that goes on whenever you have two or more people in a relationship, personally or professionally.*

Pastor (1996, p.5)

Although there are many different perspectives of empowerment, it can be identified in terms of two key aspects: first, the psychological dimension and, second, the multi-dimensional perspective.

**4.2.4.1 The psychological dimension** focuses on how the individual perceives empowerment. This perception of empowerment contrasts with the traditional study of management practices and instead emphasises self-efficacy, competence, control, perception and beliefs of power. The idea first began with Conger and Kanungo (1988) whose ideas were used as a starting point in the literature on psychological empowerment when they claimed that employee empowerment consists of a motivational concept of self-efficacy. In 1990, the notion was refined by Thomas and Velthouse (1990) when they claimed in their model of empowerment that there are four cognitions for employee empowerment: meaningfulness; competence; self-determination; and sense of impact.

- Meaningfulness: the meaning of a value of a task goal judged in relation to individual standards or own ideas.
- Competence: it reflects the extent of individual belief in the capability to perform task activities skilfully.
- Self-determination: autonomy in the initiation and continuation of work processes.
- Sense of impact: to which degree an individual can influence certain outcomes at work.

However, as a result of increasing competitiveness in the construction industry, client demands have also increased for more improvement in process integration, people management practices and outturn performance. To respond to these pressures, many large construction organisations have de-layered their structure by removing their middle management positions and shortening reporting lines. Through this transition, the project management function has grown in stature and importance within construction firms. Therefore, project managers have greater responsibility for managing the multiplicity of new relationships which have occurred through organisational and industry changes. Strategic alliances, joint ventures and increased outsourcing have all acted to reconstitute human resource management patterns, roles and responsibilities. Therefore, construction project managers offer functional flexibility by accepting new and parallel responsibilities, in addition to those that they have been used to. These changes have arguably led to project managers becoming the key human resource for the modern contracting organisation. However, as a result of these new responsibilities, their expectation level has increased to expect more from their employers in return, beyond remunerative reward, to encompass less formal requirements such as opportunities for career development, job security and better work/life balance. Therefore, it might affect employees and employer relations and might lead to high level of turnover among project managers.

According to Makin *et al.* (1996), Argyris was the first author to discuss the details of the term psychological contract in 1960, and it became widely adopted during the 1980s because of the economic downturn. It has been defined as:

*An unwritten set of expectations operating at all times between every member of an organisation and the various managers and others in that organisation.*

Schein (1980, p.4)

These oral communication contracts can be distinguished from formal contracts by being more flexible by looking for the reality of the situation because employee behaviour is different from day to day. This contract clearly identifies the relation between employee and employer and it informs both sides what are they required to do to meet their side of the agreement, and what they can expect from their organisation. Guest and Conway (2002) put these commitments in the following table:

<b>Employers promise to provide</b>	<b>Employees promise to</b>
Pay commensurate with performance	Work hard
Opportunities for training and development	Uphold company reputation
Opportunities for promotion	Maintain high levels of attendance and punctuality
Recognition for innovation or new idea	Show loyalty to the organisation
Feedback on performance	Work extra hours when required
Interesting tasks	Develop new skills and update old ones
An attractive benefits pack	Be flexible, for example, by taking on a colleague's work
Respectful treatment	Be courteous to clients and colleagues
Reasonable job security	Be honest
A pleasant and safe working environment	Come up with new ideas

Table: 4.1 A Model of the Psychological Contract.  
Guset & Conway (2002)

Thus, the psychological contract between the individual and the organisation is a vague concept because it relies on expectations and unwritten obligations, but at the same time it deserves attention as a result of affecting organisational effectiveness.

There has been a change in the psychological contract concepts as a result of organisations restructuring. The changing from the old concepts of job security generates employees hard work and loyalty to the new concepts; thus, employees acquire new skills by having organisation supports in various aspects, "*Employability rather than stability*" Houlder (1995), but many organisation still failing to meet their promises on the both sides.

The fast increase in globalisation and internationalisation is reflected in increasing the international competition and business expanding beyond the national borders which led to an increase in overseas assignments by expatriates. These assignments have faced many problems such as adaptations or performance problems which cause inability to adjust between both parties: employer and employee. Consequently, the psychological contract is different between expatriates and people operating in their country in terms of tangible and intangible aspects because the expatriate will leave behind everything and move to live in any other culture and life style while looking for housing, welfare, safety, and social life, Rousseau (1994). In addition, virtually all

the daily life aspects are controlled by the employer authority; thus the expatriate contract is wide and contains many disadvantages, such as the employer influences the expatriate life which will lead to a lack of recognition of contract violations, in some cases as a result of employer control, Guzzo and Noonan (1994). Additionally, if there is any intensive response from some employees, this will cause them to lose their job, or it will affect the employee performance such as apathy and work slowdown. Usually the response is dependent on the situation but it is totally different from one employee to another.

Employers have to see things from employees perspective and try to understand their needs and wants, try to support them to help them to discover themselves, teaching them how to do jobs but at the same time giving them more privacy to express these knowledge and experience by keeping a sufficient distance and enough time, building by that strong bonds with employees so they feel that they are sharing their values with an organisation. Moreover, by establishing a firm psychological contract, employers could gain many benefits such as employee retention decreasing by that labour turnover costs, motivation, intrinsic employee satisfaction, and high commitment.

Many arguments happened in the last century relative to the psychological contract between many authors such as Guest, Rousseau, Robison and Morrison but all of them have been dealing with the same idea and discussing the same concept but in various paths. However, the psychological contract is considered a necessary point in employer and employee relations because it controls the entire relation in terms of psychological motivation and psychological involvement and empowerment which, ultimately, are the main aspects in their relationship which require a clear understanding and awareness by employers to achieve organisational objectives. The favourable results of the psychological contract has a strong effect on increasing employee performance and commitments because it deals with perceived needs which must be met to ensure the best performance. Thus, the outcomes of this relationship must meet employee expectations and human resource management must create trust, respect and commitment in the environment with employees to keep the effectiveness and efficiency at a high level, increasing by that employee loyalty and job quality. On the other hand, any contractual violation will affect both of them mutually; for

instance, employee dissatisfaction will respond in several ways, legal action, hostility towards the entire organisation, vandalism, increasing absenteeism, which will damage the company reputation and cost the organisation serious financial damage.

**4.2.4.2 The multi dimensional perspective:** it has been suggested by Johnson (1994) that successful empowerment requires an examination of manager roles of giving employees the power to do their job as it has considerable impact upon the psychological sense of empowerment held by employee. Honold (1997) argues that the leader is responsible for creating a common goal, and responsible for communicating and sharing those within an organisation and continually monitoring that their subordinates are empowered.

Psoinos and Smithson (2002) mention that the leader plays a pivotal role in employee contribution recognition, team development, team and individual empowerment and training. Moreover, employees have to believe themselves to be capable, by giving them the right training and focusing on communication development to engage them in the new participative and facilitative leadership style. The empowerment benefits can be broadly divided into two areas: benefits for the individual; and benefits for the organisation. Cunningham *et al.* (1996) state that much of the research into empowerment has focused on organisational benefits more than an individual's benefits assuming these are the driving force behind attempts to engender empowered working.

However, Applebaum *et al.* (1999) argue that empowered organisations have demonstrated improvements in various economic performance areas, especially after the changes in business environment and increasing the global competition, which instigated organisations to improve efficiency and performance; thus they focus on employee empowerment and the driving force to improve organisation performance and competitiveness. Mullins and Peacock (1991) state that empowered employees have a greater sense of motivation, organisational loyalty and job satisfaction. Nykodym *et al.* (1994) highlight the potential benefits to the individual employee when those employees who consider themselves empowered have reduced ambiguity and conflict in their role because to a certain extent they are able to control their own working environment, which positively reduces emotional strains on the employee.

Organisational benefits, meanwhile, are mainly focused around economic benefits, cost control, flexibility and quality improvement, Greasley *et al.* (2005).

Empowerment is an important element in TQM since it is supposed to improve employee inputs and overall quality. Moreover, empowerment is also seen as a component of transformational management, whereby managers seek to instil a vision in others. In addition, it is seen as a way of improving employee commitment to the organisational objectives and vision, since workforces are more likely to adopt their managers' vision if they are able to participate in its implementation and development. However, in practice, the application of empowerment in a way to align with construction industry culture and operational environment is considered a challenge for organisations, as declared by Cunningham and Hyman (1999).

Bartram and Casimir (2007) divide the challenges of empowerment implementation into the construction sector into internal and external challenges. The internal challenges are: lack of management commitment, a resistance to behavioural change, underestimation of the extent of change required, too much bureaucracy and ineffective communication, and failure to adopt continuous learning. Furthermore, the external challenges include problems of attracting and retaining the workforce within the competitive labour market.

The construction industry working environment provides some other challenges that stem from the nature of the product and the product delivery approaches, whereas the vast majority of large construction companies comprise a large number of small groups of specialist staff in one project. These groups combine the expertise of various managers, designers, technical experts and cost control specialists; all of them have to work together in a cross-functional teams for specific project and then upon completion of the assigned project tasks, they are usually disbanded and redeployed elsewhere within the organisation, creating a matrix of organisational structure for construction organisations, Aryee and Chen (2006). Moreover, the construction sector has heavy demands on subcontracting and self-employment which requires expanding the empowerment concept beyond organisational boundaries to be applied throughout the project supply chain.

However, despite these challenges to the efficacy of the empowerment process implementation to the construction industry, empowerment has the potential to play an important role in helping the construction industry to address increasing performance demands whilst mitigating the negative effects of the fragmented project delivery structure. In this regard, Nesan (1997) and Nesan and Holt (1999) have developed a model for optimal implementation of empowerment in construction organisation based on three key stages as following;

1. ***The Preparation Phase:*** within this phase an organisation has to assess its capability to adopt empowerment and its resources in order to be developed and allocated such as, development of corporate vision; development of a suitable quality policy; development of an implementation plan; diagnose of employee attitudes; identification of organisational structure; and establishment of adequate resources. Moreover, dynamic leadership is required to develop an organisational vision; a vision that all workforces must strive for regarding process ownership and improved quality. Thus, when individual within an organisation take a responsibility toward process ownership consider the key success to successful empowerment. In this respect each employee is responsible for specific task and is considered as a "customer" in the construction production chain; and thus organisation need for achieving satisfaction customers will lead to produce quality of the final project, at the minimal supervision and minimal production cost.
2. ***The Implementation Phase:*** this phase is divided into two stages; training, and continuous follow-up training. In the first stage, the training is conducted to prepare teams and individuals in the concept of empowerment and provide them with the key principles of teamwork and problem solving techniques. For the second stage, employees are provided with follow-up training on their own business related skills; thus, they will acquire the required skills and knowledge to perform their process independently.
3. ***The Sustaining Phase:*** in this phase all employees and managers must work towards continual improvement of the new system. Also, employees are required to continuously train themselves; continuously solve problems associated with their process; management must regularly measure performance and then formally

reward the highest performance. Moreover, empowerment at this phase must be formally recognised and completely integrated into all of the business process.

#### **4.2.5 Employee Training and Education:**

Employee training and education plays a vital role in all organisation quality systems and have received management attention as a result of improving work flow and accelerating organisation performance, Farooqui *et al.* (2008). Employee training is defined according to Tsang and Antony *et al.* (2002) as the basic practices that organisations provides to improve specific skills in their employees to boost the organisational performance, quality, customer satisfaction and reduce time and costs. However, the assumption is that training is linked to economic performance and competitiveness at all levels; individuals, teams, managerial and organisational, have been central to the training policies in most businesses and even at government level, Millar (1999).

Feigenbaum (1961) points out that the importance of training is to keep the workforce up-to-date with working techniques to ensure that their skills are not obsolete, especially within the rapidly changing environment. Workforce education, according to Crosby (1979), is the core to awareness development and understanding the new quality philosophy. Employee involvement and empowerment are not affected unless employees have received formal, systematic training in quality management, Ahire *et al.* (1996). Training and development are key components of all TQM initiatives, McAdam *et al.* (2002). Ishikawa (1985) emphasises that quality begins and ends with training, while Rao *et al.* (1996) argue that TQM training should be directed at all levels of an organisation and must target everyone in the organisation, since quality under TQM considers everyone's responsibility within an organisation.

Employee training should focus on broadening employee knowledge and skills to present opportunities for individual growth and development and reflect on advantage outcomes to the organisation in terms of increasing workforce flexibility, more proficient team-work related skills, and reducing employee resistance to quality change once they have received clear information related to the change, Oakland (2003). Within quality management, organisation employees at all levels should be provided with the required and adequate education and training to ensure their full

awareness and understanding of the concept of quality management because, without educating employee attitude and behaviour, changes will not take place towards quality culture transformation, and without employee training, the organisation will suffer difficulties when solving production problems, Dale (2003).

Previous research has attempted to identify factors that affect construction productivity performance. For instance, Horner (1982), Lavender (1996), Egan Report Rethinking Construction (1998), Olomolaiye *et al.* (1998) and Naoum (2001) identified several factors affecting construction industry productivity. Among these factors, labour skills and training have been given attention by research as a result of its effect on the overall economy. Moreover, Clarke and Wall (1996) compared the process of house building between the UK, the Netherlands and Germany, where they found that the process in the UK depends on a lower level of skills than in Germany. Arditi and Mochtar (2000) argue that, as a result of inadequate levels of training within the construction industry, the projects are characterised by poor quality and high level of rework and skills shortages. Rojas and Armvareekul (2003), in their research, found that management skills and manpower issues are the two elements that have the greatest potential for affecting productivity performance.

Furthermore, HM Treasury (2006) published that improving productivity performance is a primary driver of the UK economy's long-term sustainable competitiveness and economic performance. Accordingly, the UK government has developed a strategy for improving productivity which focuses on five key drivers: encouraging investment, supporting science and innovation, raising UK skills, promoting enterprise and improving competition, Budget Report (2005). Notably, government reports give the impression that raising UK skills by providing adequate training holds the key to productivity improvement; for example, the strategic plan of the Sector Skills Development Agency (SSDA, 2005/2008) states that increasing participation levels in training by 5 percentage points could increase productivity by 4%, thereby, boosting GDP by £40 billion.

Due to the importance given to training and skills development in policy discourse as a means of improving productivity across all sectors of the UK economy, the UK government set-up a network of Sector Skills Councils (SSC's) in 2003 to promote its skills agenda, the SSC's are responsible for:

*addressing [the] skills gap and shortage; improving learning supply including apprenticeships; higher education and National Occupational Standards (NOS); taking appropriate strategic actions to increase productivity – through proactively engaging with employers.*

SSDA (2007)

The UK government published the Leitch Review of Skills in 2006 to assess the UK skills needs by 2020 to remain competitive in a rapidly changing global economy. However, Evans and Lindsay (2002) argue that, within quality management organisations, employee training and education has become one of the major responsibilities of the human resource management department, where employees have to receive adequate training and education related to teamwork, communication skills, problem solving techniques, process analysis programmes, benchmarking, customer care and quality cost. In addition, within the construction industry, health and safety training and education must be given to all employees, contractors and subcontractors. The UK government reports in 2007, 2008 show that 72 workers were killed at work on sites in the UK in 2007, while 2,800 people have died from injuries they received as a result of construction work in the past 25 years. These figures make the construction sector the most dangerous sector in the UK which shows the requirement for more training and education for workers, not only to possess the adequate knowledge and skills, but also to possess specific values and skills associated with health and safety issues with TQM.

The construction literature shows that there is a general consensus on the relation between training, educating, and skills development, and improving productivity performance and quality outcomes. However, in relation to this assumption, Abdel-Wahab *et al.* (2008) state that increasing employee qualification levels does not necessarily render itself to improve quality outcomes and quality performance in the construction industry. While the previous report, the Leitch review (2006) states that increasing the level of employee qualification attainments across all sectors of the UK economy would result in being able to compete globally and improve UK economy production performance.

A trend analysis was conducted by the UK government over the period 1996-2006 to study the change in industry productivity performance, skills base and employment levels and has shown no significant association between improving employee qualifications and improving productivity and quality outcomes. The report shows that in 1998, there was an increase in the number of trainees by over 20% over 1997 but, in the same year, there was a drop in productivity in the construction industry, while the case was different in 2003 where fewer training courses were conducted but productivity levels were higher than in other years. However, this case does not neglect the positive effect of training and skills improvement in the construction industry, whereas the same study shows that the top reason for companies engaging in training activity is to meet health and safety standards. Thus, it becomes apparent that not all training activities are geared towards productivity and quality outcome improvements. Furthermore, choosing the proper training course required might have an effect on performance productivity and quality outcomes, whereas in some cases taking insufficient or the wrong type of training might not bring about any improvement to organisational performance.

Keep *et al.* (2006) discuss the relation between organisational culture, vision, and working patterns with employee qualification improvements. The study reveals that for training to take place, an organisation has to change its working pattern and strategy; otherwise, change will not take place in terms of improved productivity performance and quality outcomes. Additionally, the construction industry employment and sub-sector structure affect the construction industry skills profile and training activities. As a study by Ive *et al.* (2004) reveals, the construction industry employment structure is skewed towards the self-employed which causes a decline in the number of trainees in the construction industry. In addition, the construction industry is comprised of various sub-sectors such as housing, commercial, industrial, infrastructure and repair and maintenance. Each sector is subject to a different growth rate, as a result of the economic changes in the UK regions. The economic changes might affect the construction industry workforce skill requirements which, in turn, affect the level of training and qualification attainment within the sector.

#### 4.2.6 Supply Chain Management (SCM):

Supply Chain Management is a concept that has originated and flourished in the manufacturing industry, originating from the supply system by which Toyota was seen to coordinate and manage its suppliers, Womack *et al.* (1990). Suppliers are defined by Evans (2005) as those organisations that provide firms with the required materials to satisfy the demand and requirement of their customers. The first signs of Supply Chain Management were apparent in the Just-In-Time delivery system as part of Toyota's production System, to regulate supplier interaction with the production line more effectively and to decrease inventory drastically, Shingo (1988). The supply chain has been defined as:

*the network of organisations that are involved through upstream and downstream linkages in the different processes and activities that produce value in the form of products and services in the hands of the ultimate customer.*

Christopher (1992)

Pryke (2009) states that supply chain is a network of relationships within which firms are positioned, where the supply chain is considered as the focus for creating more value for clients to improve profitability and improve the entire industry. Effective supply chains need to be supported by a network that extends beyond the immediate linkages of exchange to be able to create the value in each link. Supply chain networks have to be built by firms within a supply chain to complement inner and external abilities, New and Westbrook (2004), because supply chain management looks across the entire supply chain, rather than just at the next level, to increase the transparency of the supply chain's configuration, regardless of functional boundaries, Cooper and Ellram, (1993). However, Koskela (1992) mentions that there has been a shift from traditional ways of managing the supply chain towards supply chain management. The traditional way is essentially based on a conversion view of production where each stage of production is controlled independently, while the supply chain management is based on a flow view of production, where the flow view focuses on the control of the total flow of production.

Supplier development was pioneered in the automotive industry by Toyota and Honda and, since then, they have recognised that the supply chain is only as strong as its

weakest link and, therefore, invest more money and time into developing supplier skills, leading to joint team structure between both customers and supplier organisations, Liker and Wu (2000). To achieve this result, the buyer must become involved with the supplier in training and education to identify skills gaps, which requires a fundamental shift involving changing the customer supplier relation towards total quality management, but a lack of understanding the dynamic changing of the buyer/supplier relationship may cause dissatisfaction by both sides which in both cases will impact on cost, technology, flexibility and delivery, Quayle (2000). The main driver behind the adoption of the SCM philosophy within the construction industry was its success within other industry sectors such as retailers, where Sainsbury's, Tesco and Marks and Spencer in the UK developed the concept of long-term partnerships in their construction department, waste management contractors (WMC) and shop fitters. The UK grocery market, new array and concepts have been introduced to food retailers and their suppliers to maintain a high standard of quality and improve performance, such as: efficient consumer response, quick response, Kincade *et al.* (2001) and collaborative planning, forecasting and replenishment, Angeles (2000). These customer-focused strategies aim to improve performance and, at the same time, encourage strong relationships between the retailer and the supplier, Fernie (2004). However, due to increased competition within the UK market, retailers were forced to examine their strategies in terms of suppliers and differentiation to secure competitive advantages, Wagner *et al.* (2005).

Some UK retailers use the term supplier development (Sainsbury's), while others refer to the term local suppliers (Asda, Tesco). Either way it is perceptible that major grocery retailers have embarked on strategies that ease the way for food suppliers to trade with them. For instance, Sainsbury's has developed a supplier development programme to help small and medium companies on particular issues such as technical requirements and ordering and delivery to develop these businesses in terms of improving their performance and increasing their capabilities to cater for the larger retailer outlets, Western Mail (2004). On the other hand, Tesco and Asda have involved the provision of training and advice for small producers that helps them to develop their business, CPRE (2002). Marks and Spencer (M&S), one of the UK's leading retailers, announced its supply chain revamp plan in 2007 by spending £450m over three years to revamp its supply chain and supporting IT systems. The IT spend

plans to support the M&S move to open new stores in the UK and overseas, to make its supply chain more efficient and to manage its stock better. M&S shareholders noticed that their firm is more successful internationally compared to its UK retail business; thus, they decided to expand their services and integrate with more suppliers to provide more products and services such as selling financial services, life assurance, personal insurance, in addition to a few services M&S offers to their customers within the UK, M&S Group Plc (2009).

From the foregoing, it is apparent that the main UK retailers are now establishing a long term partnering relationship with suppliers and creating conditions of sustainable competitive advantages towards a greater degree of customer satisfaction which, at the same time, reinforces the competition between retailers in terms of providing customer requirements at a lower price and higher quality. However, new retailer strategies with suppliers can easily erode as competitors quickly follow or copy but, at the same time, close interaction between firms creates conditions where explicit knowledge and tacit learning is diffused between firms to form relationship specific competences and skills. However, there are still mutual benefits to be gained by retailers through supplier development such as gaining knowledge of the market and products which can be of competitive value to the retailer and, in turn, the suppliers gain opportunities for growth with access to larger markets.

Some industry sectors, such as retailer distributions and vehicle manufacturing, have made significant progress towards efficient supply chains management. However, despite the success of supply chain management integration within other sectors, the reality is different for the construction industry. The theoretical view of SCM may offer new approaches to reduce the cost project and increase reliability and speed of facility construction but reality proves difficult to achieve, Cox (1999). The construction industry in general, with but a few exceptions, remains characterised by adversarial practices and disjointed supply relationships and, commonly, construction clients appear to distrust their main contractors, Briscoe and Dainty (2005). Within the construction sector, the projects are treated as a series of sequential separate operations where the individual players have no commitment to the project and have very little stake in the long-term success of the resulting building, Reed (1999).

Borsh and Philips (2003) state that supply chains can vary significantly in their complexity and diversity and can exist in many different forms within each industry. Construction supply chains on large projects involve hundreds of suppliers and a wide range of construction services. In addition to the reliance on a largely subcontracted workforce, these difficulties increase the complexity of the supply chain network and delimit opportunities for process integration. Pocock *et al.* (1997) mention the partnering approach has been embraced by a significant number of large construction organisations and it is often identified as the preferred mechanism to deliver value for the client. Akintoye *et al.* (2000) found evidence of a growing trend towards partnering arrangements but these arrangements mainly focused on main contractors and clients rather than extending down the chain to suppliers and subcontractors. Thus, the partnering arrangement within the construction industry is criticised for being a rather loosely defined term that actually masks a multifaceted practice, Bresnen and Marshall (2000).

In 1999, Muya *et al.* carried out a survey related to partnering in the construction industry. The survey showed a significant level of co-ordinated working between main contractors and their suppliers but, on the other hand, the survey drew attention to the fact that, despite the partnering relationship, the industry still involved some poor supply chain management practices, where main contractors frequently changed suppliers, often failed to share strategic information, made late payments and provided some poor feedback to these suppliers. Another study was carried out by Thorpe *et al.* (2003) who observed similar problems within the construction supply chain management. Dubois and Gadde (2000) provide a possible explanation for the construction industry to embrace collaborative; they note that the construction industry emphasises on transactions rather than relationship exchange.

Within the UK, two government sponsored reports, the Latham report (1994) and Egan report (1998) aimed to draw attention to the main problems in the construction industry supply chain, in addition to assisting clients in obtaining high quality projects. Latham provides recommendations to all parties within the industry. The report argues that some of these recommendations are radical and that participants in the industry could react in three ways: essentially, they could ignore the recommendations (at their peril); pick-out the sections that suit them best; or enact the

whole package. Latham strongly supported the need for the enactment of all recommendations to resolve supply chain management problems within the construction industry towards partnering relationships. Latham presented many recommendations to clients, industry, contracts and legislations. The report suggests that government should become a 'best practice' client to ensure value for money in public spending, while in the private sector the report focused on solving the fragmentation issues. Moreover, regarding the construction industry, the report mentions that the construction industry argued for cutting its costs by 30% by the year 2000, to ensure long-term survival. The Egan report argues that the construction industry needs to integrate its processes and materials to ensure that clients receive higher quality.

Briscoe and Dainty (2005) state, supply chain management integration in the construction industry proves hard to realise in practice for several reasons. Usually, the large client is in a very powerful position relative to the suppliers or even contractors, who are typically much smaller organisations. They add that such clients, who in other areas of their business have sought to adopt partnering relationship, are often reluctant to do the same in their construction procurement. Additionally, from the client economic perspective, it is more advantageous to treat each construction project as a one-off venture and create more competition between tenders as a means of minimising costs. On the other hand, the same rationale is commonly used by contractors when dealing with subcontractors and suppliers.

However, in traditional procurement, the lowest price against fixed specification is the main link between companies involved in one project. The supplier role is to deliver the specified product or service as cheaply as possible. This relationship does not involve any motivation to work in the client's interest, whereas in some cases, contractors and designers have separate contracts with the client that do not even link to the supply chain. Modern procurement methods have moved to the appointment of integrated supply chains where all parties in the supply chain have a long-term objective to work as a team to deliver added value to the client. This long-term relationship involves some benefits for individual companies such as: reduced real costs, with margins maintenance; greater certainty of out-turn costs; incentive to reduce waste from the process; delivery of better underlying value to the client;

greater confidence in longer-term planning; and more repeat business with key clients. Additionally, benefits for clients include more responsive industry delivering facilities that better meet user needs and are delivered to time and cost with minimum defects, all of which creates higher customer satisfaction and improved reputation for the construction industry.

Supply chain management is an important part of TQM, because it helps organisations in several ways; reduced product cost, improved product quality, faster response, and higher market share could be achieved by efficient use of chain resources in a supply chain of the market. Making supply chain practice as a benchmark would provide organization with the opportunity of increased sales. Moreover, supply chain management would provide organization more accurate costing for their product and service produced. This could be achieved through calculation of real-time and the updated information in key accounts of buyers and suppliers (Rao, 2006). Moreover, supply chain management helps construction companies to increase coordination with customers because it help to reduce late design changes and order changes, which ultimately affects the delivery performance of the organization.

Fernie and Thorpe (2007) state, that establishing a long-term partnering relationship with suppliers is possible from the main contractor perception. Their study revealed that establishing such a relation with suppliers might be possible at a strategic level, while at the operational level, the case is different, as establishing a long-term relationship tends to be problematic, which might be caused as a result of reciprocated levels of commitment by strategic management. In addition, price is still the primary criterion by contractors, rather than identifying the added value that supplier company could offer. Thus, Love *et al.* (2004) state that the separation of the design and production process in a construction project affects the entire industry outcome; therefore, the construction industry has to bridge the gap, by involving all parties from the early start of the project design throughout project phases, as shown in the following figure. Moreover, value should be given more attention in a process rather than its cost.

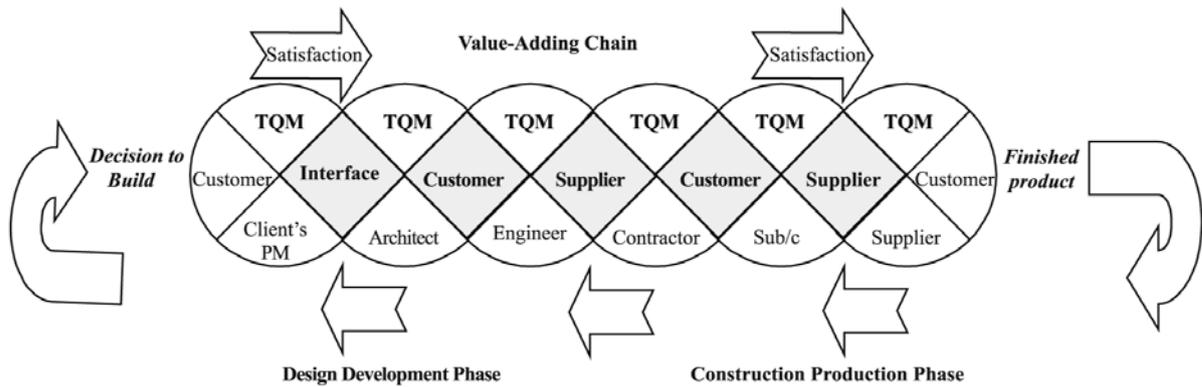


Figure: 4.2 Customer- supplier interface in the project supply chain  
Love et al. (2004)

#### 4.2.7 Customer Satisfaction:

Customer satisfaction has gained more attention recently in all areas of production, as a result of increasing competition within a dynamic business environment; thus, greater attention is continuously paid to customer satisfaction and relationships, Burns and Bush (2006). For companies, customer satisfaction is emphasised to gain competitive advantages, to differentiate themselves from competitors, but it is also an effective way to improve quality by using various approaches in developing and monitoring products and offering services to improve customer relationships, Chan and Chan (2004). However, the satisfaction phenomenon, according to Oliver (1997), is regarded as a function of comparison of pre-purchase expectations and post-purchase product or service performance. Thus, if the outcome of the product post-purchase or service delivery meets client expectations, satisfaction in general is achieved, but the levels of satisfaction are dependent on customer perception and the outcome of the comparison between expectations and performance, Soetanto and Proverbs (2004).

Different customers are likely to have different expectations which have to be considered by organisation to ensure fulfilling customer needs. Client experiences and background both play a fundamental role in providing the relevant standards of comparison. It involves what the client believes will happen with what is actually provided, Siu *et al.* (2001). Customer satisfaction is one of the key elements when implementing TQM within an organisation. By addressing and understanding client needs and expectations, anticipating their evolving interests, and establishing a

communication network with clients, organisations can overcome their competitors and improve their market-share and, thus, customer satisfaction is directly related to company success and quality improvement, Sureshchandar *et al.* (2001).

Gable (1996) states that there are two general conceptualisations of customer satisfaction: firstly, the transaction-specific which represents individual and specific experience satisfaction and, secondly, the cumulative satisfaction that is based on past experience, current experiences and all anticipated future expectations. Samwinda and Proverbs (2003) mention that a majority of customer satisfaction measurement approaches consist of subjective perceptions based on objective issues and, thus, in this concern, Evans (2005) argues that organisations can easily measure customer satisfaction by listening to their feedback and complaints, setting focus groups and distributing service evaluation cards, which all helps by collecting more information of customers and their needs. Xiao and Proverbs (2003) discuss that measuring customer satisfaction can benefit companies in several ways such as: improvement of communication between parties; recognition of the necessity of process improvement; better understanding of problems; evaluation of progress towards the goal; and monitoring and reporting accomplished results and changes.

Client satisfaction is one of the key elements in TQM, an approach that emphasises overall satisfaction through the continuous improvement of products. Furthermore, Anderson and Sullivan (1993) add that customer satisfaction is a key issue for the successful implementation of a quality improvement programme for companies, and it can be seen as an organisation goal or measurement tool in the development of construction quality. They add that customer satisfaction is directly related to improving customer retention and, therefore, competitiveness and profitability. To secure customer loyalty and generate long-term relationships and financial performance, however, organisations have to seek complete and high customer satisfaction, as it is also leads to strengthening company relationships with customers, Jones and Sasser (1995).

The manufacturing industry saw an increase in the collaboration between companies in the early 1990s; this arose from higher research and development costs, commercial pressures relating to increase competition, the increasing internationalisation of industries and increasing pace of product innovation and, thus, manufacturing firms

have to find new ways to improve performance and profits, not only to stay in business, but also to remain competitive, Leverick and Littler (1993). Hence, businesses as diverse as airlines, computers and insurance recognise the need for collaboration in relationships to improve profits and remain competitive.

Construction companies are adopting TQM to improve their performance but they still lag behind other industries with the implementation of TQM, and one of the main reasons behind that is their inability to determine customer requirements accurately and transform this knowledge into a complete facility, Anslinger and Jenk (2004). Within the construction industry, client satisfaction has remained a challenging issue for some considerable time, according to Banwell (1964), Latham (1994) and Egan (2002), as the context of customer satisfaction is only known late in the project when most of the customer's money has already been spent. The complexity of the construction process and the uniqueness of each project make it difficult to exploit customer feedback and past experiences in future projects; moreover, the relationship between contractor and client in the construction constitutes a multilevel complex in which parties operate simultaneously and collaborate with in-groups of networks. Thus, client satisfaction should be understood as a cumulative relationship rather than transaction-specific, Johnston (2004).

Client dissatisfaction, however, is widely experienced in the construction sector and this is attributed to incompetent service providers, including contractors and consultants, overrunning project costs, inferior quality and delayed completion. Thus, two government reports in the UK, Latham (1994) and Egan (1998), address the need for change to improve the industry. They highlight the inefficiency of the industry and suggest that it needs to reflect the best practices of the manufacturing industry to meet customer needs by providing satisfactory products. In addition, they suggest that the construction industry could achieve improvement through greater networks, not only at site and organisational level, but also with clients and suppliers. Thus, they advocate the use of collaborative relationships for construction development, Akintoye and Main (2007).

Winch *et al.* (1998) argue that construction could be classified as a service industry, whereby clients' purchase the capacity to produce and usually participate in the construction process to a considerable extent. Moreover, Karna (2004) discusses the

relationship between customer satisfaction and quality by dividing the quality dimensions into technical and functional dimensions. The technical dimension refers to the technical quality that the client is left with when the service production process and any interactions between contractor and client are over. The functional quality is how a client receives the service and how the simultaneous production and consumption process is experienced. Moreover, Arditi and Gunaydin (1997) mention the distinction between process quality and product quality. They refer to product quality as achieving quality in the equipment, materials and technology that go into the building of a structure, whereas process quality refers to achieving quality in the all phases of the design process: construction, operation and maintenance.

Karna (2004) states that at the project level, clients refer to three comparisons to assess contractor performance; all impact customer satisfaction, as shown in the following figure:

- Comparison – between the quality of the building, customer expectations and the adjusted goals for the building.
- Comparison – between the quality of the construction process and the experiences which have emerged during the process.
- Comparison – between customer expectations and experiences.

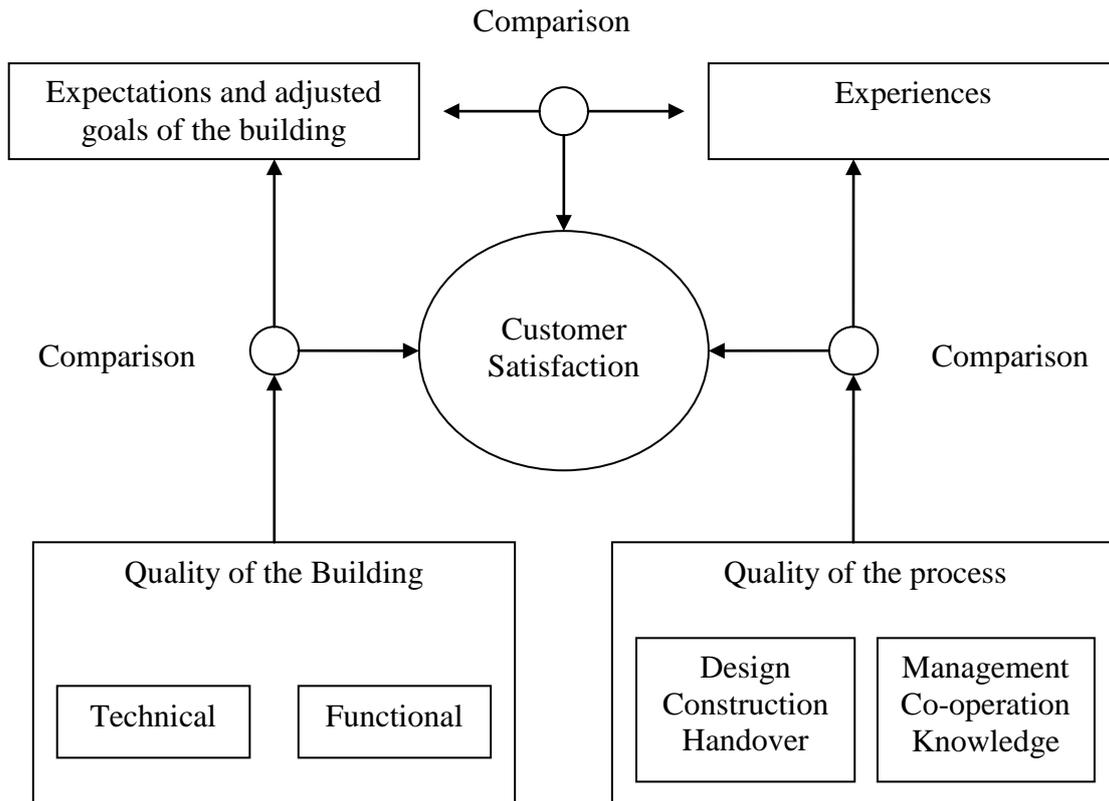


Figure 4.3: *Interrelationships between customer satisfaction and quality at project level*

Karna (2004), *Analysing customer satisfaction and quality in construction*

Chan and Chan (2004) argue that there has been a shift in the construction industry from traditional triple constraints (time, cost, and quality) towards emphasising customer satisfaction. Their study proposed key performance indicators (KPI) to measure construction project success. The measurement combines traditional (time, cost and quality) and subjective measures based on all participant satisfactions (client, end user, design team, supplier team and construction team satisfactions). Moreover, Karna *et al.* (2009) suggest that client participation at an early stage of the project and throughout the production process, at least to some extent, by establishing a communication channel between the supply chains would reflect client satisfaction, as a result of being up-to-date with any suggestion or problems that might be faced in the production phase.

#### 4.2.8 Management information system (MIS):

The marketplace has become more global and service-oriented, in addition to the changes in clients requirement, by being more demanding and sophisticated. Hence, firms have found it difficult to compete and survive in the current business environment without finding new ways to improve quality, productivity and performance to enhance their competitive edge, Mawdesley and AL-Jibouri (2010). The construction business environment is described as being turbulent. Construction projects are highly complex, involving many distinct professions which makes inter and intra-discipline communication and information flows between these distinctive professionals often problematic, as shown in the following figure. The lack of integration and co-ordination between different bodies and organisations involved in the construction project such as main contractor, sub-contractors, designers, consultants, clients and inspectors can be perceived as a major contributory factor to poor project performance, Faniran *et al.* (2001).

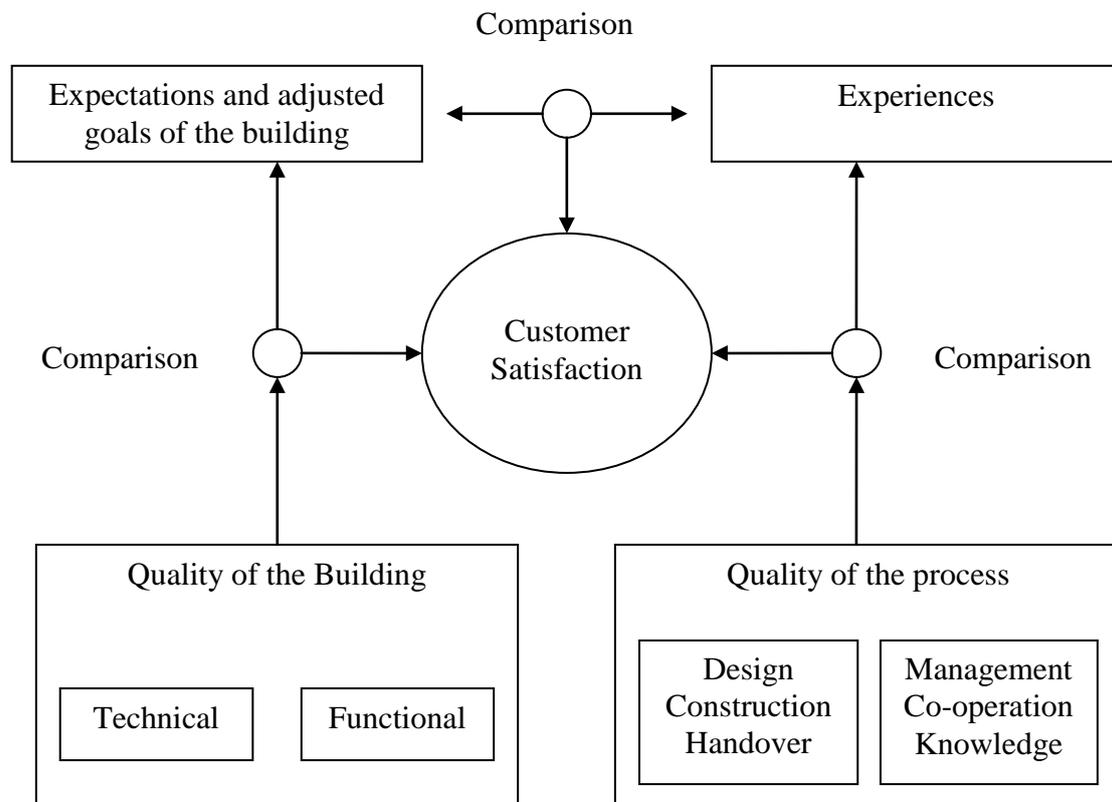


Figure: 4.4 Traditional bi-directional communication and information flows  
Wasek *et al.* (2000)

Ross (1999) discusses the relation between quality achievement and project success in relation to increasing investment in information systems within the construction industry. Ross states that there is a strong correlation between project success and having an effective information system and open communication channels. Information is considered a crucial enabler of TQM, where information technology and information system serve as core to project success and improving performance, Bharati (2003).

Over the life of a project, organisations and individuals usually accumulate huge amounts of information related to: workforce; clients; individual task of the production phase, suppliers; and all parties involved in the project. The increased vulnerability of project personnel and the fluctuating nature of the construction contracts often mean, however, that project information is not stored nor transferred in the way it was intended to be. The control of construction project information depends on who has created the information, which can range from architect to the main contractor or even the client and, thus, procurement route affects the controller of the project information. Within the traditional procurement route (design-bid-build), it is usually the main contractor's responsibility for most communication and information flow, as a result of having responsibility for the production, but the client can also still influence directly by being the party with the principal contractual links to the other parties within the contract. Therefore, the client is in a strong position to influence other parties concerning the adoption of an Information Management System (IMS). This forces integration, increases communication, and aids the transfer of project information which will help to solve incompatible communication problems and also establish integration where information is freely exchanged among all project parties in a disciplined manner. Moreover, Peansupap and Walker (2005) argue that responsibility for the control of information within the construction project may shift during the various phases regarding the rigidity and flexibility of the contract, management structure and procurement route. They add that flexibility within the management structure is essential for project success. In effect, the rigidity of the contract and management structure usually hinders the communication behaviour of the project parties.

Having an integrated information management system within an organisation is considered a fundamental tool for strategic planning for a construction project, where the gathered information can be analysed for the evaluation of various policies and strategies, analysis of quality costs, supplier and performance evaluation, quality audit, and department/function performance. However, inferior dissemination of the generated information affects quality techniques such as benchmarking and statistical process control (SPC) which will render it ineffective. The movement of project information is crucial to the running of any construction project. The different professions use their own unique process to run a project but to undertake project tasks and processes efficiently they become reliant on information supplied by the others involved in the construction project, Bowden (2005). During the construction project the provided information is rarely available in a format that is suitable for all users and, thus, professions have to recognise the need to re-construct the provided information to process the next phase of the construction project, Marsh and Flanagan (2000).

Craig and Sommerville (2006) argue that the underlying perception of the UK construction industry is that of an industry which is highly non-collaborative, fragmented and distinctly unique. Thus, to improve performance and outcomes for the construction industry, there is a need for change of the prevailing culture towards a culture which supports continuous improvement by adopting collaborative working practices between contractors and clients, which should facilitate information and knowledge sharing between projects and teams and across organisational boundaries. Pressures from clients for contractors to improve productivity and value for money has forced contractors to adopt and utilise information management systems (IMS) within the construction industry, but it has not been as rapid as other industries because construction management still relies on traditional methods (pen and paper) to deal with many information management tasks, despite the fact that many projects and tasks are geographically distributed. This will result in losses, conflicts and errors. In addition, a lack of IMS can often lead to loss of information because it is not stored in electronic format which means that others may be deprived of the opportunity of using this information.

In 1995, the UK Department of the Environment (DoE) developed an IT strategy for application in the construction industry consisting of three main elements: developing an industry wide knowledge, which promotes team synergy and the sharing of information; encouraging improved sharing of information through the use of integrated project databases; and using IT to improve project process. Given this drive from the DoE, construction organisations began to recognise the necessity to change the traditional methods of information collection, transferring and storing, to improve the overall construction industry performance and productivity, Craig and Sommerville (2006).

However, many construction organisations believe that they can exist and compete without using (MIS) technology and, thus, they still have not taken the initial steps towards the adoption and implementation of (MIS). In practice, within a construction project, the project success is highly dependent on the efficiency and effectiveness of the actual (MIS) and management ability to manage information flows and communication between all parties within the construction project, Peansupap and Walker (2006). A key benefit to be derived from integrated MIS is that it allows all project parties to gain instantaneous access to project information dependent on their role within the project. Moreover, other benefits can be attributed to an organisational, human and project perspective such as: reducing the need for bureaucracy and hierarchy; encouraging flexible communication and eliminating redundant activities; using a facilitator to build teams and overcome barriers; saving participant time and increasing their productivity as a result of minimising errors; improving project process and management; and increasing the quality and speed of work allowing faster simpler access to common data.

### **Capability Maturity Model**

The Capability Maturity Model (CMM) (Humphrey 1992) is a model developed by the Software Engineering Institute (SEI) at Carnegie Mellon University. CMM is a software process maturity model. This model attempts to quantify a software organisation's capability to consistently and predictably produce high-quality software products. CMM is viewed as "the most pervasive effort to improve the software processes, in more than 30 years ..." (Saiedian and Kuraza, 1995).

CMM is an evolutionary step-by-step framework. The CMM assessment questionnaire allows businesses to assess where they are positioned within the framework. Then the framework provides guidelines on what are their process improvement priorities. In general, an organisation's actual goal is product improvement. The assumption is that an improved process will improve the product in some perceivable way; costs may decrease or quality may rise. This assumed connection is essential to successful process improvement.

The CMM is a five level model (Paulk 1993, 1995). The model is designed so that capabilities at lower stages provide progressively stronger foundations for higher stages. Each development stage, or "maturity level", distinguishes an organisation's process capability. The CMM has two major uses: assessments and evaluations (Humphrey 1992). With assessments organisations use the maturity model to study their own operations and identify the highest priority areas for improvement. Results form the basis for an organisation's self-improvement action plan. Clients use evaluations to identify qualified bidders and monitor existing contracts. Results help develop a risk profile that augments the traditional criteria used to select the most responsive and capable vendors.

### **CMM levels**

The five CMM levels have been abbreviated as initial, repeatable, defined, managed, and optimised. These levels are (Saiedian and Kuzara, 1995):

- Reasonably represent historical phases of evolutionary improvement,
- Provide achievable improvement steps in reasonable sequence,
- Suggest interim improvement goals and progress measures, and
- Provide immediate improvement priorities once an organisation's status in this framework is known.

Generally, the levels are characterised and distinguished as:

1. Initial- While there are many degrees of management control, the first step is to roughly predict schedules and costs. This level has been described as "ad-hoc" or "chaotic". At this level the businesses produce products, however, the processes are not under systematic management control.

2. Repeatable- The organisation has achieved a stable process with a repeatable management control level, by initiating rigorous project management of commitments, costs, schedules and changes.
  3. Defined- The organisation has defined the process as a basis for consistent implementation and better understanding. At this point, the risk of introducing advance technology is greatly reduced.
  4. Managed- The organisation has initiated comprehensive process measurement and analysis. This is when the most significant quality improvements begin.
  5. Optimising- The organisation now has a foundation for continuously improving and optimising the process
- Organisation culture and communications issues in construction are similar to those encountered in software development organisations.
  - Quality management, change management and other project control mechanisms would have similar benefits in the construction industry, to those anticipated in the software industry.

Some of the main differences between the software industry and construction are:

- In construction, professional qualifications, customs and working practices are better established, and also standards and data are more readily available.
- The cost of the process was seen to be too high for construction companies in general and construction SMEs in particular.

#### **4.2.9 Continuous Improvement (CI):**

The total quality management primary purpose is to provide excellence in customer satisfaction through continuous improvement of process, products and services by the total involvement and dedication of all employees at all level within an organisation. TQM principles consist of creating the foundation for developing an organisation's system for improving quality through planning and controlling project production phases, Gieskes and Broeke (2000). TQM is a structured approach to improvement within an organisation; it is based upon a strong commitment to two guiding principles, continuous improvement and customer satisfaction and, thus, if TQM is

correctly applied, it will assist a construction company in improving overall performance, Santos *et al.* (2000).

Continuous improvement is considered a fundamental element for organisation success, as it consists of eliminating defects, reducing waste, managing production time and improving productivity and performance, Mjema *et al.* (2005). Continuous improvement is defined, according to Walsh *et al.* (2002), as an operational philosophy based on the idea that performance improvement is all workforce responsibility in the organisation. They add that there are seven principles of CI: leadership commitment; customer focus; management by data; having a prevention approach; employee recognition; commitment to ongoing improvement; and cross-functional problem solving. Government and industry in the UK is heavily involved in attempts to promote continuous improvement into the process of construction companies. After all, the construction sector is often perceived as being dangerous and dull, with adversarial relationships at all levels. Furthermore, construction projects are widely seen as unpredictable in terms of profitability, delivery time, budget and the standards of quality expected.

Therefore, compared to other sectors, investment in construction is often seen as expensive and, thus, the image of this sector has resulted in a negative impact by a growing dissatisfaction among public and private sector clients, Butcher and Sheehan (2010). In this context, continuous improvement is required in the construction industry to move to a higher level of maturity in relation to other industrial sectors. To ensure successful application of continuous improvement to the construction industry, a deep understanding of the process of focused improvement overtime is required because the industry is characterised as being a non-repetitive environment. Continuous improvement in the industry is still applicable through a set of pre-defined standards to be used as a measure against construction project performance output, to provide a fair means of comparing the performance of individual contractors. To ensure fair assessment, different projects at different locations should be evenly sampled to give an even measure of the overall standard. The measurement should concern the project structural work (reinforcement and concrete quality), architectural work (floors, walls and windows), external work (emergency access, roads, pedestrian areas, footpath areas and drainage) and general obligations (safety and general

obligations). To ensure successful improvement in construction projects in the UK, “The Construction Manager of the Year Award” was introduced in 1979 to award the best project manager of the year. Such awards improve competition among project managers, as well as improving continuous improvement.

In 1998, the UK government published the Egan report to improve construction industry practices and performance. The report emphasises that continuous improvement is achievable if the construction companies focus their efforts on delivering the required value by clients, in addition, to challenging the poor quality and waste that arises from organisation structure and working practices. This can be achieved by setting measurable objectives, and then giving these objectives focus by adopting quantified targets and performance indicators.

*Continuous improvement consists of implementing practices that result on ongoing incremental actions aimed at improving production efficiency and efficacy.*

Santos *et al.* (2000)

Furthermore, Santos *et al.* add that nothing is static and it is always subject to review and then it can be improved; even if an activity is being carried out well, management and employees should always think of better ways of improving these activities. This principle is commonly associated with the “Deming wheel”, “Plan-Do-Check-Act” (PDCA), as shown in the following figure:

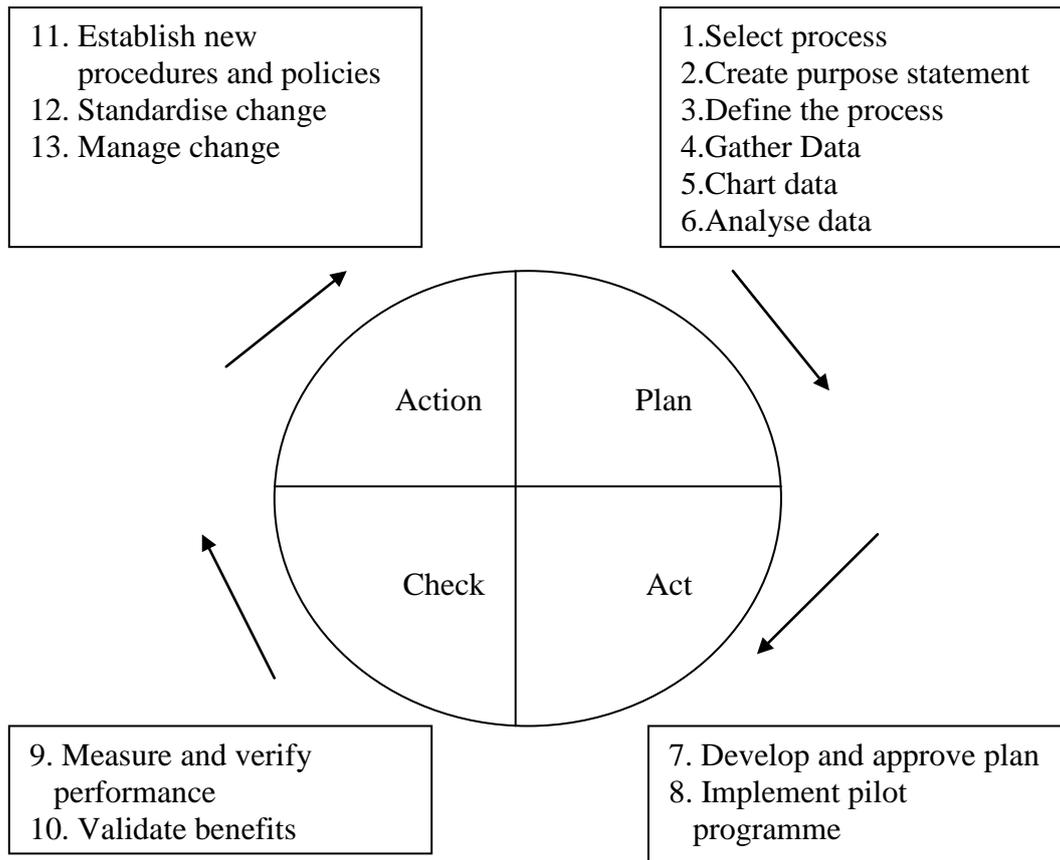


Figure: 4.5 The PDCA Diagram  
Deming (1986)

Under total quality management, management within the construction industry has two functions: to improve current procedures and methods through process control and to direct efforts to achieve major technological advances in construction processes through innovation, Sjiholt (1998). However, since each construction project is different and has its own characteristics, it is hard to generalise specific steps for continuous improvement within the construction industry. In general, CI is driven by knowledge and problem-solving activities. Thus, it depends on people's ownership of the problem in relation to maintaining the flux of the improvement. Also, giving the workforce more control over their job is strongly associated with continuous improvement in the construction industry, Nilsson-Witell *et al.* (2005). The workforce as a main controller of a continuous improvement process requires attention and full support and commitment from top management towards achieving continuous improvement in the production process. The relation between management commitment and continuous improvement is found to be positive and strongly related

and, thus, management is required to continuously communicate with employees to improve process and achieve continuous improvement.

Continuous improvement is capable of reducing costs within a construction project, even if it attacks the source of waste, such as rework and sources. Continuous improvement is associated with reducing production costs by recovering the wasted capacity used to produce rejected products. The waste during a production process is defined within the TQM phenomena as “cost of quality” and is divided into two groups of component: failure cost and control cost. The failure cost is associated with internal and external costs. Whereas the internal costs consist of the waste during the production process, the external costs are associated with after production or delivery of final project, as discussed in Chapter Three. Moreover, the second group of quality cost is the control cost which is associated with activities that remove defects from the production stream (appraisal and prevention). However, while reducing waste in the production process, continuous improvement can also be oriented to increasing value to the end customer, by directing the continuous improvement process towards contributing to the quality dimensions (performance, features, reliability, durability, conformance, serviceability, and perceived quality), Gieskes and Broeke (2000).

#### **4.2.10 Performance Measurement Systems for Benchmarking:**

Traditionally, a singular measure, profit (gross or pre-tax), was used to judge business performance by management. Profit maximisation was the main aim and measure for organisations, whereas time and money investment concerning other success factors has usually been neglected. This myopic view creates long-term problems as a result of giving insufficient attention to the main enabling factors such as people, resources and processes, Sommerville and Robertson (2000). However, within Western countries, the adoption of performance measurement systems started in the early 1980s after the dissemination of TQM philosophy. In fact, some of the basic principles of TQM are strongly related to the use of measures such as encouraging employee participation in the decision making; building continuous improvement into the process; and providing feedback based on actual data. Moreover, the application of the lean production (Toyota production system) concepts in several industries also contributes to the widespread use of performance measurements, Maskell and Baggaley (2004).

However, performance measurement is considered an essential element of business management, as a result of providing management with the necessary information for process control, supporting the implementation of business strategies, and helping with establishing challenging and feasible goals. Despite the importance of performance measurement, it has not been widely implemented in the construction industry, or in the construction industry as a whole. Therefore, there have been some initiatives concerning the establishment of performance measurement systems for benchmarking in different countries, such as the UK, (KPI, 2001), Australia, Brazil, Formoso and Lantelme (2000), and the USA (CII, 2000). Such initiatives typically aim to identify best practices in the industry, offer some guidance for performance measurements and provide some benchmarks that should be used by individual companies to establish their business objectives and goals, Butcher and Sheehan (2010).

The Key Performance Indicator (KPI) programme is supported by the UK government and was launched by the UK Best Practice Programme in 1998, through national and regional offices to enable measurement of projects and organisational performance throughout a large number of projects and, hence, it reflects construction industry performance. The collected information can then be used for benchmarking purposes. The KPI programme consists of primary and secondary indicators, where each set provides certain information. The first set of KPIs is classified as a headline because it provides a measure of the overall state of health of the projects that a firm delivers or helps to deliver and is classified into the following categories: client satisfaction-product; client satisfaction-services; construction time; construction cost; defects; predictability-time; predictability-cost; productivity; profitability and safety. There are also secondary indicators: operational indicators and diagnostic indicators. The operational indicators bear certain aspects of a firm's activities and help management to identify and focus on specific areas of improvement. The diagnostic indicators provide information on why certain changes may have occurred headline. In addition, it helps management analyse areas for improvement in more detail. However, the KPI neglects the other parties' feedback within the construction project such as suppliers, subordinates and final users, who are able to provide valuable feedback and information which can be used to evaluate the final project and also the operational process. This can then be used during the strategic planning process for future plans.

An organisation adopting the TQM concept and principles quickly appreciates that financial measures on their own are very limited in reflecting organisation performance and progress in general. The UK construction industry faces some impediments such as product diversity; organisational stability; contractual relationship; and teamwork and management behaviour. These impediments make it hard to achieve high performance within the industry, in addition to understanding customer perspectives of quality performance. Hence, the need has occurred to move towards excellent contractor performance instead of KPIs which are viewed by many companies and customers as the minimum performance requirement on construction programmes in the UK. Excellent construction contractor performance is seen as a long running programme of works instead of concentrating on previous works and, as such, will inform contractors of which ought to be their targets for continuous improvement over the life of the project. However, understanding what excellent construction contractor performance is from a customer perspective is an important area when attempting to improve organisational performance and the construction industry as a whole, Butcher and Sheehan (2010).

Benchmarking and performance evaluation are fundamental elements in TQM and considered components of recent management practices. They are about comparing the organisation performance and strategies against best-in-class or other similar organisations in key business activities and use lessons learned to introduce breakthrough improvements. Furthermore, this provides a focus on the external environment, helps developing plans and improves performance by understanding the methods and practices required to achieve higher performance levels, Chen (2002). The benchmarking consists of various stages as stated by Evans, (2005). Evans describes the benchmarking process as determining which functions to benchmark; identifying KPIs to measure; identifying the best-in-class companies; measuring performance against these companies; and taking any required action to improve performance and meeting or exceeding other company performances.

The focus of benchmarking in manufacturing is to adopt innovative practices to improve organisational ability to meet customer requirements. Typical performance measures (time, costs and defects) have been adopted in manufacturing industry for a long time due to data availability which is a major contribution to the success of

benchmarking in this industry. In construction, however, benchmarking is not a straightforward task due to both the remarkable fluctuation in productivity and the nature of the industry which lacks solid data gathering. Within the construction industry, benchmarking has been facing certain difficulties such as non-existent or incomplete data and, even if data is well recorded and retrievable, it may be highly related and dependent on the special characteristics of the project in terms of size, budget and type. Therefore, it is difficult to be used effectively as a basis for comparison. Moreover, the construction procurement types have a relation with performance benchmarking as a result the temporary nature of construction projects, where a number of parties are involved in designing and constructing a single project, adding to the complexity of the benchmarking task, Wang and Huang (2006).

#### **4.2.11 Impact on Society and Environment:**

Traditionally, construction management has been concerned with quality, cost and time. With the view of increasing concern about the environment, the construction industry has to add environment as a fourth dimension and increase the level of awareness as it is considered a major issue affecting everyday life and the local and global environmental living quality. For example, about 50% of atmospheric carbon dioxide output in the world is generated by fossil fuels in the services of building. Furthermore, construction projects increasingly affect the environment with dust, visibility levels, contaminated water, noise and polluted air, all of which has a great impact on the surrounding environment, Yip (2000).

Public concern for a clean environment is more enlightened, nowadays. For example, many government departments regulate new construction by demanding the inclusion of a wide variety of environmental protection measures, such as Noise Control Ordinance, Waste Disposal Ordinance, Air Pollution Control Ordinance, Water Pollution Control Ordinance, and Dangerous Goods Ordinance. Furthermore, every year Hong Kong has regular international conferences on environmental protection through the Environmental Protection Festival and the World Environmental Day which positively affects the country's culture, whereby citizens have become receptive to the campaign of protecting the environment, Law (1999).

There is a strong relation between construction and environment from different angles. For example, construction project planning has a significant effect on the environment in terms of unbalanced ecology, depletion of natural resources, potential sewage, and change of living environment. Taking it from the geographical perception, the construction industry geographical impacts include ecology, energy, water, timber, landscape, dust, noise, health hazards and safety. Poor design causes poor indoor air quality in many buildings, as does the use of dangerous or wrong materials in a construction project such as Blue Asbestos. This is considered useful for a variety of purposes, particularly brake lining and insulation but, at the same time, it can be hazard to health and, thus, it is more than the mere eradication of building defects or failures, such as rot, condensation or sick building which may cause suffering from discomfort and even illness for people working there and, hence, can affect morale and working efficiency.

The realisation of the potential consequences of environmental problems caused by the construction industry have brought a trend for government departments to regulate more environmental protection measures in project plans, such as water conservation, energy efficiency, environmental protection methods. The 1986 Single European Act (SEA) introduced a chapter on environmental issues, requiring substantial measures to protect the environment. Moreover, the Kyoto Protocol was initially adopted in 1997 and entered into force in 2005 to establish an international agreement aimed to stabilise and reconstruct the greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Therefore, construction professionals have to rise to the environment management challenge from customers in the public sectors and business competitors. They need to develop a competitive and positive response to protect the environment and improve public relations and the business environment. In contrast, neglecting construction industry impacts on the environment by construction management is often reflected in an unsafe and unhealthy environment which will cost the construction industry in terms of compensating people's health care, increased costs due to lower productivity and increases in absenteeism.

Environmental (Business) Sustainability is a part of TQM but not CSF. Becoming environment-friendly lowers costs because companies end up reducing the inputs they use. In addition, the process generates additional revenues from better products or enables companies to create new businesses. However, in 1987, International Standards Organisation (ISO) launched its first quality standard, ISO 9000, focusing on the management of quality in business. Later, in 1996, it came up with its family of environmental quality standards, starting with ISO 14001. And most recently the ISO 26000, released in 2010 to emphasize on social responsibility. Therefore, sustainability can be seen as a philosophy, focusing on "continuous improvement" and "change for the better".

The principles of sustainability in the construction industry focus on a continuous improvement process in a way that the business environment will continue to support future construction activities as it presently does. Therefore, management has to focus on efficiency, regular training, active communication channels, employee recognition, storage and handling of materials and try to minimise waste to reduce costs, energy and resource consumption, as well as providing value for clients and end users. Management should build a trustworthy environment and minimise the gap between employers and employees, support constant learning, innovation and development

Despite the necessity for change and the widespread awareness of the damage caused by the construction industry, it seems that construction practitioners still have little concern as a result of traditional culture and attitude; the cost of environmental management; different nature of the environment from quality, cost and time; misunderstanding of the environmental value; results oriented policies; and less environmental concern at the initial stage.

#### **4.3 Construction Project Success Criteria:**

The construction project success criteria often change from project to project depending on participants, project size, technological implications, scope of services, design and a variety of other services. On the other hand, common threats of project success criteria are often developed not only with an individual project but across the construction industry, as a result of relating project success to the expectations of the owner, contractor, and designer. Thus, after discussing the previous critical success

factor, it is important to develop an overview of CSF forms of different perception (owner, contractor, and designer) and understand the impact of each perception on the project success:

Owner's criteria of measuring success: quality (products, workmanship); on budget; on schedule; function for intended use (satisfied users and customers); building must be marketable (image and financial); end result envisioned; return on investment (responsiveness to audiences); aesthetically pleasing; and minimise aggravation in producing a building.

Designer's criteria of measuring success: quality architectural product; satisfied client (obtain or develop the potential to obtain repeat work); met design fee and profit goal; met project budget and schedule; professional staff fulfilment (learn new skills, gain experiences); minimal construction problems (easy to operate, constructible design); socially accepted (community response); and well defined scope of work (contract and scope and compensation match).

Contractor's criteria of measuring success: quality specification met or exceeded; meet schedule (preconstruction, construction, design); no claims (owners, subcontractors); under budget (savings obtained for owner and/or contractor); safety; good direct communication; client satisfaction; and minimal or no surprises during the project.

#### ***4.3.1 Common Criteria:***

While many criteria viewpoints are similar, there are several distinctions that relate directly to the parties involved and the type of business services provided, for example, the financial reality of doing business, which is a priority viewpoint that appears in all parties' criteria (owner, designer, and contractor). Moreover, all parties recognise meeting an appropriate schedule as a way of measuring project success as a common viewpoint. Another major criterion is recognising the absence of any legal claims or proceedings on a project as a desirable outcome. Furthermore, the owner wants to complete the project on time and budget, and the contractor and designer both expect to meet a certain profit.

#### ***4.3.2 Unique Criteria:***

There are some unique factors associated with each party. The designers, for instance, look for new projects which will improve professional satisfaction and development among their employees. Safety is a high-priority issue for the contractor which does not have the same importance from designer and owner points of view because their employees are at much less risk during the design or operation of building.

Moreover, there is some variability, even within the same firm on the same project. For example, two designers working on the same project may view project success differently. An experienced designer working as project engineer may be concerned about meeting client needs or meeting internal budget criteria, while less-experienced designer may consider the opportunity to gain valuable design experience as success criteria, with less concern for meeting internal budgets.

#### **4.4 Critique of Total Quality Management:**

Despite the existence of several experiences of successful implementation of Total Quality Management in different companies worldwide, the other side of the story still involves some failure or difficulties to fully implement Total Quality Management and, in some cases, it could be impossible to achieve due to the several barriers towards full Total Quality Management. For instance, Wilkinson and Witcher (1991) mention the basic barriers of total quality management application in the UK, according to a survey of 250 United Kingdom firms. The survey showed that few firms appreciate the fact that TQM is a total effort and requires culture change and management behaviour. Despite TQM initiatives having been very popular, they add that organisational segmentalism, reluctant managers, industrial relations and short-termism are some of the barriers to TQM implementation in the UK.

Lam, H. & Reshef, Y. (1999) points out that TQM is a long-range organisational transformation which requires building new competencies and destroying existing ones; thus, it involves high risk and requires high commitment. At the same time, Reshef renders the successes as short-term achievements because once the TQM long-term programme has been launched, the management needs to be updated to avoid and sudden shifts with markets in a way that threatens the company's existence.

Moreover, practising TQM means that all employees and management are involved in a lot of processes (training, measurement, presentations and team meeting) which are not directly related to the company's core mission and it put more strain on employees and management towards achieving the TQM programme. Furthermore, having on-site continuous improvement training courses and education programmes are very costly and not feasible in small businesses.

Nwabueze (2001) clarifies some of the barriers of TQM implementation as follows: it could be hard and in some cases impossible to change organisational culture; lack of management commitment; lack of teamwork; plans are not well thought out; focus on short term profits; poor measurement techniques; lack of education and training programmes; high employee turnover; employees are fearful of losing their job, especially after receiving training programmes which give them more stress to apply what they learn and take responsibility toward TQM achievement; and, management does not reward success. Thus, a company must understand some critical points before implementing a Total Quality Management programme.

- TQM programme adoption is not a phase but it is permanent and involves continuous improvement.
- If the implementation fails, it can have long lasting damage to the company and employee morale.
- TQM programme implementation is a long-term plan and it may take up to 5 years or even more to fully become a TQM company.
- It requires full commitment and cooperation from all employees, line managers, managers and owner.
- It requires culture change; thus, management has to deal with any resistance and has to banish the old ways of management.

#### **4.5 Total Quality Management Benefits:**

The absence of a unifying underlying theory to understand the relationships between TQM critical success factors and to explain how TQM works in an organisational environment results in developing various models and frameworks to implement TQM tools and techniques within an organisation. Anderson *et al.* (1994) conducted a research study to discover the characteristics and directional relationships of quality management implied in Deming's 14-point management method. They state that visionary leadership establishes an organisation characterised by cooperation and learning which improves process management towards continuous improvement, which, in turn, improves customer satisfaction. Another group of researchers, Flynn *et al.* (1995), proposed a model of quality management to improve performance outcomes and increase competitive advantages, where quality consists of such elements as customer-supplier relations, management support and process improvement.

Klein *et al.* (1995) examined the relationship between organisational culture norms and employee perceptions of control, quality outcomes, and employee performance. Their study, which focused on the questionnaire as a data collection method, revealed that a constructive culture encourages employee development and teamwork and leads to favourable perceptions of employee empowerment and quality outcomes. Kumaraswamy *et al.* (2002) examined the factors that influence the construction project organisations cultures. They identify organisational, operational, professional and individualistic sub-cultures as the principal elements that come together to evolve the construction project organisation, which directly affects employee perceptions and performance, working patterns, and quality outcomes.

Many researchers in the field of total quality management have described the benefits of adopting TQM philosophy within an organisation. Arora (1996) and Huarng (1998) mention that TQM could help reduce costs, time, waste, rework and improve quality outputs. Gunasekaran (1999) and Salegna and Fazel (2000) emphasise the positive correlation between TQM adoption and improving performance and competitiveness. Moreover, TQM proper implementation could improve productivity and efficiency of quality systems and reduce customer complaints, Sun (2000). Thus, this section has

discussed the benefits of TQM in terms of achieving competitiveness through increasing profitability, improving service quality, and enhancing market share.

#### **4.5.1 The role of TQM in achieving competitiveness:**

Today's business environment is characterised as being full of life, globally competitive, complex and continually changing, and to stay in business is to gain or retain competitive advantages. Thus, TQM turned out to be the one of the competitive strategies for all industries during the 1990s, O'Regan and Globadian (2002). There is an extensive consensus that TQM is an effective method of managing an organisation's operations and relations to improve the overall effectiveness:

*Management awareness of the importance of TQM, alongside business process reengineering and other continuous improvement techniques was stimulated by the benchmarking movement to seek, study, implement and improve on best practices.*

Zairi and Ahmad (1999)

TQM is considered a fundamental philosophy for today's organisation because it provides the required help for the entire industry. It can help private organisations to improve competitiveness locally and globally. Mersha (2000) states that firms within the industrialized countries that have adopted quality-oriented strategy have achieved their market share and enhanced their overall performance, improved customer satisfaction, higher employee morale, and improved productivity. Chew *et al.* (2008) state that within the construction industry, resources alone are not sufficient to achieve competitive advantage and high performance, but contractors have to make better use of available resources and use them to select their strategies based on resource capability. Therefore, construction organisations can shape their strategies in response to the demands of competitive environments. Thus, organisational performance should be enhanced by creating a fit between the available resources to competitive strategies.

The growing impact of globalisation has put more strain on international and local companies to improve their services and, thus, move towards quality management to reduce the overall cost, improve flexibility, better communication and manage supply chain effectively, Rawabdeh (2002). Competitiveness refers to the organisation position within the market against its competitors, by providing higher quality

products and services that differentiate a firm from its competitors and with the result that it will improve market share, profit and added value to the business. Therefore, competitiveness can be achieved through improved profitability, increased market share and quality outputs.

#### **4.5.1.1 The role of TQM in improving profitability:**

Over the last two decades, the construction industry has seen a significant change due to the effects of globalisation, increased competition, delivery system innovations and the application of information technology. Therefore, industry professionals know that to compete within this business environment, they need to manage their performance more efficiently and have strategies to maintain or increase company value and improve profitability.

Company profitability could be measured by internal rate of return, net present value, and return on turnover or sales. The internal rate of return is defined as the discount rate that gives a net present value of zero when applied to a series of cash flows, while the net present value is defined as investor and shareholder wealth, as all of the future cash flows discounted at the appropriate risk adjust cost of capital. Moreover, the return on turnover or sales could be measured by the company when it is difficult to measure the assets in a business, Grout and Zalewska (2006).

Business results can be enhanced through improving revenues or reducing costs. Thus, improvements in inner quality may raise productivity and minor inner costs which will result in increasing profitability indirectly. Moreover, improving output quality to exceed client requirements can raise customer satisfaction and, in return, that will improve customer retention and loyalty and, thereby, increase future sales and sustain competitive advantages. Al-Qudah (2006) states that strategic benefits of better quality are proven to contribute to a greater return on investment by increasing sales.

#### **4.5.1.2 The role of TQM in increasing market share:**

Market share can be considered as a main indicator of profitability in the medium and long term and it is considered one of the most important indicators of organisation success and describes the organisation's position within the market. Improving

organisational profit requires improving market share, which requires more loyal customers by improving services quality. However, profitability is not always reflected by organisation market share or performance, as many companies see it as an organisational goal, O'Regan (2002).

Finlay (2000) states that organisations can improve their market share in a several ways such as enhancing the perceived value of products and services, reducing market price, or even a combination of both measures. Increasing market share can be achieved when the markets are not saturated with organisation products and services; increased economies of scale provide significant competitive advantages; present customers can be induced to buy more; and the organisation has spare production or distribution capacity. However, a lack of funds to make the required enhancements in the market loses organisations their market share. In addition, this might be caused as a result of a firm's reputation suffering which cannot be reclaimed, or the organisation is being hit by cheap imports.

#### **4.5.1.3 The role of TQM in improving quality services:**

High quality products and services are considered vital determinants of competitiveness, where the implementation of TQM has recently gave more attention by organisation as method to differentiate their products from others and increase competitiveness advantages, Tsang and Antony *et al.* (2002). Moreover, the process of managing improved services quality begins with perceiving client anticipation. Service quality differs from goods quality in terms of being intangible, which increases organisational challenges to communicate with customers and, thus, quality may be hard for customers to assess.

Escrig- Tena (2004) stated that to achieve output quality, organisations could adopt the TQM philosophy as one approach to improve services for all customers in general, while improving organisation operations in particular. However, Li (1997) mentions that there is no association between improving performance and leadership commitment. In addition, another study conducted by Wilson and Collier (2000) showed that there is no relation between leadership commitment, strategic planning and human resource management with customer satisfaction through quality improvement.

Jannadi and Al-Saggaf (2000) found in their study that it is significant to manage and be in charge of every service encounter in order to increase overall perceptions of service quality. Improving service quality is achieved by understanding the customer's anticipation forming process. The process of managing improved service quality begins with perceiving the customer's anticipation. The expectations/perceptions concept has been extended to integrate "desires" in evaluating customers' awareness of service quality (Van der wal *et al.*, 2002).

#### **4.6 Chapter Summary:**

After studying different TQM frameworks in the third chapter, this chapter attempted to support the aim of identifying the CSF's of TQM implementation. The literature discussed different studies and research related to TQM CSF's in general and gave more attention to the construction industry. According to the available literature, the researcher has come up with the following factors with regard to CSF's in TQM implementation in the construction industry: top management commitment, quality culture, process planning and strategic quality management, employee empowerment, employee training and education, supplier chain management, customer satisfaction, information and communication technology, continuous improvement, performance measurement system for benchmarking, impact of society and environment. These factors differ between different construction projects, as each project has different success factors as a result of having different cultural backgrounds, budgets, locations and client expectations; therefore, each construction project has different CSF's. The previously mentioned factors are considered as the proposed factors so far and, as they have been identified based on previous research, they have to be tested during the data collection stage to be confirmed according to the research questionnaires and interviews which will be discussed in the following chapter. Construction project success criteria were also studied within this chapter, from the different perspectives of owner, contractor and designer. Moreover, TQM implementation barriers in the construction industry were discussed, followed by TQM implementation benefits on improving competitiveness through improving profitability, increasing market share and improving quality services.

Over the life of a project, organisations and individuals usually accumulate huge amounts of effort, money and information to come up with the construction project to satisfy clients and, at the same time, generate profits for the contractors and improve individual skills and partnering relationships. However, as each construction project has different characteristics and CSF's, it has to deal with its own internal and external environment for each differently to ensure a successful project from all party perspectives. Construction companies might be task oriented or relationship orientated according to their business strategies and plans. Because the UK and Jordan have multi cultural workforces, organisation management has to adopt the relationship and task orientation by being friendly, accessible, and understanding of their subordinates' personalities and requirements with all employees in the project and, at the same time, management has to be task oriented to have control over the process of the work and achieve the target. Management also has to be participative in the pre-contract phase and supportive during the project, which of course is culturally determined. For organisations to do that, each organisation has to identify its CSF's to achieve target.

Leadership style is different between organisations and it is also different between developed and developing countries as a result of different national and organisational cultures. In the high power distance countries, leaderships are considered to be more autocratic and, thus, their relation with their employees is not based on trust and sharing knowledge relation, making employees afraid to disagree with their managers and prefer to receive orders from managers rather than being self motivated. Within a TQM organisation, management has to adopt the new management style instead of the traditional style of management or the autocratic management style to improve communication, innovation, feedback, knowledge sharing and, thus, improve operation process and overall performance. Top management has to be committed to the quality improvement in their organisation by reacting to their rapidly changing environment by adopting new strategic quality management, process planning and optimal design by process and people, but at the same time try to reduce the risk of any future challenges through future strategic planning and risk management to deal with any external or internal factors that might affect the organisation.

Moreover, management has to focus on employee empowerment and provide them with a greater degree of freedom and recognition, in addition to providing them with the required training and education but, at the same time, creating a self motivation culture to ensure that employees are willing to improve their skills and knowledge to improve their working skills and experiences. Even if the top management is committed to providing training to their employees, it might face problems by providing the wrong training, or employees might not be willing to improve their skills as a result of low loyalty levels to their organisations. Therefore, a dynamic leadership must be able to create a trust environment and develop an organisational vision which all the workforce must strive for, regarding process ownership and improved quality.

Training and education must target everybody in the organisation since quality under TQM is the responsibility of everybody within the organisation. Therefore, employee training and education have to become one of the major responsibilities of human resource management, where employees have to receive adequate training and education related to individual skills, problem solving techniques, process analysing, benchmarking against other employees and self established criteria, customer care, and health and safety. At the same time, management has to regularly observe employee performance to ensure the training has improved their skills and performance.

Management has to develop active communication channels between all employees, management, clients, suppliers and final users. This information is related to workforce performance, turnover, health and safety, suppliers, feedback, defects, time, cost, production phase and quality, which helps the organisation during their strategic planning process. Management, at the same time, has to make sure that the gathered information is stored and analysed to be easily accessed anytime and easily transferred from one project manager to another. Continuous improvement in the construction project needs to be ensured because it is associated with employee performance, empowerment, recognition and their ability to improve performance during the production phase. The workforce is the main controller of the production phase and requires attention and full support and commitment from the management towards creating quality based on trust and communication to provide high quality

and improve customer satisfaction. Providing high quality is an effective way to improve competitiveness, market share and final project since quality is not easily copied by competitors and, thus, organisations have to formulate new methods to provide high quality to their customers to ensure repeat business and new projects.

Early involvement in the procurement process helps organisations to improve communication between all parties: designers, clients, contractors and suppliers. It also helps organisations to improve customer satisfaction and reduce defects, where all parties can share their experiences about previous experience and problems during the production process, suggest some modifications to the design, materials and other internal or external problems. Therefore, having an effective information and communication system can reduce dissatisfaction and defects and improve partnering relationships between all parties, which explains the strong relation between investment in the information and communication system and quality achievement and project success.

CSF in the construction industry is based on management commitment and the ability to improve their performance and provide higher quality. The majority of the CSF's are related to management activities, plans, strategies and their methods to create a quality culture towards quality improvement, customer satisfaction and higher competitiveness.

# **Chapter Five**

Research Methodology

## 5.1 Introduction:

Jankowicz (2002) defines methodology as “*the analysis of, and rationale for, particular method or methods used in a given study*”. The word methodology refers to the way that research should be undertaken and the activities it should cover during data collection process in terms of the disciplined collection and evaluation of specific data to help the researcher understand the targeted sample better by linking companies to their employees, clients and suppliers through a set of information to be able to understand their actions (system) and evaluate their performance and problems. Moreover, research methodology specifies the information required to design the procedures of data collection, manage the data collection process, analyse the results and link the findings and their implications, Proctor (2003, p.51).

The research methodology identifies the numerous methods that research has used to gather the required data to establish a clear understanding of the Total Quality Management system and to investigate whether it is fundamental to being adopted by all organisations or not. In addition, the research intention is to measure the effectiveness of implementing the TQM system within an organisation and its role in improving competitiveness. Therefore, the study began by establishing a general understanding of TQM development based on the available secondary data; consequently, the study collected the primary data after discussing the numerous types of primary data collection techniques, evaluating each technique and whether it will be used or not for a specific reason.

There are two types of primary data used for this research for the specific purpose of addressing the problem at hand. Primary data may be Quantitative or Qualitative data, according to Malhotra and Birks (2006, p.132), and will be discussed later in this research. The position taken by researchers regarding the relative merits of quantitative and qualitative strategies of research varies considerably, from those who see the two strategies as entirely separate to those who mix these strategies within their research projects. For instance, Bryman (1998) and Best and Khan (1989) suggest that both approaches should be combined to gain more reliable research findings, while Hughes (1997) argues that combining both approaches underestimates the politics of legitimacy that are associated with the choice of methods. Nevertheless, the use of interviews or observations in the research might be seen as qualitative

strategies, while the use of questionnaires might be seen as a quantitative strategy. Interviews might be structured and analysed in a quantitative manner when collecting numeric data or when non-numeric answers are categorised and coded in numerical form. On the other hand, questionnaires may allow for open-ended responses and lead to the in-depth study of individual cases.

Greene *et al.* (1989) state that the development of the mixed method approach began in the 1980s, when scholars began expressing concerns about the mixed methods of qualitative and quantitative data without articulating defensible reasons for doing so. However, the mixed methods research approach allows researchers to be more integrative, flexible and holistic in their investigative techniques, as they strive to address a range of complex research questions that arise, Powell *et al.* (2008).

Therefore, this study has combined quantitative and qualitative data techniques to gather the required data, by using the Hybrid Survey (self administrated and interviewer-administrated questionnaires) as the quantitative data technique and the individual face-to-face in-depth semi-structured interview as the qualitative technique. These techniques have been selected for specific reasons which will be clarified in this chapter.

## **5.2 Research Aims and Objectives:**

Methodology is concerned with the overall research process from the theoretical underpinning to the collection and analysis of the data, Collis and Hussey (2003). For the credibility of the research, it is crucial that there is both a transparency in how the work is carried out and a clear explanation of the methodology. A flawed methodology can result in invalid conclusions. Therefore, the methodology chosen must be in line with the research objectives and able to answer the relevant research questions. Consequently, to choose an appropriate methodology, the research aim and objectives should be identified.

The main aim for conducting this research is to contribute to the understanding of TQM in UK construction companies to provide recommendations to Jordanian construction companies. Investigating whether TQM implementation is important for all the UK construction companies will assist in how it can be implemented in the Jordanian construction companies to improve competitiveness and sustainable growth

and compete with international construction companies operating in the Jordanian market. To achieve the research aim, as discussed in the first chapter, five objectives are developed:

- To investigate whether all construction organisations require a TQM system or if they have adopted a different system to provide constructive recommendations to support and improve TQM implementation and control in the Jordanian construction sector by investigating TQM practices and implementation in the United Kingdom.
- To define the CSF's for the construction industry, as managers and experts have not agreed yet how to apply TQM tools and techniques to their organisations, in addition to having different CSF's for each construction project.
- To define the external environmental factors and obstacles which affect the TQM implementation within the construction industry.
- To explore the benefits of acquiring a TQM system within an organisation.
- To measure the impact of the independent variable (11) TQM CSF's on the dependent variables (profitability, market share, performance and quality services).

### **5.3 Research Design:**

Research design, according to Oppenheim (1992, p.6), is the “*basic plan or strategy of the research, and the logic behind it*” which will help the researcher to draw the research sample and categorise the sub-groups it must contain and which variables need to be measured. Kumar (1999) points out that the term research design refers to researcher adoption of a procedural plan to answer questions on validity, accurately and objectively. Therefore, the research design will identify the research philosophy, approach, purpose, logic and outcome of the research.

Aaker *et al.* (2001) identify the research design as a blueprint that guides the research towards the research objectives by investigating the research philosophies, approach, strategies and determination of the sample size. The research will determine the effectiveness of adopting a TQM framework within an organisation by researching the impacts of the relevant CSF's to the construction industry and evaluate whether other

factors have to be applied to the sector to improve quality services and customer satisfaction. The research design is concerned with drawing valid inferences from the available data, and guides the study in a way that will produce specific answers for specific questions, Chisnall (2001). The research has been through the following research design stages to ensure achieving the research aims and objectives.

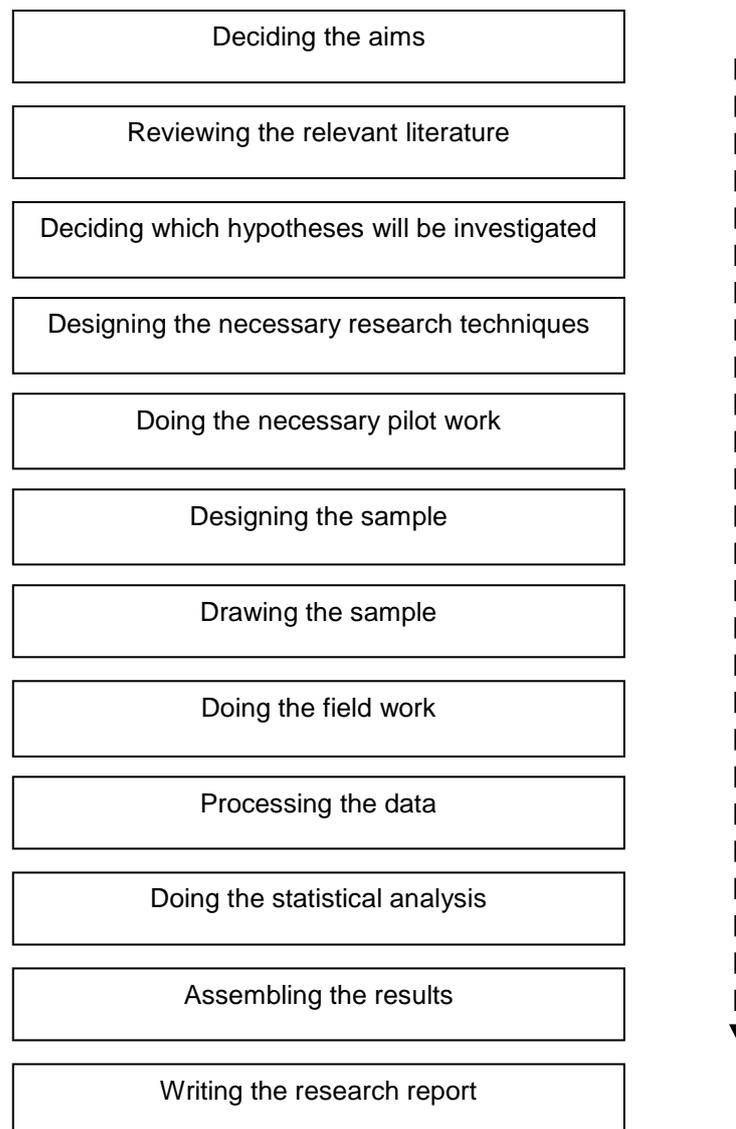


Figure 5.1 Research design stages

#### **5.4 Research Philosophy:**

The research philosophy, or paradigm, refers to the way the researcher thinks about the development of knowledge, Saunders *et al.* (2003), and it is a philosophical framework that guides how scientific research should be conducted. According to Saunders *et al.* (2003), there are three paradigms for business research: *positivism*, *Realist* and *interpretivism*.

A positivistic philosophy aims at the derivation of laws or law-like generalizations similar to those in the physical and natural sciences (Remenyi et al. 2000, p.32). Quantitative research allows researchers to familiarize themselves with the problem or concept to be studied. The emphasis is on facts and causes of behaviour (Bogdan and Biklen 1988), with the information in the form of numbers that can be quantified, and summarized using a mathematical process for analysing the numeric data and expressing the final result in statistical terminology (Charles 1995).

The realistic philosophy shares two features with a positivism philosophy: a belief that the natural and the social sciences should apply the same kinds of approach to the collection of data and to explanation, and a commitment to the view that there is an external reality to which scientist direct their attention (Bryman 2001). Hybrid methods are defined as the mixing of data or methods so that diverse viewpoints or standpoints cast light upon a topic.

The interpretivistic philosophy, on the other hand, asserts that the assumptions of both philosophies are unwarranted; especially in cases where the objectives of study are influenced by many factors, extremely difficult to isolate and control in experimental laboratory settings. Qualitative research, broadly defined, means any kind of research that produces findings not arrived at through quantification (Strauss and Corbin 1990, p.17) and which arise from real-world settings (Patton 2001, p.39).

This research is based on a comparative investigation of TQM in the UK and Jordan, from different perspectives and, therefore, the researcher had to focus on contractors, clients and final user point of views. In order to collect the required data, this research has adopted the Hybrid methods for data collection. Thus, face-to-face semi structured interviews were conducted with managers, and final users while questionnaires were

given to the employees. Therefore, this research had adopted the realistic philosophy to be able to collect data from contractors and final users through interviews and from employees through questionnaire.

### **5.5 Research Approaches:**

Induction and deduction are two approaches used to establish what is true or false in research and draw conclusions. Deduction is usually undertaken using a structured quantitative research method. Quantitative research involves numerical analysis of data and enables the use of statistical procedures to answer research questions about relationships and differences between measured variables (Ghuri and Gronhaug 2005; Partington, 2002). On the other hand, induction is usually undertaken using a less structured qualitative research method. Qualitative research involves collecting data, including words, narratives and observations, and the interpretation of this data to answer research questions about the various views of phenomena rather than numbers (Maxwell, 1996).

Partington (2002) argued that the selection of the research approach relies on the research aim and objectives. Therefore, this research is deductive. However, triangulation of primary data will be undertaken where quantitative data is used to corroborate and support qualitative findings (Bryman and Bell, 2007). However, before choosing the appropriate research design, three criteria should be taken into consideration: the nature of the research topic, time availability, and degree of risk, Creswell (1994). The rationale for choosing a deductive approach is threefold:

a) The literature of TQM allows developing theory which can be tested in later stages. This approach, as argued by Ghauri and Gronhaug (2005), is deduction.

b) Deduction can be a lower-risk approach, although there are potential risks, such as the non-return of questionnaires. In contrast, induction is a more risky approach since there is fear of not getting useful data patterns and, thus, theory would not appear (Cooper and Schindler, 2003).

c) This research attempts to generalize the findings in order to represent the entire population. This makes the choice of the deductive approach most appropriate since deduction aims to generalize findings from sample to population, while the inductive approach aims to generate theory or investigate new ideas (Saunders et al., 2007).

### 5.6 Purpose of the Research:

The purpose of the research depends on the research aims and objectives, the research can be exploratory or conclusive, Hussey & Hussey (2003). Research design involves an understanding of how different respondents will respond to the different techniques of data collection method; thus, this research will focus on understanding the problem from the respondents' perspective to help in the research of understanding the phenomena.

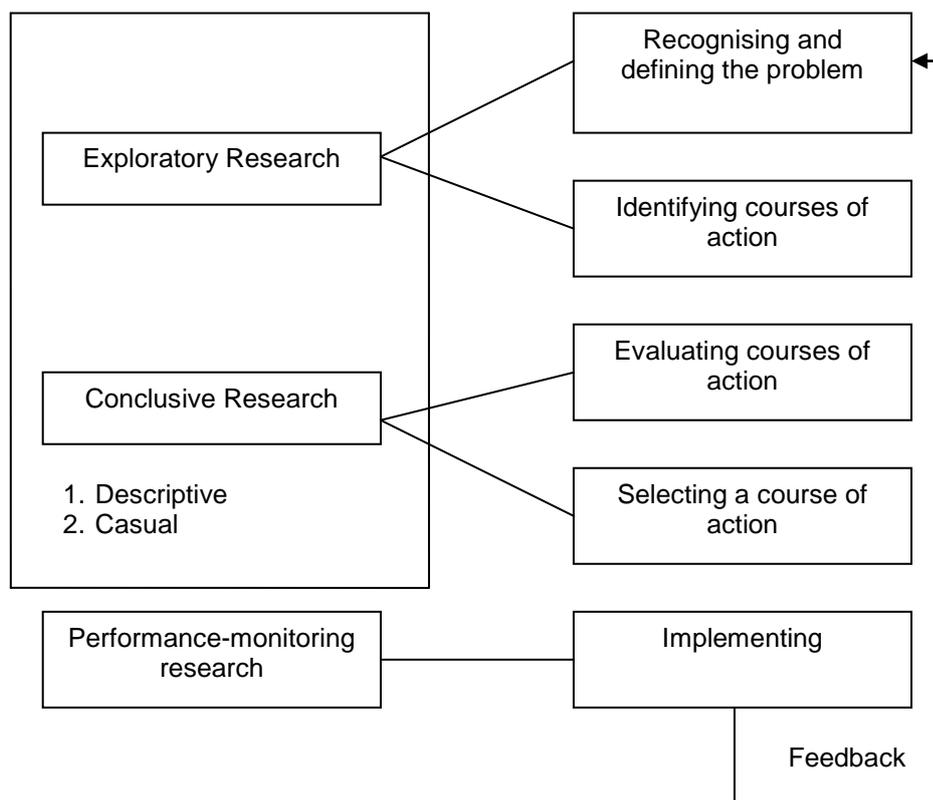


Figure 5.2 Relationships between Exploratory and Conclusive Research design  
Collis and Hussey, (2009)

- **Exploratory Research Design:** the objective of exploratory research is “to gather preliminary information that helps to understand the phenomena and suggest hypotheses”, Kotler *et al.* (2006, p.122). This is usually used by a researcher when the researcher has a low degree of the problem or phenomena understanding to cope with the subject of the study. In addition, it characterised by flexibility because the researcher might redirect the exploration in another direction once he or she is alert to a new idea. This type of research relies on secondary and qualitative data to be able to understand the phenomena or the problem but not for measurement purposes.
  
- **Conclusive Research Design:** The objective of the Conclusive Design is to measure and test specific hypotheses and examine the relationships between different variables once the knowledge of research problems or phenomena certainty has increased, and it relies on quantitative data such as surveys and observation.

This research has used a combination of research design (Exploratory and Descriptive), starting with a descriptive design then moving to exploratory design, to ensure the best use of the qualitative and quantitative approaches in order to answer the research questions. The combination of the quantitative and qualitative approaches is justified in section 5.14.

### **5.7 Research Strategies:**

According to Saunders *et al.* (2003), a research strategy is a blueprint which the researcher will use to answer specific research questions, by specifying the sources the researcher will use to collect the required data and considering the constraints during data collection process such as location, time, access to data, ethical issues and money. There are many research strategies which are firmly rooted in a deductive approach, while others are in an inductive approach such as Experiment, Case Study and Grounded theory. The focus of this research is not to what approach one strategy is attached, but whether it is the appropriate strategy to answer the research question or not. Saunders *et al.* (2007), classify research strategies into six categories: Experiment, Case Study, Grounded Theory, Survey, Action Research and Ethnography.

As mentioned previously, some of these strategies have attached to Inductive Design, while others to Deductive design. Thus, some of these strategies can fit with the research, taking into consideration the advantages and disadvantages of each strategy. Starting with the Experiment strategy, this is considered a classic deductive research design which is generally used to find relations between different variables by identifying the theoretical hypothesis among a small number of variables and measuring the change of one or more of the variables. The second strategy is the Case Study and this strategy is attached to the inductive research approach. The case study is a “strategy of doing research which involves an empirical investigation of particular contemporary phenomena within its real life context using multiple source of evidence”, Robson (2002). In addition, this strategy can provide a clear understanding of the research context, and can be based between any mix of qualitative and quantitative data collection methods; however, this strategy involves analysing archival information instead of using samples and, therefore, it is not used in this research.

The third strategy is the Grounded theory. This strategy generates data by a series of observations without any initial theoretical framework, which requires much more time and effort than other strategies. The fourth strategy is Ethnography; it is similar to the case study strategy but, in this case, researchers have to immerse themselves in the life of the social group under study to observe them closely. It is based on a series of in-depth observations and is considered a very time consuming strategy. The next strategy is Action research. According to Coghlan and Brannick (2001), “*the purpose of action research is not just to describe, understand and explain the world but also to change it*”; therefore, this strategy focuses on studying the management which requires a close collaboration between researcher and practitioner. This strategy requires repeated processes and time and, thus, it has been avoided by the researcher.

The final research strategy is the Survey. It is usually associated with the deductive approach and, thus, data are often obtained by using a questionnaire as one method of data collection; however, it is not the only data collection method that belongs to this strategy. Structured observation and interviews also belong to the survey strategy and these methods help researchers to collect a large amount of standardised data from a sizable population in a highly economical way. Therefore, this strategy is easily

understood and allows easy data comparison. On the other hand, much time is spent on questionnaire design and piloting, while less time is spent on data collection compared with other observational and experimental methods. However, since the survey strategy gives the researcher more control of the research process, the researcher took the time criteria into consideration during questionnaire design and piloting.

As a result of the above advantages of the survey as a research strategy, this research adopted the survey strategy for its data collection process. Moreover, the availability of data and literature on TQM allows developing a theory by studying different TQM frameworks. Following this, the researcher identified the relations between different variables among individuals and organisations to clarify the research phenomena.

### **5.8 Time Horizon:**

Time is considered an important element of any research design. Time horizon, also known as planning horizon, is based on a researcher's future prediction of the required time for the research process to be evaluated or assumed to end. William (2006) classifies the research into longitudinal studies and cross-sectional studies.

A longitudinal study is a correlation research study that has to observe the change and development of research variables over time without manipulating them, though it can observe the temporal order of the relations between variables and, therefore, it requires a long time to detect and understand the research phenomena and the relationship between variables. On the other hand, cross-sectional study is a descriptive or observational study that can study particular phenomena at a particular time. It aims to describe the relationship between variables and how they affect each other as they exist in a specific population at the same time and period. However, Cross-sectional study must be done on representative samples of population to ensure findings validity.

The choice of which of these two types of research is to be undertaken is influenced by three issues: the purpose of the research; the research strategy; and the time available for the researcher, Saunders *et al.* (2003). Bearing these criteria in mind, a cross-sectional study was chosen for this research. The rationale for this choice is threefold: a) cross-sectional study is a common method of descriptive research in

business studies because descriptive studies research is aimed at providing a detailed picture of a particular issue; b) the cross-sectional study is the most common method of survey research because a survey strategy requires collecting data from a sizable population in a particular time; c) the cross-sectional study is appropriate for most research projects undertaken for academic courses because such research projects are time constrained, Saunders *et al.* (2003); Churchill, (2001).

### **5.9 Data Collection Methods:**

Saunders *et al.* (2003, p.188) clarify the data collection methods for any research as secondary and primary data. Most researchers start with reanalysing data already collected for other purposes to answer or start answering the research questions and objectives, supporting the research after that with collecting new data for a specific problem at hand using primary data collection methods. This research study involved two types of data, secondary and primary data, to help the researcher to obtain the required information during data gathering process from the United Kingdom and Jordanian construction firms. Primary and secondary data are considered comprehensive sources due to their roles in helping the researcher by providing basic information during secondary data collection, and deeper and more accurate details in the primary data section by looking to the implementation process and TQM tools and techniques from different perceptions. However, due to the nature of this study, which focuses on researching the implementation of the TQM implementation within large and medium size construction firms in the United Kingdom and Jordan, the researcher studied the quality perceptions of all participants involved in the construction project to recognise their needs and expectations.

Secondary data is usually gathered by researchers to gain useful and relevant information to answer any vague questions and solve any problems during the implementation process. Moreover, the available secondary data so far does help during data gathering by saving the researcher time, money and effort, due to the availability of TQM implementation comparisons among prior global studies. Likewise, it would be necessary to mention that some relevant secondary data might not fit with the research undertaken because it was gathered for different research purposes; thus, it could be inaccurate and not up-to-date.

When the collected secondary data cannot help the researcher to answer the research questions and achieve the required aims and objectives for any reason, the necessity for primary data arises to gain more accurate and updated information by dealing with clients and managers in powerful positions, as they are able to provide more and deeper information about the industry in general and the organisation in particular.

### 5.9.1 Secondary Data:

Secondary data can be defined, according to McDaniel and Gates (2008, p.72), as “*information that has been previously gathered and only might be relevant to the problem at hand*”. Other authors such as Malhotra and Birks (2006, p.85) define secondary data as “*data that have already been collected for purposes other than the problem at hand*”. The main purpose of collecting secondary data is to improve and develop researcher understanding of the subject matter at hand, and it can be reanalysed by the researcher to get a better understanding of a concept, even if it has been compiled by another researcher, once it is related to the subject of study. Moreover, the researcher has to locate, evaluate and verify the data by being aware of the data details when researching books and online data, making sure that the data are reliable and not old and can still be used for future research. Secondary data can be classified as either internal or external as follows:

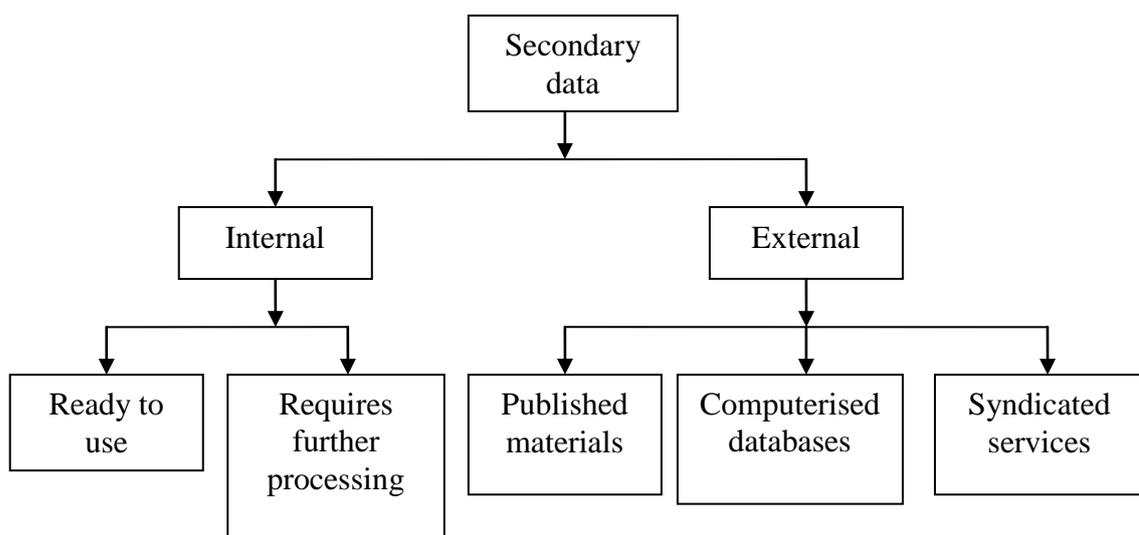


Figure 5.3 A classification of secondary data  
Malhotra & Birks (2006 p.90), Marketing Research

### **Sources of Internal and External Secondary Data:**

The internal secondary data are “*those generated within the organisation for which the research is being conducted*”, Malhotra and Birks (2006, p.90), and may be available in a ready-to-use format, such as that routinely supplied by the management or it requires a considerable processing format, such as sales invoices. Internal secondary data is considered as a vital source of secondary data because the data come from within organisations. They may be held by different departments such as Human Resource or Quality and Marketing departments and stored in different ways (computerised databases and manually). Thus, the data are seen as being operational data which have been generated and stored about organisation customers on a daily basis.

Moreover, internal secondary data is considered as a starting point for researchers for many reasons, such as having already been collected and so there should be no additional data collection costs and no access problems. On the other hand, because such data has been gathered for the organisation’s own use, they must have a high accuracy rate to reflect organisational operation and process. These data can be formed as government and company statistics for quality and performance, salaries and dismissals and their reasons.

The second type of secondary data are the data that originated outside the organisation and can be easily accessed by the researcher through books and websites such as computerised databases, published materials and syndicated services as described in the following.

**Published Materials:** These types of data are easily available to the researcher and it can be gathered in two forms: firstly, non-profit organisations, local authorities, trade association, regional and national governments, chambers of commerce and investment brokerage firms; secondly, government sources, such as census data and other government publications in construction, and general business sources (indexes, statistical data, directories, and comprise guides).

**Computerised Databases:** these types of external secondary data contain readable information that has been made available in computer file formats for electronic distribution and can be classified into online (stored in computers but requires a telecommunications network to access), offline (data available on CD-ROM or diskette) and internet database (data can be accessed, searched and analysed on the internet). However, the computerised databases offer a number of advantages over printed data in terms of being up-to-date, making the search process quicker and comprehensive, accessing the information instantaneously, at low cost and convenient to access.

**Syndicated Sources (services):** this is the final major source of external secondary data which can be gained by companies that specify in collecting and selling common pools of data; these data are not collected with a focus on specific problems but it can be personalised to fit specific needs.

#### **Sources and problems of Secondary Data for International Research:**

Since secondary data are necessary and valuable in this research within the UK and Jordan, the researcher might have faced some problems with secondary data collection in Jordan in terms of few managers in the Jordanian sector having little familiarity with TQM implementations and, thus, their companies have few internal secondary data to be used; hence, the researcher depended on other sources to collect the required data such as government census and syndicated services.

However, there are two main problems for any researcher when collecting international secondary data: data accuracy and comparability of data. The data accuracy problem might occur when comparing the contribution of the construction sector to the Gross Domestic Products (GDP). On the other hand, because this research compares a highly industrialised country (the United Kingdom) with a developing country (Jordan), the accuracy of the data collected varies because it is likely to have a higher level of accuracy in the UK than in Jordan.

Secondary data can be used by a researcher in several ways, according to Aaker *et al.* (2007, p.112), as follows:

- Considered as valuable sources for new ideas which can be explored through primary data.
- The possibility of providing enough information to solve a specific problem.
- To collect primary data research is a prerequisite to examining available secondary data to define the problem and formulate hypotheses about its solution.
- By examining the available methodology and techniques employed by previous researchers helps the researcher to plan the present research process and techniques.
- Serve the researcher by considering the data as a reference base against which to compare the primary data validity and accuracy.

Secondary data offer the researcher many potential benefits which involve saving researcher time, cost and effort of data collection compared with the primary data collection because the research is based on books, internet, companies and the government census. In addition, because this research is based on studying the quality and operational systems of companies, it has to deal with historical data which only can be gathered by secondary data. Moreover, in some cases secondary data might be considered more accurate and reliable than primary data when the researcher looks for profits, meetings or missing deadlines, performance and quality improvements. Thus, the researcher started this research with a different set of secondary data, to be supported by primary data to collect more up-to-date information.

Despite the many benefits of secondary data, they still have a number of limitations. The major concern with that is, the secondary data were collected in the past for other research different from the one at hand and so there is high possibility of fit problems likely to occur when applying these data to the present research. In addition, because this research measures quality from clients, contractor, designer, and final user perceptions, it might have different units of measurement from previous research. Moreover, the researcher does not have knowledge of data credibility in terms of the ways the data were collected and whether previous researchers had control over data collection. Finally, in some cases the secondary data may be outdated, taking into consideration two reasons. The first reason is that the data may be irrelevant to the current research even if relevant to the previous research, and the second reason is the

time gap between data collection and publication is often long, so the data are outdated even before publication and, hence, cannot be used in the current research.

### **5.9.2 Primary Data:**

Primary data is the second type of data collection method, when the researcher could not gather enough or required information to solve specific problems or when the researcher aimed to support the secondary data and, thus, the necessity for primary data to take place within the research. Primary data can be identified, according to Malhotra and Birks (2007, p.733), as “*data originated by the researcher specifically to address the research problems*”. Hence, it is original material which has not been interpreted by anyone other than the researcher. These data are collected by the researcher to solve a specific problem at hand, giving the researcher the control over data collection. Moreover, primary data are characterised with being up-to-date data related directly to the research problem, increasing by that, data credibility and accuracy.

Primary data may be qualitative or quantitative in nature, Chisnall (2005, p.47), depending upon which approach is perceived to solve research problems and give the most accurate understanding of the research phenomena. Primary data involve some advantages such as being up-to-date information; once data is collected to answer specific research questions and problems, the researcher is able to gain relative sufficient and accurate information to fit with the research; collected data are confidential and the researcher is the only person with access to these data until publication, and in some methods of primary data collection, the results can be gained quickly such as through online surveys and telephone interviews. However, despite these advantages, there are still some disadvantages such as, in some manner, the data could be difficult to collect; this process might require a long time compared with secondary data; the process might be considered an expensive method of collection and may provide misleading results if data collecting tools are not worded properly, or if the targeted sample is not large enough and chosen with care.

### Primary Versus Secondary Data:

Secondary	Primary
Secondary data collected by people / institutions other than the researcher.	Primary data is gathered from direct observation or data personally collected.
Method of gathered data is the re-analysis of existing data.	Method of collection is through interviews, personal telephone calls, focus groups, observations, interviewer-administrated, self-administrated questionnaires.
Second-hand information about an event that has not been personally witnessed by the researcher.	Written or oral account of a direct witness of or participant in an event.
Data collected by someone else for another purpose and therefore there may be a lack of relevance.	Data collected for a specific purpose.
The use of secondary data saves time and money.	Costs are incurred on a first time basis.
Inaccuracy may occur because of a number of potential sources or error such as gathering and processing the data.	Full control is provided in working with primary data.
Accessibility to the data may be problematic.	Data accessed for the first time.

*Table 5.1 Primary Versus Secondary Data (Adam, Online 2009)*

#### **5.10 Primary Data Collection Methods:**

Robson (2002, p.70) argues that primary data can be collected in two ways, quantitative and qualitative methods and those methods vary in terms of the time required for data collection, data credibility and trustworthiness, level of response and data collection costs. For instance, collecting quantitative data might require less time than collecting qualitative data. However, in some cases, the researcher is restricted to one method despite the data collection time, cost and effort.

During the first half of the 20<sup>th</sup> century, the focus was given to qualitative methods when looking at all idiosyncratic aspects of specific phenomena or problems. Around the middle of the 20<sup>th</sup> century, attention was given to the quantitative method and it became gradually more appealing to researchers due to its ability to yield general generalisable conclusions. Nowadays, quantitative methods are usually associated

with qualitative methods in any research, despite the fact that both methods are inherently incompatible and play an equally significant and complementary role in knowledge building, Babbie and Rubin (2001). The use of mixed methods (qualitative and quantitative) is based on the assumption that qualitative and quantitative methods are complementary rather than competitive, Saunders *et al.* (2003).

Identifying the proper method to be used in the research is an important step before starting the data collection process, due to its role in collecting relative and accurate data; thus, deciding on which primary data collection method the researcher uses has to be chosen carefully to ensure achieving research aims and objectives. Hence, the researcher usually studies several methods to be able to choose the appropriate methods. However, since this research is a mixed methods research, this researcher has identified quantitative and qualitative methods, clarifying the advantages and disadvantages of each method and the reason behind using or not using each method is discussed in the following.

#### **5.10.1 Quantitative Data:**

The objectives of the quantitative data are to establish and employ mathematical models, hypotheses and theories related to research phenomena by using mathematical language to describe specific phenomena. Quantitative data is defined as:

*Those observations that readily lend themselves to numerical representations: answers to structured questionnaires, pay records compiled by personal offices, and the like.*

Rossi *et al.* (1999, p.270)

Malhotra and Birks define quantitative research as:

*Research techniques that seek to quantify data and, typically, apply some form of statistical analysis.*

Malhotra and Birks (2007, p.132)

Therefore, quantitative research is a systematic scientific investigation of the research phenomena and their relations. Moreover, quantitative research is considered a repeated process whereby often theories and hypotheses are refined. There are several methods of collecting quantitative data, according to Proctor (2003, p.129), such as sample surveys, diaries and questionnaires. Proctor states that the questionnaire is the most common used method in collecting quantitative data and involves self-administered, personal (face-to-face) interviews, postal surveys, web surveys (email), panel surveys, and telephone interviews. Moreover, Proctor declares that sometimes two or more methods can be combined to collect the required information. On the other hand, Robson (2002) classifies data collected by questionnaire in three ways: face-to-face, self completion and telephone interview. These methods and others are discussed in this research as follows:

#### **5.10.1.1 Postal Survey:**

Chisnall (2005, p.63) defines the postal survey as “*questionnaires...mailed to a sample of population to be surveyed*”. However, in the case of the postal survey, the data collection is through self completion schema by respondents, where the researcher has to post out the questionnaire to the targeted sample and then respondents have to fill in the questionnaire and post it back to the researcher, Proctor (2003). In some cases, the researcher may receive back few responses which would require resending the questionnaire after a few weeks to the same population or a search for another potential population, Waters (1998).

Using the postal survey involves many advantages for both data collection elements when conducting this method. Starting with the researcher, this method is considered inexpensive when posting out a considerable amount of questionnaires compared with telephone interviews and personal surveys. In addition, it helps the researcher to cover wider range of the targeted population once it is distributed, Schmidt and Hollensen (2006). On the other hand, respondents have a choice in completing the questionnaire whenever it is convenient to do so. Furthermore, since that this method does not involve any interviews, there is no chance for interruption by the researcher, and interviewer bias is totally absent in the responses, Proctor (2003). Additionally, since the respondent is under no pressure, the researcher has more chance to ask a

reasonably long sequence of questions, and respondents can talk freely about some personal or general organisation problems which they cannot discuss face-to-face.

With all the previous advantages of the postal survey, it still involves some limitations in terms of providing a low response, as in the study shown by Waters (1998, p.43) whereby “*less than 20% of target sample replies to the questionnaire*”. The results, therefore, may be misleading. Moreover, researchers do not have the advantage of face-to-face contact with the respondents and, thus, they missed observing their reactions and feelings about specific questions and the chance to explain any vague questions. This means, therefore, that more attention is required during questionnaire design, which has to be simple and easily understood by respondents to ensure receiving reliable responses in the absence of researcher. Finally, the questionnaire may be not fully complete or even completed by another person; hence, that would directly affect and mislead the findings, Hague (2004).

The main reasons behind not using the postal survey are the time required to receive respondent answers back, especially since this research is based upon a comparative study between Jordan and the UK which means that, if the researcher does not receive enough responses, the survey has to be sent again to the same or another sample which increases the overall time and cost. Additionally, due to the nonexistent or local difficulties postal system in Jordan, the researcher might face difficulties in using this method. Furthermore, the survey may not be fully completed or even completed by other than the targeted person which, as mentioned before, misleads the research by affecting data creditability.

#### **5.10.1.2 Telephone Interview:**

The telephone survey is a computer-controlled method which is considered a highly efficient follow-up method in connection with another basic method, the postal survey. This type depends upon the use of the computer by the researcher to read the questions from the computer to the respondents exactly as they appear on the screen. However, this method, according to Proctor (2003, p.136) “*involves a team of interviewers working from a central location, with workstations provided along with outgoing telephone lines for each*”. Telephone survey questions are usually shorter than other method questions since it uses the telephone, where respondent answers are

limited to a choice of possibilities such as Yes/No questions or Likert scale types, and then the answers go directly onto the computer for further analysis. Moreover, there are certain facts which have to be considered before conducting this method, for instance, choosing the targeted sample properly, having a well designed questionnaire and, finally, survey time management, which should not exceed 20 minutes, Hague (2004).

The main advantage of this method is the ability to cover a wide range of respondents locally and internationally without the need for any travel to meet respondents. This is because of the availability and effectiveness of the new call technique “Computer Assisted Telephone Interviewing”(CATI), Babbie and Rubin (2001), reducing by that the overall research cost and time. Furthermore, due to the business telephone coverage which reaching approximately 95%, according to Proctor (2003), this method reflects a high response rate as the researcher has the ability to call anytime and receive a call-back by respondents whenever they feel it convenient to answer the survey. This is considered efficient, together with the ability to modify and explain any vague questions. Finally, there is a compulsion to answer the telephone despite what respondent happens to be doing at the time of call.

Schmidt and Hollensen (2006) argue that this method could be expensive in the case of dealing with an international target sample, due to the time required for each questionnaire which might take 10 to 20 minutes. Also, the telephone network signal quality might affect the collected data value and cause a distribution for interview content. Moreover, the list of telephone numbers could be outdated or respondents not available to answer the calls resulting in the high possibility of missing a large part of the targeted sample. Nevertheless, this method does not involve providing visual aids in any way which affects information quality, according to Brace (2004) who stated that respondents prefer to deal with tangible documentation more than verbal conversation.

Since this research is based on international comparison, which requires targeting a quite large sample in Jordan, it is considered time and cost consuming due to the high rate charges for making international phone calls, and the time differences between countries which might increase the possibility of missing a large number of respondents. Additionally, there is no way for the researcher to observe the targeted

sample reactions and feelings which may mislead the findings somehow; thus, to improve research credibility and trustworthiness, the researcher has avoided using this method.

#### **5.10.1.3 Web Survey (Email):**

This method is considered reasonably similar to the postal survey due to the nature of distributing questionnaires and waiting for the responses, but this method is considered more efficient even though in some cases the researcher might face same difficulties as with the postal survey such as incomplete answers and no responses. However, it is still more effective in terms of cost and time in getting the responses back which can be from a few minutes to a few months or even longer. Nevertheless, the responses are in electrical form, which helps the researcher to manage and analyse it more easily or even save it for future use.

This type of survey involves several advantages in terms of data distribution and gathering methods which, in some cases, can be done within a few hours compared with the postal survey where distribution and gathering requires a longer time. Moreover, since there are no charges for using this technology, it is considered the cheapest method among the quantitative data collection methods. Finally, this method is a very convenient method in terms of data analysis and storage.

Email survey methods require some experience and skills for the researcher and respondents to distribute and answer the questionnaire and, thus, due to the lack of experience of internet usage in the small sized Jordanian targeted sample, the researcher avoided this method. Furthermore, in some cases, responses will be incomplete due to time limitations of respondents or failure to understand some questions, especially with the absence of direct contact. In addition, accessing the proper sample is a main challenge for any researcher starting with buying an email list of the targeted sample from third party, if applicable, taking into consideration the data protection legislation in the United Kingdom and Jordan, Schmidt and Hollensen (2006).

#### **5.10.1.4 Panel Survey:**

The panel survey involves a continuing group response to questioning from time to time to track specific phenomena movements and changes over time in order to be updated regularly on a weekly, monthly or yearly basis. This survey can target individuals or companies to measure any changes of a specific problem or phenomena over time to ensure that the updated data can be used whenever it becomes necessary. Waters (1998, p.258) defines the panel survey as a “*form of sample survey from which comparative data from the sampling units are taken on more than one occasion*”. Furthermore, the required update may be done by personal interviews, telephone interviews, post or even email.

Since this method is conducted by specialist companies or agencies, the collected data is considered highly reliable and up-to-date; moreover, the regular updates to the database allow the researcher to monitor and measure any changes of specific phenomena within the targeted sample over time and, thus, the researcher can compare historical data with present and up-to-date data. Additionally, this method can be updated easily by email, post and telephone or even face-to-face.

Crouch and Housden (1996) have discussed that the panel survey method is an effective method but it involves high costs to gather the required data and, thus, it can observe and monitor a small segment or organisations or individuals. In addition, the panel survey can be adopted by companies or agencies but can hardly be adopted by individuals as it requires a long time, money and a huge effort to deal with different firms and individuals with different backgrounds and beliefs to update the current databases.

As mentioned previously, this method requires a long time, huge effort and a high budget to gather the required data and, since this research is an international comparative based study, the researcher found that using this method has a direct effect on increasing the overall research time and budget. In addition, since this research has been conducted by an individual researcher, it would be impossible to adopt this method within the current research due to lack of necessary experience, skills, time, effort and money, which is needed to implement it properly.

#### **5.10.1.5 Self-administered Questionnaire Survey:**

This method depends on giving the questionnaire to the respondents to fill in, or leaving it in a convenient place to be filled in by potential respondents for it to be returned either to a convenient depository and then collected by the researcher or to be sent back to the researcher by post, email, (during pilot test) or even by hand (during field work).

According to Oppenheim (2000, p.103), this method is the most commonly used method of collecting quantitative data in management surveys because it ensures a high response rate, low cost compared with other methods, minimum interviewer bias, and accurate sampling. This method is considered cheaper than other methods and requires less effort by the questioner when compared with verbal and telephone surveys. Moreover, this method involves written questions and usually standardised answers that make it simpler for respondents to follow. The main disadvantage of this method is that respondents control the time of returning their response which reflects on increasing the overall time.

The researcher decided to use this model due to time limitations by employees and their organisations and, thus, the responses were collected after one or two weeks during the pilot test and during the field work the researcher was present to collect the responses. This method does not require having any known emails, home addresses, or even known telephone numbers by the respondents, nor did it require high skills to answer the questions. Moreover, it was considered a cheaper, faster way and involved a higher response rate than other methods such as the postal and telephone surveys.

#### **5.10.1.6 Interviewer-administrated Survey:**

Interviewer-administrated method is based on conducting the questionnaire face-to-face so that it can be filled in by the researcher. This method involves asking respondents the questionnaire questions and filling in the answer for them, which gives the researcher the chance to explain any vague questions and make sure that all questions are answered.

Interviewer-administrated is a face-to-face survey, provides direct contact with the targeted sample and gives the researcher the chance to explain any vague questions. Moreover, it helps the researcher to ensure that questionnaire is fully answered by the targeted sample and not anyone else. Thus, it is considered a flexible method in quantitative data collection. In addition, it gives the researcher the opportunity to reflect and study any reaction by respondents to specific questions and, thus, this can be transferred later by the researcher to the data. Moreover, the researcher can gain reliable and valid data once they have full control of selecting the targeted sample, Schmidt and Hollensen (2006).

Proctor (2003, p.134) argues that there are some limitations involved in interviewed-administrated in terms of the time, cost and effort required by researchers to collect the data, even if it is still less time, cost and effort compared with other methods; but the researcher has to travel to different places and sites to meet employees which will increase the overall cost and time. In addition, Cooper and Schindler (2003) mention that the time pressure on both researcher and respondents might affect the findings as a result of respondent time limitations, where they might have limited time to answer the questionnaire during their working hours. This method involves a high refusal rate for several reasons, such as time, or the respondent might even be uncomfortable with answering any question related to their job so they try to avoid starting the interview, Proctor (2003).

This method can save the researcher time and money in two ways. Firstly, the researcher has gained access to all targeted organisations and, secondly, the researcher can get direct and reliable results and feedback due to the use of face-to-face contact, compared with other methods which require more time to get results and reliable findings. Furthermore, this method helps the researcher to explain any vague questions and observe and utilise respondent reactions in terms of facial expression, voice and body language.

#### **5.10.1.7 Mixed Methods (Hybrid) Surveys:**

The choice of type of survey to be conducted by the researcher is influenced by three main factors: the time required for each survey to be completed, research strategy, and sample size. The combination of survey methods is considered an effective method during the data collection process. It is based upon combining two or more methods for the same study and retaining the best features of each method, while minimizing the limitations. Aaker *et al.* (2006, p2.62) argue that this method has proven very effective in improving research credibility by increasing the response rate. This research is based upon the combination of the two effective surveys: the interviewer-administrated and the self-administered survey.

The flexibility of this method gives the researcher the choice to combine multiple relevant methods to answer research questions and achieve research objectives. This combination can produce a high response rate and high research credibility. Moreover, by using two or more methods at the same time, the researcher can cover a wider range of respondents once the questionnaire is distributed. However, such a method requires more time and effort by researchers, in addition to having high skills and the experience to manage the hybrid method procedure.

The main purpose behind using this method is to establish a clear understanding and gain high quality results of TQM in the UK and Jordan by covering wide range of respondents in both countries and to increase the possibility of producing a high response rate to generate reliable, and generalisable findings.

#### **5.10.1.8 Sample:**

The research population is the entire group of people, events or things of interest that the researcher wishes to investigate, Sekaran (2003). Selecting the targeted sample is a fundamental element in any research; clear identification and misidentification of the targeted sample has its advantages and disadvantages. However, it is impracticable to survey the entire population to answer the research questions, which involves high cost, difficulties when gaining access for all the targeted organisations and a very long time for data collection and analysis. On the other hand, it seems obvious that the smaller and more sizable the targeted sample is, the more likely the research will be practical, cheaper and save time in terms of data collection and analysis. Therefore,

the researcher has to clearly identify and choose the targeted sample to answer the research question and to achieve the required findings and results. The population for this research consists of large and medium sized construction companies in the UK and Jordan. As the sample is big and there is a huge number of large and medium sized construction companies in the UK and Jordan, the researcher focused on investigating a small sample to generalise the results to the entire sample. Gay (1996) argues that the research has to target the entire sample when researching a small population ( $N < 100$ ); therefore this research focuses on a small sample, not the entire sample.

Defining the targeted population is a critical step in any research and requires a lot of effort to ensure research reliability and validity. The research population in any research has to start with a complete list of all the organisations in the population to ensure giving all organisations the chance to be selected; then the researcher determines the targeted organisation from the list. Because this research is studying the construction sector in the UK and Jordan, making such a list required much time and effort to be done and, since all the statistical reports are issued annually, an accurate list was impossible to make.

However, the targeted sample in this research is a small subset of the targeted population, focusing on the large and medium sized construction firms in the UK and Jordan, based on a list of the top 100 construction companies in the UK, and the top 100 construction companies in Jordan. To choose the more representative subset from a large population, the researcher took into consideration the factors that influence the determination of the target sample which are knowledge about the topic of interest, access to the population elements and the availability of the population elements and the time frame, Hair *et al.* (2003).

***Knowledge about the topic of interest*** - the population elements (participants) are a subset of the large and medium sized companies, according to each country's classification of the top 100 construction companies. Some of these companies have been operating regionally and internationally which means that experience and knowledge of the topic has high availability.

*Access to the population elements* - the population participants were contacted at an earlier stage of this research to ensure getting the required access. These companies deal with all types of construction works and have been operating for quite a long time.

*The availability of the population elements and the time frame* - the population participants are available and operating within the Jordanian and the United Kingdom market during 2008-2011.

The sample size for this research is 18 interviews and 200 questionnaires. Ten interviews were conducted with eight companies in the UK, including (contractors and clients) and eight companies in Jordan, including (contractors and clients). Two out of the 18 interviews were conducted with an international construction company operating in the UK and Syria as an alternative to Jordan because of the difficulties in finding one international company operating in the UK and Jordan. Thus, Syria was the alternative country to Jordan because it has similar culture and background to measure whether quality concepts are similar or related to each country's roles and regulations; therefore, the total targeted companies are 18 construction companies in the UK, Jordan, and Syria. In addition, the research focused on 200 employees to answer the self administered questionnaire. The study targeted managers, project managers, and employees who have been working with their companies for a certain time to ensure their credibility in answering the research questionnaires and interviews.

#### **5.10.1.9 Developing and Designing the Questionnaire:**

Hair et al. (2003) recommended a five-stage approach for designing a research questionnaire. This approach was used in this research for the purpose of designing the research questionnaire. The following is a description of these stages and the corresponding activities that were carried out at each stage:

- a) *Initial considerations* In the initial considerations phase, the target population, sample and potential respondents were clearly identified in both interviews and questionnaire. The population for this research consists of large and medium sized construction companies in the UK and Jordan. As the sample is big and

there are a huge number of large and medium sized construction companies in the UK and Jordan, and due to the regional nature of the construction industry where some big construction companies prefer to work regionally the researcher focused on investigating a small sample to generalise the results to the entire sample. Gay (1996) argues that the research has to target the entire sample when researching a small population ( $N < 100$ ); therefore this research focuses on a small sample, not the entire sample.

Defining the targeted population is a critical step in any research and requires a lot of effort to ensure research reliability and validity. The research population in any research has to start with a complete list of all the organisations in the population to ensure giving all organisations the chance to be selected; then the researcher determines the targeted organisation from the list. Because this research is studying the construction sector in the UK and Jordan, making such a list required much time and effort to be done and, since all the statistical reports are issued annually, an accurate list was impossible to make.

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***Knowledge about the topic of interest*** - the population elements (participants) are a subset of the large and medium sized companies, according to each country's classification of the top 100 construction companies. Some of these companies have been operating regionally and internationally which means that experience and knowledge of the topic has high availability.

*Access to the population elements* - the population participants were contacted at an early stage of this research to ensure getting the required access. These companies deal with all types of construction works.

*The availability of the population elements and the time frame* - the population participants are available and operating within the Jordanian and the United Kingdom market during 2008-2011.

The sample size for this research is 18 interviews and 200 questionnaires. Ten interviews were conducted with eight companies in the UK, including (contractors and clients) and eight companies in Jordan, including (contractors and clients). Two out of the 18 interviews were conducted with an international construction company operating in the UK and Syria as an alternative to Jordan because of the difficulties in finding one international company operating in the UK and Jordan. Therefore, the total targeted companies are 18 construction companies in the UK, Jordan, and Syria. In addition, the research focused on 200 employees to answer the self administrated questionnaire. The study targeted managers, project managers, and employees who have been working with their companies for a certain time to ensure their credibility in answering the research questionnaires and interviews.

**b) Clarification of concepts** In this phase, three main steps were undertaken. Firstly, the research concepts that will be measured were identified. In this research, these concepts are: employees knowledge of TQM, employees perception of TQM, data acquisition methods, quality perception within construction companies, Critical Success Factors for construction companies, external environmental factors relation to TQM implementation, and benefits of TQM with an organisation. Secondly, question wording was considered carefully. The issue of question wording is significant as it will help to ensure that all respondents interpret all questions similarly (i.e. draw similar meaning from all questions) (Ghauri and Gronhaug, 2005). Easterby-Smith et al. (2008), Hair et al. (2003) and Black (1999) suggested that a number of points have to be borne in mind when wording the questions used in a research questionnaire. These include: only questions relevant to the research objectives were chosen; each question reflects only one idea; jargon and

negatives were avoided; simple expressions and concise language were used; ‘double-barrelled’ questions were avoided; questions were created in formal and polite language; inappropriate language was avoided; and the use of ambiguous terms was also avoided. Thirdly, at the end of this phase, an initial list of potential questions was prepared (Appendix 2).

- c) *Typology of the questionnaire* Hair et al. (2003) argued that the type of questions used and the way in which they are structured- which also reflect on the quality of the questionnaire and might influence the response rate- should be determined in this phase. Lee and Lings (2008) stated that there are two types of questions that can be used namely: open-ended and closed-ended. Open-ended questions allow the respondents to answer using their own words and expressions. They are usually used when the researcher is not certain of some issues related to the research topic. In addition, they can provide rich information (Hair et al., 2003) noted. However, open-ended questions have some disadvantages, such as the lack of comparability and consistency across respondents, as well as being time-consuming when it comes to understanding responses (Lee and Lings, 2008; Hair et al., 2003). Closed-ended questions require respondents to choose a specific response from which a set of responses (i.e. predetermined answers) is provided. Close-ended questions have the advantage of making data collection and analysis easier. However, they are likely to be more difficult to design compared to open-ended questions. Based on this discussion, and bearing in mind issues, such as the sample size, which consists of eighteen organizations and time constraints, closed-ended questions were dominant in the questionnaire for the purpose of facilitating data collection and analysis. However, a number of open-ended questions was also used in the form of ‘other, please specify’.

The five-point Likert scale was employed to explore the employee opinions in relation to the CSF’s of TQM, external environmental factors in relation to TQM implementation, and TQM benefits, where the step “1” represents strongly agree and “5” is strongly disagree. The main reason behind adopting the Likert scale was to give some degree of flexibility of choice to reflect the intensity of respondent views.

Generally, the fieldwork processes were successful as respondents were supportive and co-operative. In spite of that, the researcher faced some difficulties during the data collection process. The research is based on a comparative study between the UK and Jordan and, thus, the researcher had to travel between the two countries to conduct the fieldwork, including personal visits, arranging appointments and the pilot study. During the fieldwork, the researcher found it more difficult to arrange interviews and conduct questionnaires in the UK compared with Jordan due to the researcher's previous work experience in the Jordanian Construction industry. In the UK, the difficulties started with getting a list of the targeted sample (large and medium size companies) and then arranging the interviews and conducting questionnaires.

The researcher faced some difficulties due to the absence of industrial contacts or previous experience with UK construction companies. Therefore, the researcher developed some strategies to gain access to the targeted sample. The strategy began with sending out emails and making phone calls, which were all rejected or ignored. The researcher then decided to rely on external contacts (friends, relative, previous or present students who work in the targeted organisations, the researcher's director of study and supervisor) and arrange a personal visit to the targeted companies which turned out to be more efficient than the previous method. The personal visits took place in different cities in the UK (Nottingham, London, Manchester, Bristol, Leeds, and Huddersfield) which required travelling from one city to another to gain access, depending on the list of targeted companies.

The researcher built a rapport with the participants to determine a deadline for completing the questionnaire. In addition, the researcher persuaded the targeted person (manager) of the value of the research, so that the managers felt the benefits of the interview or questionnaire by thinking through an issue and reflecting on any action that they had adopted before. Additionally, the results can be used internally by the organisations in a non-threatening and non-judgemental environment to measure employee satisfaction or expectations.

#### **d) Pre-testing and correcting problems**

Before using a questionnaire to collect the required data, it should be tested and pilot tested to ensure avoidance of any mistakes and irrelevant information, and to ensure that the questions will provide the right answers and not mislead, Malhotra and Birks (2003). A pilot test refers to the idea of distributing the questionnaire on a small sample of respondents before using it to collect the required data so that it can be refined and, thus, enable the researcher to obtain some assessment of question validity and likely reliability of the collected data. The pilot test is discussed in more detail in section 5.11.

#### **e) Questionnaire distribution**

The final stage in questionnaire design is administering the questionnaire. To ensure collecting more reliable data, the researcher decided to use the interviewee administrated questionnaire to help employees with any vague questions, 65% of the targeted sample were able to answer the questions during their break, while 35% decided to fill in the questionnaire and leave in the company main reception to be collected after that by the researcher.

#### **5.10.1.10 Translation of the Questionnaire**

The study is based on a comparative investigation between the UK and Jordan. The researcher had to translate the questionnaire into Arabic. Despite the fact that English is an official language in Jordan and is widely spoken in the business sectors, it might be spoken by some managers, engineers and clients, but it is not spoken by the majority of employees in the construction industry. As mentioned previously, the majority of employees in the Jordanian construction industry are international workers and come from different backgrounds and education levels with a minority able to speak English as a second language and able to understand the questions. Therefore, the decision was made to translate the questionnaire into Arabic to make it clear and easy to understand for respondents to provide more reliable findings. Malhotra and Birks (2003) suggest two alternatives for translating a research questionnaire to be conducted in an international research context. Firstly, back translation: source questionnaire to target questionnaire to source questionnaire, which might be repeated

several times to remove any errors or misinterpretations which might be cumbersome and time consuming. Secondly, parallel translation: source questionnaire to target questionnaire by two or more independent translators and then create the final version, which can lead to a good wording of the targeted questionnaire. The parallel translation was adopted in this research.

#### 5.10.1.11 Response Rate

After designing the questionnaire and conducting the pilot test, the questionnaires were then personally distributed to 200 employees in the UK and Jordan between September 2009 and April 2010. A total of 114 questionnaires were returned; 5 out of the 114 were not completed. However, according to the Neuman (2000) formula to calculate response rate, the total response rate, as shown in the equation below, is 58.46%, which, according to Saunders *et al.* (2003), is high and adequate to carry out the data analysis.

$$\text{Total response rate} = \frac{\text{Total Number of responses}}{\text{Total number of sample} - \text{Ineligible}}$$

$$\frac{114}{200 - 5} = 58.46\%$$

#### 5.10.2 Qualitative Data:

Qualitative research is a fundamental method of collecting valuable data by seeking out the “why” not the “how” of any phenomena. It does not just rely on statistics or numbers, but gives more focus on gaining insights into people attitudes, understanding specific phenomena, content and culture by analysing structured and unstructured data, figures, feedback forms, photos and videos, Ereaut (2008). Rossi *et al.* (1999, p.271) define qualitative data as “*protocols of unstructured interviews and notes from observations [which] tend to be less easily summarized in numerical form*”. There are two main methods of collecting qualitative data, as argued by Malhotra and Birks (2006, p.158), which are direct and indirect approaches, as follows:

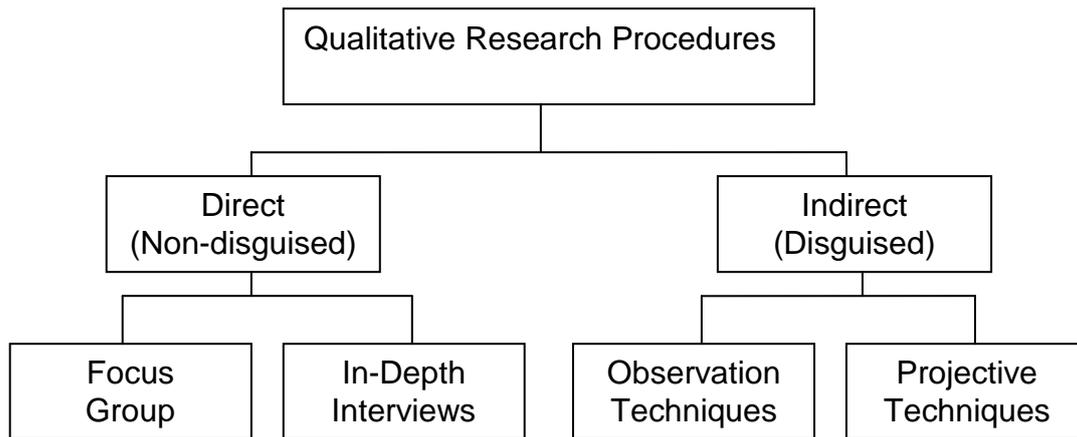


Figure 5.4 A Classification of Qualitative Research Techniques, Malhotra & Birks (2006, p.158)

### Methods of Collecting Qualitative Data:

#### 5.10.2.1 Focus Group:

A focus group is a gathering of 8-10 experts of the problem at hand, willing to generate data and insights that the researcher cannot gain without the interaction between the focus group experts. In addition, those experts share relevant characteristics related to the topic discussed in the group and are able to evaluate the research problem or phenomena in terms of ability to define the problem, identify research strengths and weaknesses and generate new ideas.

A focus group, according to Proctor (2003, p.210), is “*a discussion conducted by a trained moderator among a small group of respondents in an unstructured and natural manner*”. The main purpose of the focus group is to learn what people would say of the problem at hand and understand their arguments. According to Aaker *et al.* (2007, p.160), the researcher has to keep participants active and productive and, thus, guide the discussion towards a conclusion which all participants can agree to. Aaker *et al.* (2007) classify the focus group as three types. The first is the exploratory group and at this type, participants aim to define the problem at hand precisely. The second type is the clinical group which aims to discover participant hidden thoughts and beliefs about the research problem or phenomena. The final type, the experiencing focus group, aims to examine the target sample emotional framework. Furthermore, preparing a topic guide is considered as an important aspect of conducting a focus group. It is a list of specific topics and areas related to the research problem and, thus,

it can lead the discussion towards solving specific problems and provide the initial outline of research findings.

This method involves some advantages such as the general environment and the previous knowledge of the topic at hand by all participants creating a friendly environment and, thus, participants are willing to share and exchange their ideas and experiences of the topic under discussion. In addition, by preparing a clear and organised topic guide, the researcher can motivate all participants in the discussion by encouraging them to share their experiences. What is more, it encourages some people who are unenthusiastic or illiterate for an individual interview.

The focus group method requires a highly qualified and experienced researcher to be organised and able to motivate participants to provide a valuable contribution to the discussion, and to be able to argue and deal with different points of view to generate reliable findings which can be generalised. Chisnall (2005) argues the difficulties of conducting a focus group discussion in terms of choosing a suitable time and location that all targeted participants agree to. Additionally, some participants are not able to share their ideas but prefer to gain the experiences of others and, thus, researcher has to be able to select acceptable number of highly qualified participants to increase the chance of giving all participants enough time to express their feelings and experience of the problem; therefore, this research avoided using this method.

#### **5.10.2.2 Individual Face-to-face In-Depth Interviews:**

The in-depth interview is considered a very strong and effective tool for collecting qualitative data due to its characteristics of extensive probing and, thus, it provides the ability to discuss specific and deep topics to generate valuable data. Aaker *et al.* (2001, p.187) define in-depth interviews as “*interviews conducted face to face with the respondent, in which the subject matter of the interview is explored in detail*”. Aaker *et al.* (2001) discuss two types of interview: nondirective and semi-structured (or focused) individual interviews.

With the nondirective interviews, the researcher starts the interviews with a specific open-ended question and, then, the respondent is given maximum freedom to respond to the question. However, success depends on researcher ability to establish a

sympathetic and relaxed relationship and needs high skills to guide the discussion towards providing valuable findings.

The second type of in-depth interview is the semi-structured or focused individual interview. With this type, the researcher attempts to cover a specific list of topics and manage overall time, exact wording and the time allocated to each question by devoting extra time to some questions more than others depending on the topic. Moreover, the researcher should be able to return to the topic when discussion become unfruitful and should be prepared to answer unexpected questions from respondents Proctor (2005).

Cooper and Schindler (2003) state that the researcher gains many advantages when using the individual in-depth interview such as yielding the richest data, new insight and detail, since it is direct contact with respondents which provides opportunities to explore topics in-depth by dealing with open ended questions. In addition, this type of interview is not costly compared with the focus group type because it can be set in a professional office or organisation and usually respondents provide the researcher with the required information for free. Moreover, direct contact allows the researcher to take advantage of observation by measuring respondent feelings and reactions to certain topics. Stacks (2002) mentions that the researcher should have high skills to manage the interview and should have enough time due to the time required to arrange an interview with the target sample. Flexibility could cause a misleading result because of researcher desire to please the interviewee. Finally, the volume of information might be too large and difficult to analyse.

This research adopted the individual face-to-face semi-structured interview to gain more specific and focused information of the research phenomena which might not be gained by nondirective interviews because of respondent freedom to discuss and express ideas which might consume more time and mislead the research. In addition, this method is considered as the most appropriate path to discuss strategic and sensitive information compared with the focus group discussion. Nevertheless, it gives the researcher chance to explain any vague questions.

This research targeted large and medium size companies in the UK and Jordan registered as first grade construction companies dealing with all kinds of construction

works. Therefore, some other large size companies specialising in one type of construction work such as electro-mechanical and infrastructure were not targeted. The company size was measured in relation to the employee number because no single measurement scale can define organisation size and it might be different between countries. Within each company the researcher targeted owners and project managers with previous work experience because they are able to provide more deep and accurate information related to TQM implementation within their organisations. Every interviewee was asked whether the interview could be tape-recorded and the researcher was given permission by all interviewees to record the interviews for an academic purpose. In addition, the answers were also recorded by note-taking to be used in case the voice-recorded tape was not clear. Some interviews were held in the interviewee offices and others were held on site during their working hours, at their own convenience. Each interview took an average time of 30-60 minutes. Some of the interviews that were conducted in Jordan were postponed and some others were rescheduled for the same day. (See appendix 4)

In the UK, ten interviews were conducted with eight construction companies and clients: 4 large size companies, 3 medium size companies, and 3 clients. One of the three clients (The Business School of Huddersfield University) has a group of ten students, including a student with special needs, to provide regular feedback about the building and if they require any improvement. Meetings were held on a regular basis with the contractor and the client and, therefore, the researcher was able to gather some relative information related to the final client perception of the quality of the building.

In Jordan, the research targeted eight construction companies and clients: three large size companies, three medium size companies, and two clients. Because the study is based on investigating TQM in the UK and Jordan, the research focused on interviewing one company operating in both the UK and Jordan to measure whether TQM is implemented in the same way by one company when operating in different countries or whether it is different between countries, and whether it is different based on each country's perceptions of quality and roles and regulations.

Generally, the fieldwork processes were successful as respondents were supportive and co-operative. Interviewee provided the research with the required information which helped in drawing research findings. The researcher did not face any serious problems and difficulties during the interviews, despite some difficulties to secure the interviews with the required sample. However, **Cronbach's Alpha** is used to measure internal consistency; **Independent sample T-Test** analysis is used to compare sample means and to investigate if the means of the two sample distributions differ significantly from each other. **Multiple regression** analysis is used to test the effect of the independent variables (TQM critical success factors) on the dependent variables (profitability, market share, and service quality).

### 5.10.2.3 Interview Sample

In choosing the sample for interview, there are four broad decision areas: deciding on a suitable sample size; identifying a suitable sampling frame; selecting the most appropriate sampling technique; and choosing the respondents within each firm. With regard to the first of these decision areas, the suitable sample size needed for qualitative research, according to Lee (1998) and Yin (2003), is a subjective judgement, since qualitative studies do not require the same sampling logic, as do quantitative surveys. The final sample size, however, can be determined according to the research questions and objectives, Saunders *et al.* (2003), and the researcher's available time and budget. Bearing these elements in mind, 18 interviews were conducted as semi-structured face-to-face in-depth interviews, as shown in Figure 5.5. The rationale of targeting this number is that the study is based on a comparative investigation of TQM in the UK and Jordan, from different perspectives and, therefore, the researcher had to focus on contractors, clients and final users. In the UK, ten interviews were conducted with eight construction companies and clients: 4 large size companies, 3 medium size companies, and 3 clients. One of the three clients (The Business School of Huddersfield University) has a group of ten students, including a student with special needs, to provide regular feedback about the building and if they require any improvement. Meetings were held on a regular basis with the contractor and the client and, therefore, the researcher was able to gather some relative information related to the final client perception of the quality of the building. The accessibility of the targeted sample faced some difficulties during interview arrangements, explained in more detail in section 5.12.

In Jordan, the research targeted eight construction companies and clients: three large size companies, three medium size companies, and two clients. Because the study is based on investigating TQM in the UK and Jordan, the research focused on interviewing one company operating in both the UK and Jordan to measure whether TQM is implemented in the same way by one company when operating in different countries or whether it is different between countries, and whether it is different based on each country's perceptions of quality and roles and regulations. Fewer difficulties occurred in the Jordanian context, also explained in section 5.12.

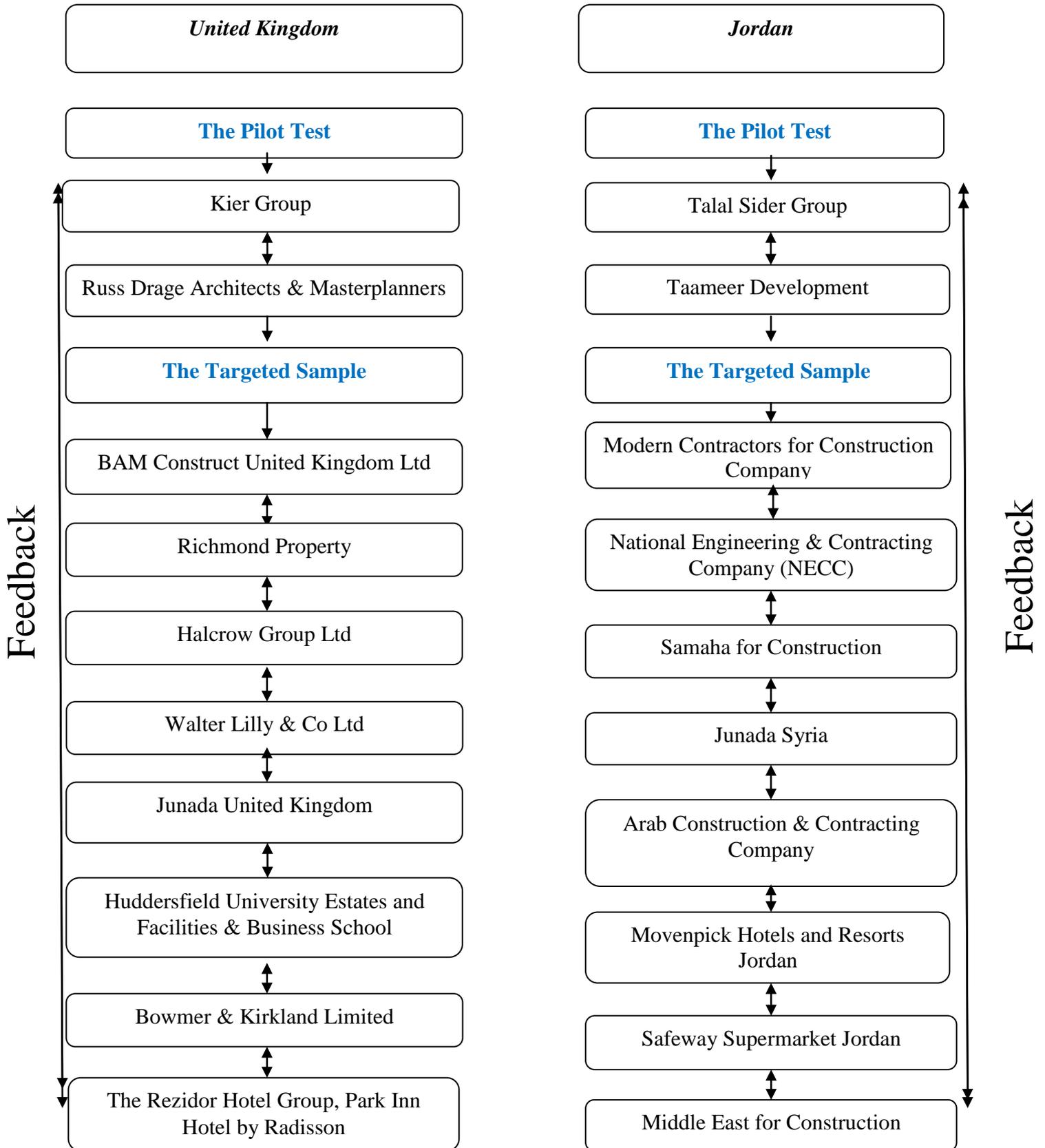


Figure 5.5 The targeted sample

#### **5.10.2.4 Interview Process**

The face-to-face individual semi-structured interview method, as shown in Appendix 2, is a list of nine questions to be covered during 18 interviews. All interviewees were asked the nine questions but in a different order according to the flow of the conversation. Additional questions were asked when it was felt that additional research questions could be explored. In accordance with recommendations suggested by Malhotra and Birks (2003) and Sekaran (2003), every targeted respondent was provided with a copy of the support letter and some of them asked to be provided with a copy of the interview in advance. Every interviewee was asked whether the interview could be tape-recorded and the researcher was given permission by all interviewees to record the interviews for an academic purpose. In addition, the answers were also recorded by note-taking to be used in case the voice-recorded tape was not clear. Some interviews were held in the interviewee offices and others were held on site during their working hours, at their own convenience. Each interview took an average time of 30-60 minutes. Some of the interviews that were conducted in Jordan were postponed and some others were rescheduled for the same day. In general, the researcher did not face any serious problems and difficulties during the interviews, despite some difficulties to secure the interviews with the required sample, discussed in section 5.12.

#### **5.11 The Pilot Study:**

Once the researcher had adopted the hybrid survey and semi-structured interview, pilot testing was divided into three stages. The first stage was distributing the questionnaire and interview questions on a small size sample, targeting eight current PhD students at the University of Huddersfield, focusing on those students with previous experience of questionnaire design, interview skills, data collection and analysing methods, to provide the researcher with information related to wording, design and layout. The second stage was distributing the questionnaire and the interview questions to four academic staff at the University of Huddersfield, University of Bradford, and University of Salford, focusing on specific people with previous experience of TQM to provide the researcher with useful comments related to data quality and accuracy.

The third stage was to conduct four face-to-face individual semi-structured interviews with project managers in the UK and Jordan and give the questionnaire to nine employees in the construction industry to investigate whether there were any misunderstandings or ambiguous questions and collect feedback. Five out of nine questionnaires were collected with some feedback related to some questions. In terms of the interviews, two interviews were conducted in the UK (Kier Group, and Russ Drage Architects & Masterplanners) and two in Jordan (Talal Sider Group, and Taameer Development) and some useful feedback was generated from the interviews which helped to make some final changes to the questions. After that, the fieldwork took place in the UK and Jordan by distributing 200 questionnaires and conducting 18 interviews. Out of 200 questionnaires, 114 were collected, where 5 out of the 114 were unusable, and 18 interviews were conducted face-to-face.

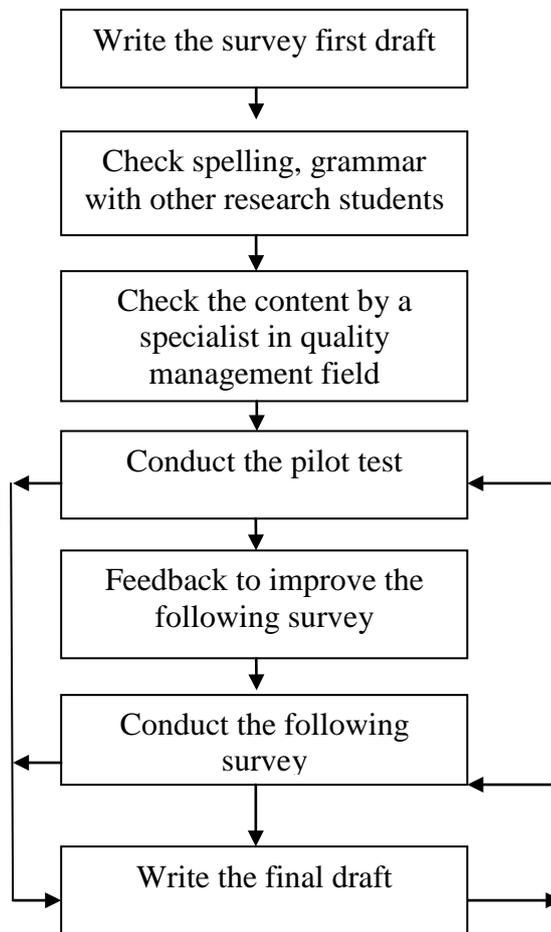


Figure 5.6 The pilot test phases

### **5.12 Negotiating Access and Fieldwork Limitations:**

Generally, the fieldwork processes were successful as respondents were supportive and co-operative. In spite of that, the researcher faced some difficulties during the data collection process. The research is based on a comparative study between the UK and Jordan and, thus, the researcher had to travel between the two countries to conduct the fieldwork, including personal visits, arranging appointments and the pilot study. During the fieldwork, the researcher found it more difficult to arrange interviews and conduct questionnaires in the UK compared with Jordan due to the researcher's previous work experience in the Jordanian Construction industry. In the UK, the difficulties started with getting a list of the targeted sample (large and medium size companies) and then arranging the interviews and conducting questionnaires.

The researcher faced some difficulties due to the absence of industrial contacts or previous experience with UK construction companies. Therefore, the researcher developed some strategies to gain access to the targeted sample. The strategy began with sending out emails and making phone calls, which were all rejected or ignored. The researcher then decided to rely on external contacts (friends, relative, previous or present students who work in the targeted organisations, the researcher's director of study and supervisor) and arrange a personal visit to the targeted companies which turned out to be more efficient than the previous method. The personal visits took place in different cities in the UK (Nottingham, London, Manchester, Bristol, Leeds, and Huddersfield) which required travelling from one city to another to gain access, depending on the list of targeted companies.

After gaining the required access, the researcher conducted individual face-to-face semi-structured interviews, some on site and others in the same company offices. During the pilot study stage, the researcher found it difficult to drive the interview and write down the required information, but it helped the researcher to get some feedback and modify the interview final draft. During the fieldwork, the researcher used the pilot study stage experience to start the interview and drive it towards the required questions and answers, and gain permission to record the interview which helped to follow up with the interviewees and get access to the data anytime during the study. Nevertheless, in Jordan some interviews were postponed or even cancelled.

The researcher built a rapport with the participants to determine a deadline for completing the questionnaire. In addition, the researcher persuaded the targeted person (manager) of the value of the research, so that the managers felt the benefits of the interview or questionnaire by thinking through an issue and reflecting on any action that they had adopted before. Additionally, the results can be used internally by the organisations in a non-threatening and non-judgemental environment to measure employee satisfaction or expectations.

### **5.13 Validity and Reliability of Data Collection Methods:**

The use of questionnaires and semi-structured interviews raises two data quality issues, validity and reliability, as follows:

#### **5.13.1 The validity of data collection method**

Leedy and Ormrod (2001) state that a questionnaire may not accurately measure what it is intended to measure, which, in turn, can affect the probability that a researcher obtains statistical significance in data analysis and draws meaningful conclusions from the data. To meet the requirements of validity in this research, the following procedures were undertaken, as suggested by Malhotra and Birks (2003).

An extensive literature review was undertaken including a comparative investigation of the TQM gurus, awards and evolution, in addition to researching TQM CSF's in the construction industry and other industries, such as manufacturing, services and retailers to understand the TQM implementation process and reasons for success or failure to be able to define and clarify the questions used in the questionnaire later. Some of the questions used in the questionnaire were adapted from related studies, which, in turn, made possible the comparison of the research findings with the findings of the other studies. Before using the questionnaire to collect the required data, the pilot study was conducted in three levels: colleagues, lecturers and experts, and targeted firms, as mentioned in section 5.11, which helped to establish content validity.

### **5.13.2 The reliability of data collection method**

Reliability is raised as a quality data issue with regard to the use of either questionnaires or semi-structured interviews, Sekaran (2003). The reliability of a data collection method is concerned with the degree by which the method will yield consistent findings and how far similar observations would be made or conclusions reached by other researchers when the entity being measured has not changed, Leedy and Ormrod (2001). This research has adopted the interviewee administrated and self-administrated questionnaires which were filled in while the researcher was at the company or on site to ensure that the targeted sample would complete the questionnaire.

The lack of standardisation in semi-structured interviews raises concerns such that interviews would not yield consistent findings by other researchers, Robson (2002). Moreover, the interviewee may provide partial or biased information which, in turn, affects the research findings. Therefore, the interviewees were provided with a support letter before the interview to confirm that the data will be only used for academic purposes and that confidentiality and anonymity are highly respected. Permission was given by the interviewees for tape-recording and note-taking before all interviews. The previous procedures were taken to meet the requirements of reliability, but still complete reliability cannot be guaranteed.

### **5.14 Data Analysis:**

The data analysis is a necessary stage after the collecting primary and secondary data. This stage mainly focuses on transferring the questionnaires and the interview results into useful and reliable information and making sure that the collected data achieve the research objectives and answer the research questions. However, presenting and analysing research data is not the end of any research because the researcher still needs to develop a link back to the theoretical and practical problems by interpreting the qualitative and quantitative results and findings. After collecting and analysing the data, the researcher has interpreted the data in terms of creating an understanding of these data and linked it to the research questions to investigate whether it answered these questions or not.

As mentioned previously, this research is based on combining the qualitative data with quantitative data to achieve research objectives and answer the research question to arrive at a better understanding of the problem and generate more reliable findings. TQM is seen as everybody's responsibility, involving management, stakeholders, employees, engineers, suppliers, designers and all parties involved in the construction project and procurement process. Therefore, this research depends on mixed methods to collect the required data from different perceptions and different parties. Blaxter *et al.* (2006) propose eleven ways to combine qualitative and quantitative research approaches, as follows:

- 1- Logic of triangulation: the result from one approach can be checked against the result from another approach, for example, qualitative results against quantitative results.
- 2- Qualitative research facilitates quantitative research: qualitative research may help to provide background information for quantitative research.
- 3- Quantitative research facilitates qualitative research: quantitative research helps with the choice of subjects for qualitative investigation.
- 4- Quantitative and qualitative research is combined to provide a general picture: quantitative research may be employed to plug the gaps in a qualitative study.
- 5- Structure and process: quantitative research is more efficient at getting at the structural features of social life, while qualitative studies are stronger in terms of process aspect.
- 6- Researcher and subject perspectives: qualitative research depends on the subjects' perspective as a point of departure, while quantitative research is driven by the researcher concerns.
- 7- Problem of generality: the addition of quantitative evidence may help generalisability.
- 8- Qualitative research may facilitate the interpretation of relationships between variables: quantitative research helps to establish relations between variables, while qualitative research is considered stronger in terms of analysing the relation between these variables compared with quantitative research.
- 9- Relationship between macro and micro level: applying mixed methods may provide a means of bridging the micro-macro gulf.

- 10- Stage in the research process: mixed methods may be appropriate to different stages of a longitudinal study.
- 11- Hybrids: when qualitative research is conducted within quantitative research design.

This research began with the qualitative approach to collect the required data by conducting eighteen interviews, followed by the quantitative approach to support the qualitative data and for it to be compared against the qualitative data results. Furthermore, in terms of data analysis the study started with analysing the qualitative data and identified the gaps which need to be filled by the quantitative data. Some of the gaps which needed to be investigated are the employee perceptions and understanding of TQM, employee perceptions of their management strategies toward TQM implementation, employee satisfaction and expectations of the proper adoption of TQM, as well as an investigation of whether employees understand the benefits of TQM and the obstacles they faced or might face during the implementation process.

Specific statistical methods were used to analyse the data, starting with the *descriptive analysis* to provide a summary of respondent characteristics, in addition to their company characteristics. The research included a link between research objectives and the collected data. The data was divided into the research objectives, relatively. Each objective was clearly presented by discussing the relevant question and data collected by respondents. However, analysing these data required further statistical analysis and, thus, the researcher studied different statistical analyses to understand and investigate the most appropriate analysis to be used. *Cronbach's Alpha* was used to measure internal consistency; the result shows that the questionnaire has relatively high internal consistency with .977. Moreover, *Independent sample T-Test* analysis was used to compare sample means and to investigate whether the means of the two sample distributions (Jordan and the UK) differ significantly from each other. *Multiple regression* analysis was used to test the effect of the independent variable (TQM critical success factors) on the dependent variables (profitability, market share, effectiveness and service quality), and to calculate P-values, T-values, F, R, and  $\square$ . The result indicates that the overall TQM factor is statistically significant with  $P=.000$ . Furthermore, all of the predictor variables are statistically significant. *Thematic approach* was used to analyse the interviews, based on decoding the

collected data and grouping according to relevance and then analysing to be decoded again, as shown in Chapter Six.

Within the data analysis chapter, collected data are presented and analysed in relation to the research objectives, respectively. The data analysis is based on linking the qualitative data findings to the quantitative data findings to fill the gaps and to be measured against research objectives. For example, within the qualitative data, some interviewees stated that their employees were satisfied and totally understood the benefits and the outcomes of TQM implementation, while during the quantitative data, the employees stated that they did not totally understand why their organisations have applied TQM. The differences between the qualitative and quantitative data demonstrates that there is a misunderstanding by managers, lack of communication between top management and employees, lack of sharing and communicating organisational vision and mission, or lack of loyalty by either management or employees. Therefore, mixed methods help to clarify the differences between qualitative and quantitative data to provide a better understanding of the research problem and provide reliable findings.

### **5.15 Research Ethics:**

Ethics refers to the moral principles that govern the conduct of an individual or group. Research ethics, according to Saunders (2007), “*refers to the appropriateness of researcher behaviour to the rights of those who become the subject of researcher work or are affected by it*”. Questions on ethics can arise at all stages in any research, from research design through the data collection and writing, to the findings and analysis.

The researcher has a responsibility to the research and respondents before, during and after collecting the required data. Since access was granted from managers in a powerful position, the researcher was sensitive to the way in which access was granted by choosing an appropriate time to make the telephone call and avoiding any unsociable times or sending several emails. Moreover, the researcher did not apply any pressure on participants to gain access, or on any external contact to help the researcher to grant access to any organisation. Moreover, once the researcher gained access to the organisation and was some time by managers to set face-to-face

interviews, the researcher gained some limited power, even for a short time, in terms of the ability of formulating questions. Therefore, ethical issues were an initial issue in terms of the way the interviewer formulated the questions to avoid any discomfort that might be caused by any question.

In addition, researcher took the privacy issue as a cornerstone by not abusing the data, such as participant reactions and lack of consent knowledge, confidentiality and the way the data is used, analysed and reported. Even so, the researcher avoided any deception to collect the data and accepted any withdrawal or refusal by individuals or organisations.

It should be noted that the researcher complied with the data protection legislation in the UK and Jordan by not allowing any movement of the gathered data or any usage by a third party under any circumstances. However, the researcher faced some limitations during data collection (interviews and questionnaires) in terms of securing access to the targeted sample, travelling from one city to another, and driving the interviews towards gaining the required information.

### **5.16 Chapter Summary:**

This chapter presented and justified the research approaches, strategies, design and philosophy to meet the research aims and objectives. Because this research has adopted the positivism philosophy, it is based on deductive approaches. This commenced with a development of generalisation or theory from the available data and literature and expressed it in operational terms. Then, there was an attempt to test the relationship between two or more variables from the theory to be measured and subject to empirical scrutiny, followed by it being confirmed, modified or rejected. Secondary data was the base to understand the general theories and idea of TQM in the construction industry, followed by face-to-face individual interviews and self-administrated and interviewer-administrated questionnaires, as primary data collection methods. The selection of these methods to be used as a primary data collection method is related to the nature of the study and budget allocated for the research.

To collect the required data and understand TQM from different perceptions, interviews with the project manager, suppliers, and designer were conducted in the early stage to pilot the research interview and questionnaire, followed by 18 formal interviews with owners, project managers, clients, final users and 109 questionnaires in the UK and Jordan in 2009-2010 to collect the required data. At one point, measuring quality perception from one international construction company operating in the UK and Jordan was necessary to understand the organisational perception of quality when operating in two different countries. Unfortunately, the researcher could not find any company operating in both countries and, thus, Syria was considered later on as an alternative to Jordan because it has similar culture, economic climate, working environment and construction rules and regulations.

Because the research is based on a comparative study between the UK and Jordan and, thus, the researcher had to travel between the two countries to conduct the fieldwork. The researcher faced some difficulties due to the absence of industrial contacts or previous experience with UK construction companies.

After collecting the required secondary and primary data, the researcher had to transfer these into usable data to investigate if they achieved the research objectives and answered the research questions and, therefore, specific statistical methods were

used to analyse the data, starting with descriptive analysis to provide a summary of respondent characteristics, in addition to their company characteristics. **Cronbach's Alpha** is used to measure internal consistency; **Independent sample T-Test** analysis is used to compare sample means and to investigate if the means of the two sample distributions differ significantly from each other. **Multiple regression** analysis is used to test the effect of the independent variables (TQM critical success factors) on the dependent variables (profitability, market share, and service quality) and to calculate P-values, T-values, F, R, and  $\square$ .

# **Chapter Six**

Data Analysis

## **6.1 Introduction:**

This chapter aims to present and analyse the data related to the research study's five objectives. The chapter, therefore, is divided into six sections. In section 6.2, the characteristics of the respondents to the questionnaires and interviews are described. Section 6.3 deals with investigating whether TQM is fundamental for all construction companies in the United Kingdom and Jordan, by asking specific questions related to employee knowledge, experience, and perceptions of TQM. This is to determine whether the interview results with managers have provided similar answers. Section 6.4 deals with the CSF's for the construction industry, based on a comparative investigation between TQM gurus, awards and TQM literature. Section 6.5 deals with the external environmental factors and obstacles that affect TQM implementation in the UK and Jordanian construction companies. Section 6.6 deals with the benefits of acquiring a TQM system for construction companies in the UK and Jordan. The final section, 6.7, deals with measuring the impact of the independent variables (eleven) TQM CSF's on the dependent variables (profitability, market share and quality services).

## **6.2 Characteristics of the Targeted Sample:**

### **6.2.1 Characteristics of Participant Companies:**

This research targeted large and medium size companies in the UK and Jordan registered as first grade construction companies dealing with all kinds of construction works. Therefore, some other large size companies specialising in one type of construction work such as electro-mechanical and infrastructure were not targeted. The company size was measured in relation to the employee number because no single measurement scale can define organisation size and it might be different between countries. During the pilot test, some interviewees were asked to identify company size measurement tools and the majority of interviewees stated that having a large number of employees reflects that company has large number of projects and, therefore, a high turnover. Thus, the relation between employee number, turnover and projects cannot be separated. Therefore, the number of employees was adopted by this research to reflect company size, where companies with more than 1,500 employees were perceived as big and companies with between 50 and 1,500 employees were considered medium sized, as shown in the following table.

Interviewee Characteristics			
	<i>Company Name</i>	<i>Company Size</i>	<i>Type</i>
Jordan	Arab Construction & Contracting Company	1,900 employees	Privately Held
	Modern Contractors for Construction Company	2,350 employees	Privately Held
	National Engineering & Contracting Company (NECC)	1,600 employees	Privately Held
	Samaha for Construction	1,350 employees	Privately Held
	Junada Syria	890 employees	Privately Held
	Middle East for Construction	400 employees	Privately Held
	Movenpick Hotels and Resorts	Over 250 employees	Client
	Safeway Supermarket	2,000 employees	Client
	United Kingdom	BAM Construct United Kingdom Ltd deals with more governmental projects and railways	2,800 employees
BAM Nuttall United Kingdom Ltd deals with private projects		2,800 employees	Privately Held
Richmond Property		1,000 employees	Privately Held
Halcrow Group Ltd		4,813 employees	Privately Held
Walter Lilly & Co Ltd		1,640 employees	Privately Held
Junada United Kingdom		1,340 employees	Privately Held
Bowmer and Kirkland		1,400	Privately Held
The Rezidor Hotel Group, Park Inn Hotel by Radisson		30,000	Client
Manager of the Business school of Huddersfield University , also represents student (final client) feedback		School Manager The Business School Over 150 members of staff	Client
Huddersfield University Deputy Director of Estates & Facilities		Deputy Director of Estates & Facilities	Client
Total	Eighteen Companies		

Table 6.1

Source: Semi-Structured Interviews with Companies in the United Kingdom and Jordan

The table shows that some companies have a huge number of employees who could not participate in the study and, therefore, a recommendation to each company managers was provided to target a specific number of employees working on some projects rather than other projects. However, that does not mean that one project had more experienced employees than another; rather, according to the managers, some projects have a high percentage of turnover which reflects a high number of new employees with less experience than others, as shown in the following section.

### **6.2.2 Characteristics of Self-administrated Questionnaire Respondents**

This section aims to describe the sample characteristics of 109 questionnaires conducted with people already involved in the construction industry such as employees, line managers and supervisors, divided into five groups: gender, age, qualifications, occupation and experience (Appendix 3.1).

The results show that 97.2% of participants were male in both the UK and Jordan, while 2.8% were female. The age category was presented in four levels, where 34.3% of participants were aged between 18 and 28 years, 44.4% were aged between 29 and 39, 14.8% were aged between 40 and 50, and 6.5% of participants were aged over 51 years old. The third table shows the verification of participant educational levels, where 16.0% of participants went to primary school, 28.3% hold a high school degree or equivalent, 48.1% hold college degrees or equivalent, and 7.5% hold postgraduate degrees. The fourth table shows participant occupations in their companies within the UK and Jordan: 2.8% were in a managerial position, 3.7% were supervisors, 6.5% were project managers, 9.3% were engineers, 9.3% were technical, and the highest percentage were builders at 68.5%. The final table shows participant experience, where 6.7% have worked for their companies for less than one year, 33.7% have worked for their companies between 2 and 3 years, 36.5% have worked between 4 and 5 years, and 23.1% have worked for their companies for more than six years.

### **6.3 The importance of TQM in Construction Companies**

The aim of this section is to present and analyse the data obtained from the interviews and the questionnaires regarding the first objective: whether TQM implementation is fundamental for all construction companies in the UK and Jordan.

### **Interview Findings:**

To find out if TQM implementation is fundamental for all construction companies, the researcher asked the targeted construction companies the following question: *It has been seen recently that organisations in the construction industry have eschewed implementing TQM practices because they believe that the short-term benefits are relatively minimal. So, do you consider TQM as a fundamental system within an organisation to achieve high quality services and improve customer satisfaction and retention?*

The answers show that all respondents, six construction companies and two clients in the UK, emphasised having a total quality management system in place for all construction companies. Supervisors, site managers and clients believe that it is important to retain a total quality management system in place as a key function for organisation success since it would improve performance and work patterns, and enhance reputation and quality outputs. They added that TQM's successful implementation would reduce costs in the short and long terms, since, when the organisation has to deal with defects and mistakes and the company is, thus, unable to secure any repeat business with the client, this could lead to a poor reputation. However, all companies agreed that with the economic problems, they would not be able to provide extra quality (more sophisticated technology and computer software) to their customers as they used to do before because they will not put in any extra effort if they do not get paid for it, which reflects the relation between the economic health and quality level in the construction industry. This relation has changed the quality standard within the UK construction industry, where the construction industry has seen a dramatic change in the quality level provided by contractors in terms of reducing the quality standard to the lowest level, whereas the lowest acceptable quality level has become the highest quality standard for the construction industry in the United Kingdom. However, one company (Bowmer and Kirkland) manager stated that providing extra value for the project does not mean adopting sophisticated technology but, in some projects, extra value means not making any serious mistakes which might cause delay for the project, especially when the client is keen to meet the deadline such as opening new stores or a new school within a university because any delay might cost the client a lot of money and affect their reputation. Furthermore, the participants agreed that having an active quality management in place does not mean

that the final project will be handed in defect free because any quality system that companies apply will not predict the external factors affecting the work progress but might help the organisation to minimise the effect of any external factor, such as weather, which might affect the project deadline and budget. In some cases, construction companies could take 10% of their time to finish 2% of the job, such as remedying defects or even doing small jobs.

A total quality management system is considered an organisational plan to cover all management procedures and responsibilities relating to the construction of the project and, thus, it is considered as a document planner for the management and at the same time as a plan which sets out a managed inspection regime of the works. Total quality management helps construction companies to establish a good relation with suppliers, designers and clients and, thus, to have early involvement in the procurement process, allowing construction companies to solve any problem before even starting the actual project which could save companies time, money and having poor reputation.

In the housing sector, the definition of quality is slightly different where one out of eight construction companies within the UK sample work in the housing sector and have a TQM system already in place, but the main drive behind the quality system is mainly to improve profits. In the housing sector, construction companies buy a piece of land and build a number of houses for their quality standard, even before involving the clients. In some cases, clients will buy the house even before it has been built; therefore, construction companies are able to control the quality level. That does not mean that the quality level will be low as they are still under the control of and are monitored by the British government Building Regulations which applied by building inspectors employed by local authorities, but quality is still controlled by the construction company, not the clients. All participants in the UK have agreed that the TQM system is fundamental for construction companies to boost organisation performance, market share, reputation and satisfying their clients and final users, but they still build to price rather than to standard.

There is a contrast with the Jordanian construction companies. The researcher conducted eight interviews with eight Jordanian construction companies and clients and one was conducted with a Syrian company. The result shows that six out of the

eight companies believed that a total quality system is important but is not considered fundamental for construction companies, as they have been in the sector for a long time without having a total quality system. They clarified that applying a total quality system is considered slightly expensive at this stage and requires time and effort. Moreover, they do not see any benefits in the short and midterm. Five out of the eight companies stated that applying total quality management requires top management commitment and highly trained and educated teams to ensure the best implementation of the quality system within the organisation, while two out of the eight companies adopted a total quality system mainly to be able to compete with the international construction companies in the Jordanian market. Other reasons for applying a total quality management system were improving customer satisfaction and boosting company performance. Even though 75% of the sample believed that a total quality management system is not important, it might be adopted within their organisations.

Within the entire sample, 62.5% emphasised having an active quality system in place to improve customer satisfaction, improve performance, improve work flows and meet deadlines, increase profits, enhance reputation, improve market share and expand their business into new markets internationally.

### **Questionnaire Findings:**

In this section, respondents to the questionnaires were presented with four sections and each section is divided into a number of questions to understand and find out whether all organisations require a TQM system in place. Thus, this part involves four sections, as follows (Appendix 3.2):

- Participants' knowledge of TQM
- Participants' perception of quality
- Data acquisition methods
- Quality in your organisation

#### *1. Participants' knowledge of TQM:*

Many organisations have a TQM system in place but the employees do not understand the reason behind implementing it which, of course, will affect the quality achievement and the success of the quality programme. To evaluate the knowledge of

employees in the construction industry, and to find out if they do understand the TQM concept and the reason behind it, the researcher asked some general questions related to TQM implementation, benefits, and potential improvement to measure the extent of employee understanding of quality systems.

The results show the answer for 109 respondents, divided between Jordan and the UK. The results showed that 84.6% of the UK sample was aware that a TQM system had already been implemented in their organisation, while 9.6% showed that the system is still under preparation, and 5.8% of the sample agreed that their organisations have not implemented a formal quality management system. However, comparing the UK questionnaire answers to the semi-structured interviews showed that 100% of the interviewee sample agreed that TQM is fundamental for their organisation and they have a quality management system in place. This result shows that 15.4% of the questionnaire respondents in the UK are not aware of any quality management system within their organisation. That might be caused as a result of a lack of communication, lack of training courses and lack of top management commitment towards quality improvement and awareness between employees.

Within the Jordanian sample, the percentages were actually different. The highest percentage at 79.1% indicated that their organisations have never implemented a quality system before, while 19.3% of the Jordanian sample mentioned that their organisations were preparing to implement a quality system and 8.8% said that a quality management system is already implemented. Comparing that with the interviews, the questionnaire respondents were aware of their management's lack of commitment towards quality with 79.1%, emphasising the absence of any quality system within their organisation and, thus, they understood the need for such a system to improve their job and performance but it had not been implemented yet.

The majority, 51.4% of employees, defines quality as satisfying external customers, with 43.9% for the Jordanian companies and 59.6% for the UK companies. In other words, external customer satisfaction must become the focus for construction companies. Despite the employee definition of quality being satisfying external customers, they define quality as being expensive and it is the second highest percentage among the other options. However, comparing that to the semi-structured

interviews within the Jordanian market, the interviewed respondents believed that applying a TQM system to their organisation is considered expensive at this stage and they do not see the short term and midterm benefits of applying it. In the UK, the interviewed respondents mentioned that applying a TQM system to their organisation is not considered expensive to a certain extent, but it depends on reducing defects and the technology level that each organisation uses to provide extra quality.

Of the Jordanian respondents, 52.6% believed that TQM will work very well in their organisations, while 24.6% felt that the TQM system will not work for their organisations. However, according to the Jordanian semi-structured interviews, the majority of participants agreed that TQM implementation requires knowledge, experience, and time to be implemented. Of the UK respondents, 11.5% said that the current TQM does work very well for their organisation, while the highest percentage at 71.2% said that they could not say if the TQM system had been implemented successfully and worked for their organisation. That might refer to many reasons: they have not seen yet the benefits of TQM for their organisations, poor communication channels between top management and employees, lack of understanding of TQM concept and implementation process by top management, lack of knowledge of TQM among employees, and lack of the required training and education. Son the other hand, such problem might be caused by employees as a result of them not being interested in the training course they have been provided with, or even they might be some new employees with lack of previous experience in TQM. However, despite the reason standing behind such problems between top management and employees, the implications might affect organisation performance and quality of final project.

In total, 56.9% believed that TQM will be beneficial for their organisations, while 35.8% believed that TQM will not be beneficial. However, among the Jordanian respondents, 57.9% felt that applying a TQM system will not be beneficial, while 28.1% felt that it will be beneficial, which almost reflects the interviewee responses within the Jordanian companies. Within the UK questionnaire respondents, 88.5% agreed that having TQM in place has been useful for their organisation, while 11.5% say it is not beneficial, which might be as seen as TQM as a system to increase profits, not to improve customer satisfaction.

The minority of questionnaire respondents, 41.3%, felt that a TQM system can be used to increase market share, with 55.8% from the UK sample and 28.1% from the Jordanian sample. However, specifically, the highest percentage among the Jordanian sample (36.8%) felt that TQM would reduce claims, while in the UK, the highest percentage (55.8%) of respondents felt that TQM would increase market share.

## *2. Participants' perception of quality:*

As mentioned previously, the researcher's intention is to study the quality concepts from different perceptions, as TQM is the responsibility of all parties. Thus, the researcher specified this section to understand employee perception of quality in the construction industry and, therefore, understand whether employees thought they required a quality management in place for their organisations.

Of the entire sample in the UK and Jordan, 36.7% respondents perceived quality as elimination of defects. However, looking at each sample separately, the UK respondents perceived quality as a tool to increase profits as the main purpose of doing business, while the Jordanian sample perceived quality, if implemented, as elimination of defects. Few respondents viewed quality as a competitive advantage.

The UK (94.2%) and Jordanian (80.7%) respondents perceived products/services quality as very important which indicates that, if the products/services quality is high, that will satisfy customers and thus increase profits. Therefore, construction firms have to pay more attention to the construction products and services.

Moreover, measuring the respondent knowledge of the quality system within their organisations showed that respondents perceived quality as very important for their organisation and, thus, they believed that it is a tool to satisfy customers. They ranked customer satisfaction as very important within the UK (90.4%) and Jordan (87.7%), and at 89.0% for the total sample.

Respondents were asked to rank in order of importance in a project Cost, Scope, Time, Quality, and Safety as they perceived them. However, the result showed that Scope occupied the first option, where 42.2% of respondents perceived it as the most important for a construction project compared with the other options. The following is the order of importance, according to UK and Jordanian respondents:

1. Scope
2. Quality
3. Time
4. Safety
5. Cost

### 3. *Data acquisition methods:*

This section included four questions. These questions were asked to find out the methods that construction companies within the United Kingdom and Jordan use to gather useful information regarding quality such as customer satisfaction and employee suggestions.

The results indicated that 72.5% of the entire sample agreed that their organisations solved problems by assigning an individual to solve each problem within the construction project. However, when looking into each sample separately, within the Jordanian sample, 94.7% perceived assigning an individual to solve construction project problems as their organisational way of solving problems, where almost half that percentage in the UK, 48.1%, stated the same. The second method of solving problem was to set up a multi-disciplinary team for each problem; this method has been used in UK construction companies more than Jordan, where 30.8% of the UK respondents stated that this is the second way of solving problems; 3.5% of the Jordanian respondents shared the same method.

The results reflected that 98.1% of the UK respondents stated that their organisations have a system for gathering customer suggestions, which might be during the procurement process or even through regular meetings with their clients during the project. In contrast, 1.8% of the Jordanian respondents stated this.

Within the Jordanian companies, 73.7% stated that customer satisfaction was not measured in their organisations and 15.8% stated that customer satisfaction was measured by the number of complaints and 10.5% by other methods. In the UK, the respondents stated that customer satisfaction has been measured in their organisation in different ways: 40.4% stated that customer satisfaction was measured by questionnaire survey; 57.5% stated that it was measured by the number of complaints; and 1.9% stated that it was measured by other methods.

Of the Jordanian sample, 98.2% agreed that their organisations do not have any system for gathering employee suggestions, which reflects top management commitment towards quality improvement in the Jordanian construction industry. This compares with 88.5% of UK respondents stating that they had a system for gathering employee suggestions.

#### *4. Quality in your organisation:*

Respondents were asked nine questions to investigate quality in the United Kingdom and Jordanian construction firms. The respondent answers showed that the Jordanian construction companies have not developed a clear definition of quality, as stated by 91.2% of the sample, whereas in the UK, all respondents stated that their organisations have developed a clear definition of quality. The result again reflects management lack of commitment towards quality in the Jordanian construction industry and lack of communication.

The majority (75.2%) of construction companies within the sample did not have a quality improvement programme. Furthermore, within the Jordanian construction companies, all employees stated that a quality improvement plan programme had not been a part of corporate policy for some time now, whereas 63.5% of the UK sample stated that it had been a part of corporate policy for some time.

The respondents were asked if their organisation had a quality improvement programme; 45 out of 56 respondent answers were No and, thus, 12 out of 57 only could answer this question. Thus, 4 out of 12 stated that their organisations had a TQM system in place, whereas the remainder stated that they had a quality control system. In the UK, 59.6% stated that they had a TQM programme in place, while 88.5% said that their organisation used ISO9000, and 92.3% used other quality systems.

Within the Jordanian sample, 50.0% said that customer demand provides the motivation to start TQM for their organisation, whereas 25.0% stated that their company chief executive provides the motivation to start TQM; another 25.0% said that the need to reduce costs and improve performance provides the motivation to start TQM. In the UK, the result showed the motivation to start TQM as: customer

demand, 78.8%; pressure from competitors, 17.3%; and need to reduce costs and improve performance, 3.8%.

Of the Jordanian respondents, 75.0% described a quality improvement programme as a periodic short-range solution to a motivational programme; 16.7% stated that there was no formal programme, while 8.3% gave other reasons such as, "it is still under consideration". In the UK, 57.7% described it as a periodic short-range solution to a motivational programme; 30.8% said that they had a quality improvement programme underway in their organisations; and 11.5% said that they did not have a formal quality improvement programme.

Within the entire sample, 85.9% said that their quality improvement programme had the full support of top management. However, among the Jordanian sample, 7 respondents (58.3%) stated that their organisation quality improvement plan had top management support, while 48 out of 52 respondents in the UK stated the same.

The majority of the Jordanian respondents (75.0%) said that cost reduction is the major objective of their quality programmes; increased profitability, 25.0%; compliance with statutory, environment and safety requirements, 16.7%; and the remainder said that involvement of employees in the quality building effort and other reasons are their organisation objectives of their quality programme. This indicates that the Jordanian construction companies saw a quality programme as a financial improvement programme to increase profits and reduce costs. In the UK, 42.3% stated that their organisation objective of quality improvement programme was to increase productivity; 32.7% said cost reduction; 19.2% said involvement of employees in the quality building effort; and the remainder said that their organisation objective of quality programme was compliance with statutory, environment and safety requirements.

After the implementation of a quality improvement programme in the Jordanian companies, 25.0% said that service/product quality had improved; another 25.0% said that quality remained the same; 47.1% did not say anything about service/product quality after the implementation of the quality improvement programme. In the UK, 48.1% said the product/service quality had improved and 21.2% said that quality had remained the same; 23.1% did not say anything.

After the implementation of quality improvement programme in the Jordanian companies, 25.0% said that relationships with customers and suppliers had improved; another 25.0% said that relationships remained the same; and 47.1% did not say anything about relationships with customers and suppliers after the implementation of quality improvement programme. In the UK, 50.5% said the relationship with customers and suppliers had improved, while 17.3% said that relationships had remained the same and 25.0% did not say anything.

In summary, the results showed that the Jordanian construction companies have not developed a clear definition of quality and the majority of employees were not aware whether their organisation had applied a quality system or not. Moreover, the majority of employees (75.2%) said that their organisations did not have a quality improvement programme but they lacked the commitment of their management. The main objectives of quality improvement programmes are cost reduction, increased productivity and compliance with statutory, environmental and safety requirements. customer demand, company chief executives and the need to reduce costs and improve performance were the key reasons behind applying quality systems in their organisations. The majority of respondents felt that services/product quality and relations with customers and suppliers remained the same after the implementation of the quality programmes.

In the UK, all the employees agreed that their organisations had developed a clear definition of quality and they were all aware of the quality systems. Of the respondents, 63.5% said that quality improvement programme had been a part of corporate policy for some time and had the support of top management to improve quality. Also, there were a mix of quality improvement programmes, TQM and quality control. The main objectives of the quality improvement programmes were increasing productivity, involvement of employees in the quality building effort and cost reduction. Customer demand, pressure from competitors and the need to reduce costs and improve performance were the key reasons for applying a quality system in their organisations; 48.1% said the product/service quality had improved, while 50.5% said the relationship with customers and suppliers had improved

## 6.4 TQM CSF's in the Construction Industry

The aim of this section is to present and analyse the obtained data from the interviews and questionnaires regarding the second objective, to define TQM CSF's in the UK and the Jordanian construction industries, because each project has different TQM CSF's and, therefore, this section aims to investigate the most common CSF's implemented by the majority of the targeted sample.

### Interview Findings:

After understanding whether TQM is fundamental for all construction companies, and whether they are still able to survive without any quality system in the changing business environment, the researcher aims to identify the Critical Success Factors (CSF's) for those organisations who applied TQM, and to understand the relation between these factors. To do this, the researcher asked the following questions (Appendix 2):

*1. Top management commitment and having a quality culture consider the most vital principles in TQM because they are often assumed to have a strong relation with customer satisfaction and retention. So, to what extent is the top management committed to quality?*

*2. If your company has adopted a TQM system, which of the following factors have been implemented and what are the reasons behind implementing those factors? Top management/leadership commitment, Quality culture, Process planning, Strategic quality management, Employee empowerment, Employee training and education, Supplier chain management, Customer satisfaction, Management Information System (MIS), Continuous Improvement, Benchmarking, Impact on society and environment.*

*3. How do you measure TQM implementation and how do you measure the quality of the final project and performance throughout the project?*

*4. Previous studies have found that "establishing healthy relations with suppliers greatly reduces business risk". So, do you choose suppliers based on price or quality? And in which way could the relation with suppliers affect project quality, meeting deadlines, and the overall budget?*

All the respondents in the UK construction company sample said that their management was totally committed to quality, and that came from looking at the commercial implications of not getting things right. Thus, a few years ago they would typically spend a lot of money to put defects right, then the snagging team had to come and correct defects on site and put things right. Therefore, they believed that having good quality, trained and satisfied employees and customers, the right subcontractors, quality planning, new technology, regular benchmarking, corporate social responsibility and continuous improvement were of great economic benefits to the business which comes from having a quality culture and committed management, and directors and snagging teams who are always looking to reduce defects and deliver a better quality building, improving by that client relations and company reputations.

Moreover, the majority of the sample stated that their management was committed to regular meetings with clients to keep them updated with working progress, and also committed to the environment and local community by pushing local suppliers to reuse materials. Thus, creating a quality culture cannot be achieved without management and shareholder commitment to quality.

Being competitive and successful in the long term within the UK and being able to compete internationally required a professional recruitment team to ensure recruiting the right person for the right job. They also have to be highly trained and educated, provided by the construction companies after getting hired. The required skills are not only to demonstrate technical knowledge and management skills, but also to add value to the project by making a positive contribution to the overall project and organisational customer care ethos.

In terms of construction industry aspects on the environment, the majority of the UK sample pushed their suppliers and subcontractors not only to cope with their environmental policy, but also to develop their own environmental policy and offer more environmentally friendly and sustainable alternatives for construction projects.

Almost all the companies stated that they had had a TQM system in place for a long time and they had implemented CSF's for the company, but their aim was to achieve customer satisfaction through implementing continued improvement initiatives to

maximise value. Additionally, to ensure customer satisfaction, they implemented a programme of Continuous Customer Care (CCC), based on the philosophy of total quality management. This system helps organisations to understand the relation between their internal customers (sites and departments) and their external customers (clients, suppliers, design team, and third parties). This commitment to CCC is based on management belief that developing consistent customer focused procedures across the entire company is an essential ingredient in providing ongoing customer satisfaction. The CCC manager is also responsible for leading organisational key performance indicator (KPI) initiative, including the ongoing performance measurement of the projects and also obtaining customer satisfaction feedback from designer and clients following project completion. At quarterly intervals, the manager collates, analyses and reports to the board of directors and senior managers on the performance of the company against predetermined KPIs. This process allows construction companies to demonstrate their track records in term of time, cost, quality, and safety performance in a statistical form, whereas customer satisfaction feedback enables customers to comment during the whole life cycle of the project on both soft and hard issues such as teamwork, financial management and programme confidence.

In terms of supplier relations, two out of eight (25.0%) companies implemented the Purchasing Excellent Programme system “PEP” which helps organisations to categorise their suppliers into category one, category two and category three suppliers, where the management tends to place 75.0% of their work with category one who is already aware of the organisation’s quality standard, health and safety and communication programme which, by the end of the day, will ensure work flow and quality outputs.

In the Jordanian sample, two out of eight had implemented a TQM system in their organisation. The result showed that the other companies were applying some of CSF’s for their organisations even without having a formal TQM system in place. They stated that, even though they do not have formal TQM, their main priority was maximising profits throughout the quality of the final project. They stated that customer satisfaction was an important element for their organisation which helped them to build their reputation in the Jordanian market. Two out of eight companies

said that they believed that, recently, the Jordanian construction sector was dealing with clients who were looking for companies to build for the purpose of ‘no more and no less’ than to reduce costs as far as possible.

One out of six construction companies and two clients emphasised the importance of customer satisfaction, where construction companies are always keen to satisfy their customers through teamwork which helps employees to share knowledge and experience. Thus, instead of providing employees with costly training and education programmes, management tends to focus on teamwork under the supervision of project managers to ensure finishing the job on time and budget. Furthermore, establishing a long relationship with supplier is fundamental for Jordanian construction companies to ensure getting the required construction materials on time and ensure a competitive price to reduce costs. The main concern is when dealing with international suppliers to secure more materials which are not available in the Jordanian market; the contractors have to deal with agents to ensure receiving the right materials at the right time.

The Jordanian construction companies stated that they did not benchmark or measure their performance throughout the project. Each client has to hire a personal supervisor or supervision team responsible for measurement throughout the project. The supervisor has to be on site on a daily basis, checking all materials before and after installation, reporting to the client and providing feedback to the contractors. By the end of each project, the supervisor has been responsible for the quality of the final project, making sure that the final project is exactly as planned and everything working. Thus, there are no measurement systems or software, and the researcher believes that final project quality relates to supervisor experience and points of view.

However, within the entire sample, the interview results showed that all TQM (CSF's) were discussed with 18 construction companies and clients in both countries, but none mentioned the entire CSF's for TQM system implementation; however, they added more factors such as health and safety and social responsibility. The following table shows the number of companies applying each factor:

Critical Success Factors for TQM in the United Kingdom and the Jordanian Construction Industry

Critical Success Factors for TQM	Valid N = 18 interviews	
	Number mentioned	%
Top Management / Leadership Commitment	18	100%
Quality Culture	12	66.6%
Process Planning and Strategic Quality Management	10	55.5%
Employee Empowerment	10	55.5%
Employee Training and Education	8	44.4%
Supplier Chain Management	12	66.6%
Customer Satisfaction	11	61.1%
Information and Communication Technology	8	44.4%
Continuous Improvement	8	44.4%
Performance Measurement Systems for Benchmarking	9	50.0%
Impact on Society and environment.	8	44.4%
Health and safety	8	44.4%
Social Responsibility	6	33.3%

Table 6.2, Source: Data analysis results

### Questionnaire findings:

To define the CSF's of TQM system within the construction industry, the respondents were asked to answer 36 questions related to TQM in general. The questions were built on five points of the Likert scale (1. Strongly agree; 2. Agree; 3. Neutral; 4. Disagree; 5. Strongly disagree). The respondents were asked to answer, at which point they would mark from Strongly agree with or Strongly disagree with the given statement. The average of the Likert scale is 3  $((5+4+3+2+1) / 5)$ ; therefore, a mean below 3 shows overall disagreement, while a mean above 3 shows agreement (Appendix 3).

The CSF's of TQM implementation were discussed in Chapter Four in more detail. The factors are: Top Management/Leadership Commitment; Quality Culture; Process Planning and Strategic Quality Management; Employee Empowerment; Employee Training and Education; Supplier Chain Management; Customer Satisfaction; Information and Communication Technology; Continuous Improvement; Performance Measurement Systems for Benchmarking; Impact on Society and Environment.

### Top Management / Leadership Commitment

The extent and degree of top management commitment adoption in the UK and the Jordanian construction companies recorded an average rank in the UK, and a low rank in Jordan. *Top management continually demonstrates their commitment to quality* recorded the highest mean with 2.4912 but this still indicates total disagreement by respondents in Jordan, while in the United Kingdom it recorded 3.8269 which is slightly above the mean. *Top management has an inclination to allocate adequate time and resources for quality improvement* recorded 2.1228 which still indicates disagreement by Jordanian respondents, and 3.9038 in the UK. *Top management learns from problems* recorded 2.2982 in Jordan, and 4.3077 in the UK. The mean indicates total disagreement about top management commitment levels within the Jordanian construction companies, while it shows an agreement within the UK with a mean around 4.00.

### **Quality Culture**

The result shows a gap between Jordan and the UK agreement in the quality culture factor. *Your organisation is willing to adapt cultural change to fit with the changes in the business environment:* the first statement recorded a very low mean in Jordan with 1.7719, while recording a mean of 4.1346 in the UK. *There is an ongoing creation of quality awareness among employees* also recorded a low mean in Jordan with 1.8596, while it recorded 4.1538 in the UK. *The creation of quality awareness among employees is ongoing process in your organisation* recorded 1.8070 in Jordan, while it recorded 4.3269 in the UK. That shows a total disagreement with the statements in relation to the quality culture towards TQM application in Jordan, while the results indicate a total agreement in the UK.

### **Process Planning and Strategic Quality Management**

The result shows a lack of process planning and strategic quality management in the Jordanian construction companies, where the first statement *There is general policy development and effective development of goals in your organisation* recorded a low mean with 2.2281, while in the UK it recorded an agreement with a mean of 3.9231. *There is strategic quality planning of the long term quality journey* indicates a disagreement in Jordan with the lowest mean of 1.7321, while it recorded an agreement in the UK with a mean of 3.8462. *TQM principles are used in reviewing*

*the formulation and implementation of strategies* has also recorded a low mean with 2.0 in Jordan and a high mean in the UK with 3.7885. Results indicate a total disagreement about the statement in relation to Process Planning and Strategic Quality Management application in the Jordanian construction companies.

### **Employee Empowerment**

The result reveals that all statements related to employee empowerment recorded a low rate in Jordan, while recording a high rate in the UK which, again, reflects the gap between two samples. *My company empowers rather than controls* recorded 2.0 in Jordan, and 4.0577 in the UK. *Employees are encouraged to come up with new idea and suggestions to enhance their job* also recorded a low rate in Jordan with a mean of 1.9298, while it recorded the highest rate in the UK with a mean of 4.3462. *Employees have authority in their positions to make necessary actions when required* recorded 2.0702 in Jordan, while it recorded 4.2115 in the UK. The final statement, *Management involves employees in the decision making process*, again recorded a low rate in Jordan with a mean of 1.6842, while it recorded a high rate in the UK with a mean of 4.2500. The statements show a total disagreement in Jordan in relation to employee empowerment application towards TQM.

### **Employee Training and Education**

The results show that the level of employee training and education in relation to TQM implication has recorded a low rate in Jordan, while it has recorded a high rate in the UK, measured through six questions on a five-point Likert scale. The first statement *My Company prefers training and coaching rather than supervision* recorded 1.6316 in Jordan, while it recorded 4.3654 in the UK. *I receive the required quality training regularly* also recorded a low rate in Jordan with a mean of 1.6842, while it again recorded a high rate in the UK (4.7308). *Employees get trained to improve company outputs*: within Jordan respondents totally disagreed with the previous statement with a mean of 1.7544, while they totally agreed in the UK with a very high rate of 4.7500. *Training aims to enhance employee performance and skills*: despite the fact that Jordanian respondent answers reflect their lack of training, the majority of them agreed on the benefits of training in terms of enhancing their performance and skills with the highest result among statements with a mean of 3.4386, while in the UK, the statement recorded a high rate with a mean of 4.4808. *Employees receive regular*

*health and safety training*: regarding health and safety training, which was mentioned by the majority of participants in the semi structured face-to-face interviews as a very important factor in the construction industry, Jordanian respondents totally disagreed on the statement regarding their health and safety training with a mean of 1.5439, while in the UK, the respondents agreed with a mean of 4.3269. The final statement relating to employee training and education was also related to the health and safety for construction industry: *Safety equipment and clothes have been provided by company* and the result again shows a high rate of disagreement among Jordanian respondents with a mean of 1.6491, while it shows a high rate among UK respondents with a mean of 4.1923.

### **Supplier Chain Management**

This factor reflects the employee perception of their organisation in relation to suppliers. Respondents were asked to answer three questions in relation to supplier chain management in TQM application. The result shows that Jordanian employees perceive their organisation relation with their suppliers as very poor, as follows. *The company establishes good relations with suppliers which lead to continuous improvements*: Jordanian respondents ranked their company relations with their suppliers which leads to continuous improvements as 1.9123)which indicates a poor relation with suppliers, while in the UK, respondents agreed with the statement with a high mean of 4.4231. *Supplier materials are conducted to an examination before installation to ensure meeting client demands and high quality standards* recorded a low rate in Jordan with a mean of 1.8246, while again it recorded a high mean in the UK of 4.2885. *Your organisation categorises suppliers to ensure dealing with the first category with high quality standard* recorded a low mean of 2.0351 in Jordan, while it recorded a high mean in the UK of 4.0769.

### **Customer Satisfaction**

Respondents were asked to answer three questions relating to customer satisfaction in relation to TQM implementation. *The priority attention is given to fulfil customer needs by my company* showed that customer satisfaction is not the main priority for Jordanian construction companies according to respondents, with a low mean of 2.0351, while it is considered important for UK construction companies with a mean of 4.1154. *There is a regular quality meeting with customers to keep them updated*:

Jordanian respondents indicated that their companies do not set regular meetings with customers to keep them updated, with a low rate of 2.0702, while in the UK, the respondents agreed with the statement with a high mean of 4.2115. The final statement in relation to customer satisfaction was *My company has implemented a systematic approach to add value to its services to increase customer satisfaction* and the results showed a low rate with a mean of 1.6842 and a high rate in the UK with a mean of 4.1923.

### **Information and Communication Technology**

Respondents were asked to answer three questions related to their company's information and communication technology in relation to TQM implementation; the result shows that the Jordanian respondents disagreed with the statements with a low mean for all of them, while the UK respondents agreed with the statement. The first statement was, *My Company continually tries to improve communications* and recorded 1.9464, while it recorded 4.3654 in the UK. The second statement, *The company clearly communicates its strategies and goals with employees*, recorded the lowest mean in Jordan (1.6316) and also in the UK (3.9615). The final statement was *I receive regular feedback to make performance developments* and it recorded a low rate in Jordan with a mean of 2.0175, while it recorded a high rate in the UK with a mean of 4.0769.

### **Continuous Improvement**

Continuous improvement was measured by three statements in relation to TQM implementation. The results show respondent perceptions of their company's continuous improvement plan. *The company emphasises improvement rather than maintenance* recorded a low rate with a mean of 2.3333 in Jordan and 4.0192 in the UK. *Management encourages continuous improvement, creativity, and innovation* recorded the lowest rate in Jordan with a mean of 1.9123, while it recorded higher than that in the UK with a mean of 3.8077. Moreover, respondents in Jordan showed disagreement with the final statement, *The company emphasises the best implementation of continued improvement process for all tasks at all levels*, with a low mean (1.9825), while it indicated respondent agreement in the UK with a mean of 3.7885.

### **Performance Measurement Systems for Benchmarking**

Respondents were asked to answer three questions related their company's performance measurement system for benchmarking in relation to TQM implementation. The first statement, *My company adopts a self assessment system to improve performance*, recorded the lowest rate in Jordan (1.7895) and the lowest in the UK (3.8269). *Competitive benchmarking is made against primary competitors* recorded a low mean in Jordan (1.9825), while it recorded a high mean in the UK (4.4038). The final statement was *My company is tracking quality cost to reduce the cost of waste, rework, and rejection* which again recorded a low rate in Jordan with a mean of 1.9107 and high rate in the UK with a mean of 4.4038.

### **Impact on Society and Environment**

The final factor is the impact on society and the environment. The respondents were asked to answer two question related to their company's policy towards society and the environment in relation to TQM implementation. Results show total disagreement among the Jordanian sample for the first statement, *Your organisation construction activities are carried out in such a way as to minimise their impact (quicker, quieter, and cleaner) on others (the local community,)* with a mean of 1.5965, while it shows total agreement among the UK respondents with a mean of 4.00. The second and final statement, *The selection of products and materials take full account of their environmental impact (extraction of raw materials, and processing) including their potential for recycling*, indicates Jordanian respondent disagreement with a mean of 1.7018, while it recorded a high rate in the UK with a mean of 4.4038.

## Reliability

		N	%
Cases	Valid	106	97.2
	Excluded <sup>a</sup>	3	2.8
	Total	109	100.0

## Reliability Statistics

Cronbach's Alpha	N of Items
.977	63

Reliability can be measured using a statistical package such as SPSS by measuring the reliability coefficient (also known as Cronbach's Alpha). Cronbach's Alpha takes a value ranging between 0-1. The higher the value, the more reliable are the instruments and the questions used in the questionnaire. Thus, it is a measure of internal consistency; that is, how closely related a set of items are as a group. In this research, and as shown in the following table, the value of Cronbach's Alpha was 0.977, which indicates that reliability was high and suggests that the items have relatively high internal consistency. It should be noted that a reliability coefficient of .70 or higher is considered acceptable, George and Mallery (2010). Using Cronbach's Alpha for measuring reliability was also used by Mittal *et al.* (2011) who have undertaken research in the field of critical success factors of TQM implementation in the Indian manufacturing and services industry and had a value of 0.77 for Cronbach's Alpha.

## Independent Sample T-Test

*“The Independent sample T-Test is a procedure used for comparing sample means to see if there is sufficient evidence to infer that the means of the corresponding population distribution also differ”*, George and Mallery (2010). More specifically, the study conducted the survey in the United Kingdom and Jordan; the two samples are measured on the Critical Success Factors for TQM implementation. Thus the Independent Sample T-Test will determine if the means of the two sample (UK & Jordan) distributions differ significantly from each other (Appendix 3.3).

The Independent Sample T-Test was used to test differences in TQM factors according to the sample, and it was found that calculated p-value = 0.000 and t-values

are significant at .05 level for all factors, which reflects that there are significant differences for these factors according to the sample and these differences tend to increase in the UK sample.

## **6.5 The Benefits of TQM Implementation**

The aim of this section is to present and analyse the data obtained from both the interviews and questionnaires regarding the third objective: explore the benefits of acquiring a TQM System within an organisation.

### **Interview Findings:**

To investigate the benefits behind implementing a TQM system for the construction industry and to understand the improvement after applying such system and whether it influences company competitiveness positively, the researcher asked the following question (Appendix 2):

*What are the benefits of applying a TQM system within your organisation and does it influence company competitiveness?*

The results in the UK show that quality is very important for construction companies because organisations find that decisions made by clients are not based around price and, thus, the lowest bid does not always win; rather, the client decision is based on what else contractors can deliver. They added that quite often clients have been involved with the project development, where they feel that they are looking after their project like a future dream. Therefore, in most cases, they do not want the cheapest contractor to come in and deliver poor quality and so, increasingly, contractors get tendering reviews and health and safety performance checks. Again, cost is the driving factor from a lot of client perceptions but they are also looking at what contractors can deliver (on time and to standard) and if they can bring value through quality to the project, meaning that quality is important but it is not the main concern. Quality perception depends on the project; for example, the required quality for a petrol station or a hotel are different from the required quality for an industrial warehouse, but it is important to get that understood and clear at an early stage to be able to target client perception and understand exactly what contractors have to bring to the project.

Client perceptions depend on what sector they work in and so through understanding the client, the contractor can demonstrate quality. Thus, managing quality on site can avoid many problems between contractors and clients and then again between clients and final users. In addition, construction companies have to keep in mind that there is a direct line between poor quality and defects from one side and reputation and sustainability from the other side; therefore, quality is a very important for the construction industry. Taking an example of the BAM Construction company and its relation with the University of Huddersfield, BAM ensures avoidance of any problem with the University of Huddersfield both during the project and after final submission of the project to ensure repeat business with the University as stated by BAM project manager.

Having a quality system in place helps organisations to achieve customer expectation which leads to repeat business with the same client and at the same time getting reference letters. So, it is not just repeat business but also references that help companies to secure new clients, which is so important in terms of improving competitiveness, profits, enhancing company reputation and expanding market share. Additionally, by adopting TQM, organisations try to improve quality by ensuring conformance to internal requirements and, thus, create constancy of purpose towards improvement of products and services, with the aim to improve competitiveness and remain in business and thus provide jobs.

Two out of eight Jordanian construction companies have a TQM system in place. Those companies see the benefits of applying TQM as a tool to reduce errors produced during the manufacturing or service process, increase customer satisfaction, aim for modernisation of equipment and ensure workers have the highest level of training. Furthermore, they said that the quality system is very important for their organisation, even though the quality concept is different from one company to another, but they stated that the majority of construction companies in Jordan who have adopted a quality system apply the quality system to satisfy customers and, thus, maximize profits through enhancing reputation and repeat business. This may lead to enhancing competitiveness but the main reason is maximising profits, not competitiveness.

### **Questionnaire Findings:**

In this section, respondents were asked 18 questions to find out the benefits of applying a TQM system from their perspective, and because the majority of organisations within the total sample have an active TQM system, respondents should answer according to what they experienced as a benefit from the current system. The benefits of a TQM system have been measured by a group of 18 questions built on five points of the Likert scale (1. Strongly agree; 2. Agree; 3. Neutral; 4. Disagree; 5. Strongly disagree) (see Appendix 3).

Based on the means of the TQM benefits, the 57 Jordanian respondents gave their personal evaluation of each statement showing that reducing operation defects (4.5614) gave the highest mean; followed by 4.5439 for improving customer relations; meeting customer requirements (4.5263); increasing service quality (4.5263); increasing company turnover (4.3333); and increasing company market share (4.3158). The lowest means show that improving supplier satisfaction, quality and retention gave a mean of 4.0877; expanding company activities overseas with mean of 4.0351; and improving employee satisfaction with mean of 3.9123 gave the lowest mean between the benefits of applying TQM for their organisation. Looking back at the Jordanian respondent views of TQM benefits shows that the majority of those benefits are related to financial improvement and cost reduction, whereas employee satisfaction came with the lowest mean, reflecting their dissatisfaction which, of course, has a direct effect on the final project performance and quality outputs.

Looking at the UK respondents, the result shows increasing company turnover (4.8846) with the highest mean; 4.7308 improving employee satisfaction; 4.7115 reducing customer complaints; 4.6731 motivating employees; and 4.6154 reducing operation defects. The lowest mean shows enhancing company reputation with a mean of 4.3846; improving customer relations (4.3077); and meeting customer requirements with a mean of 4.2885. Thus, looking at employee beliefs of TQM benefits shows that employee satisfaction and reducing customer complaints ranked as the highest mean, and that shows the relation between employee satisfaction and reducing operational defects and, therefore, reducing costs and satisfying clients.

## **6.6 External Environmental Factors and Obstacles of TQM Implementation**

The aim of this section is to present and analyse the data obtained from the interviews and questionnaires regarding the fourth objective: define the external environmental factors and obstacles that affect TQM implementation in the construction industry in the United Kingdom and Jordan.

### **Interview Findings:**

This section aims to find out the main obstacles and the external factors that may influence the adoption of a TQM system within construction companies in the UK and Jordan. Therefore, the researcher asked the following questions (Appendix 2):

1. *What are the main impediments that may influence the adoption of TQM within your organisation specifically and the construction sector in general?*
2. *Do you believe that the cost of TQM implementation could be higher than failure of achieving quality in terms of rework, correcting errors, reacting to customer complaints, missing deadlines, and having deficient project budget due to poor planning?*
3. *Do you believe it would be easy to generate awareness, educate, and change the attitudes of staff towards quality improvement, especially in the construction industry, due to the nature and never-changing environment of the construction project?*

The results in the UK show that the biggest problem will be the commercial competitors because of the economic climate that the construction industry faces these days. Thus, that can restrict what contractors are able to provide and which subcontractors they want to work with because they might be expensive. Thus, contractors have to compromise on procurement, material selection, and design which might create quality problems; however, at the same time, contractors have to stay in business and remain commercially competitive. The main problem recently, therefore, is creating a balance between being commercially competitive and dealing with the current economic climate. Furthermore, the current economic climate affects the entire industry and makes it even harder to secure new projects which, of course, have caused quality problems in terms of redundancy, employee retention and cultural issues. In addition, participants stated that they focus on errors made by the workforce

who are responsible for a small percentage of mistakes, whereas the existing system which is desired by management is responsible for the majority of the unintended consequences. The participants said that having a TQM system in place is more effective in terms of quality achievement in the short and long terms. Dealing with defects and rework costs organisations time, money, reputation and confidence in their employees and their system and, therefore, rework, correcting errors, reacting to customer complaints and missing deadline costs are higher than having a TQM system in place.

In the Jordanian construction industry, the main impediments from participant perspectives are relying on inspecting the quality of process and outputs, rather than improving product quality; relying on the quality control department rather than relying on management, supervisors, managers of purchasing, and production workers. In addition, the use of technology has driven management to rely on technology to solve problems which might be considered slightly expensive. Three out of eight of the Jordanian sample said that applying a TQM system is expensive and their organisations lack the expertise to deal with a TQM system, as well as the educational level of employees who would require training courses to help them to understand the quality system.

### **Questionnaire Findings:**

In the first section, respondents were asked 9 questions to find out the effects of external factors on TQM implementation within the Jordanian and United Kingdom companies. The second section relates to the TQM implementation obstacles (Appendix 3).

Based on the means of external factor effects on TQM implementation, 57 respondents in the Jordanian companies stated that the taxation system within the construction industry is considered slightly high, which ranked as the highest mean with 4.5088; followed by the country economy level, which might affect employee satisfaction in terms of health insurance and payment rate (4.4737); political relations between countries might affect company exporting and importing systems with mean of 4.4561; and education level, which supplies the company with well educated and innovative employees with mean of 4.4035. The lowest mean shows that customer

expectations and the quality level they want in exchange for their budget and project with mean of 4.2982; government control over the minimum required quality with a mean of 3.0702; and government regulations towards forcing companies to provide a minimum quality to meet customer satisfaction (2.8772) ranked as the lowest mean among the external environmental factors affecting TQM implementation in the Jordanian construction industry.

The UK results show that government building regulations towards forcing companies to meet safety standards and provide minimum quality to meet customer satisfaction ranked as the highest mean with 4.6731, especially with the economic recession; followed by government control over the minimum required quality with a mean of 4.5962; and the country economic level, which might affect employee satisfaction in terms of health insurance and payment rates with the same mean (4.5962); and 4.5769, local community culture and their relations with clients and service quality. The lowest means, according to the UK respondents, were education level, which supplies the company with well educated and innovative employees with mean of 4.3269; customer expectation and the quality level they want in exchange of their budget and project with a mean of 4.0577; and shipping policies, since it involves a third party, with a mean of 3.7115.

The results show respondent perception of TQM implementation obstacles, where they were asked to answer one question related to TQM implementation obstacles. The result show, according to the previous tables, that the Jordanian respondents perceive lack of expertise in TQM as the main obstacle for TQM implementation with 40.4%; followed by schedule and cost treated as the main priorities with 35.1%; lack of education and training to drive the improvement process with 26.3%; whereas the current bidding climate ranked as the lowest obstacles of TQM implementation in Jordan with 1.8%. However, the UK respondents ranked emphasising short-term objectives as the first obstacle of TQM implementation in the UK with 25.0%; followed by lack of top management commitment with 23.1%; and lack of employee commitment with 19.2%. Current bidding climate ranked as the lowest obstacle of TQM implementation in the UK with 0.9%.

## **6.7 The Impact of TQM Implementation on Competitiveness**

This section aims to present and analyse the data obtained from the interviews and questionnaires regarding the fifth objective: measure the impact of TQM implementation on improving company competitiveness, by measuring the impact of the independent variables TQM (eleven) critical success factors on the dependent variables (profitability, market share and service quality). To test the relations between these variables, the researcher employed multiple regressions to measure the impact of independent variables on the dependent variables. Then, the results are presented by using the model summary ANOVA and coefficients model. However, this research aims to measure the impact on TQM CSF's implementation on improving construction companies profitability, therefore, two out of eight company's has adopted the TQM approach, while in the UK the entire sample have implemented TQM approach for their organisations. The results show according to the interviews (Chapter Seven) that TQM has improved companies profitability in the long-term.

All statistical tests produce a p-value and this is equal to the probability of obtaining the observed difference, or one more extreme, if the independent variables have no impact on the dependent variables. In other words, if the independent variables have no impact on the dependent variables, the p-value is the probability of obtaining a difference at least as large as that observed due to sampling variation. Consequently, if the p-value is small that means that the independent variables have an impact on the dependent variables. If the p-value is large, then that means that the independent variables have no impact on the dependent variables. The question is how small 'small' is and how large 'large' is. A p-value of 0.05 (5%) is generally regarded as sufficiently small. If the p-value is larger than 0.05, it is considered large. The 5% value is called the significance level of the test. See appendix (5)

**The impact of the (eleven) TQM CSF's on the dependent variables (profitability, market share and, quality services), respectively:**

**Profitability:**

**The entire sample (United Kingdom & Jordan)**

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.548 <sup>a</sup>	.300	.236	.53641

a. Predictors

**ANOVA<sup>b</sup>**

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	12.207	11	1.356	4.714	.000 <sup>a</sup>
	Residual	28.486	99	.288		
	Total	40.693	108			

a. Predictors

b. Dependent Variable: profitability

Multiple regression was used to test the effect of TQM on profitability in the entire sample in the UK and Jordan, including all predictor variables, and calculated P= .000, F= 4.714 is significant at .05 level, with moderate Pearson correlation with R= .548 and  $R^2$  =.300.

**Jordan**

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
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1	.530 <sup>a</sup>	.281	.144	.64325
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*a. Predictors*

**ANOVA<sup>b</sup>**

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	7.614	11	.846	2.045	.055 <sup>a</sup>
	Residual	19.447	47	.414		
	Total	27.061	56			

*a. Predictors*

*b. Dependent Variable: profitability*

Multiple regression was used to test the effect of TQM on profitability in the Jordanian sample including all predictor variables, and calculated  $P = .055$ ,  $F = 2.045$  is not significant at .05 level, with moderate Pearson correlation with  $R = .530$  and  $\square = .281$ .

## United Kingdom

### Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.702 <sup>a</sup>	.493	.384	.30504

a. Predictors

### ANOVA<sup>b</sup>

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	3.799	11	.422	4.536	.000 <sup>a</sup>
	Residual	3.908	42	.093		
	Total	7.707	51			

a. Predictors

b. Dependent Variable: profitability

Multiple regression was used to test the effect of TQM on profitability in the United Kingdom sample including all predictor variables, and calculated  $P = .000$ ,  $F = 4.536$  is significant at .05 level, with moderate Pearson correlation with  $R = .702$  and  $R^2 = .493$ .

## Market Share:

### The entire sample

#### Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.552 <sup>a</sup>	.305	.242	.54907

a. Predictors

#### ANOVA<sup>b</sup>

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	13.094	11	1.455	4.826	.000 <sup>a</sup>
	Residual	29.847	99	.301		
	Total	42.940	108			

a. Predictors

b. Dependent Variable: market share

Multiple regression was used to test the effect of TQM on market share for the entire sample in the United Kingdom and Jordan including all predictor variables, and calculated  $P = .000$ ,  $F = 4.826$  is significant at .05 level, with moderate Pearson correlation with  $R = .552$  and  $R^2 = .305$ .

## Jordan

### Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.596 <sup>a</sup>	.355	.231	.58868

a. Predictors

### ANOVA<sup>b</sup>

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	8.958	11	.995	2.872	.009 <sup>a</sup>
	Residual	16.288	47	.347		
	Total	25.246	56			

a. Predictors

b. Dependent Variable: market share

Multiple regression was used to test the effect of TQM on market share in the Jordanian sample including all predictor variables, and calculated  $P = .009$ ,  $F = 2.872$  is significant at .05 level, with moderate Pearson correlation with  $R = .596$  and  $R^2 = .355$ .

## United Kingdom

### Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.835 <sup>a</sup>	.697	.632	.32303

a. Predictors

### ANOVA<sup>b</sup>

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	10.098	11	1.122	10.753	.000 <sup>a</sup>
	Residual	4.383	42	.104		
	Total	14.481	51			

a. Predictors

b. Dependent Variable: market share

Multiple regression was used to test the effect of TQM on market share in the United Kingdom sample including all predictor variables, and calculated  $P = .000$ ,  $F = 10.753$  is significant at .05 level, with moderate Pearson correlation with  $R = .835$  and  $\square = .697$ .

**Service Quality:**

**The entire sample**

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.605 <sup>a</sup>	.366	.308	.45275

*a. Predictors*

**ANOVA<sup>b</sup>**

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	11.699	11	1.300	6.342	.000 <sup>a</sup>
	Residual	20.294	99	.205		
	Total	31.993	108			

*a. Predictors*

*b. Dependent Variable: service quality*

Multiple regression was used to test the effect of TQM on service quality for the entire sample in the UK and Jordan including all predictor variables, and calculated  $P = .000$ ,  $F = 6.342$  is significant at .05 level, with moderate Pearson correlation with  $R = .605$  and  $R^2 = .366$ .

## Jordan

### Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.477 <sup>a</sup>	.228	.080	.48980

a. Predictors

### ANOVA<sup>b</sup>

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	3.323	11	.369	1.539	.162 <sup>a</sup>
	Residual	11.276	47	.240		
	Total	14.599	56			

a. Predictors

b. Dependent Variable: service quality

Multiple regression was used to test the effect of TQM on service quality in the Jordanian Construction companies including all predictor variables, and calculated P=.162, F= 1.539 is not significant at .05 level, with moderate Pearson correlation with R= .477 and  $R^2=.228$ .

## United Kingdom

### Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.851 <sup>a</sup>	.723	.664	.33355

a. Predictors

### ANOVA<sup>b</sup>

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	12.221	11	1.358	12.205	.000 <sup>a</sup>
	Residual	4.673	42	.111		
	Total	16.894	51			

a. Predictors

b. Dependent Variable: service quality

Multiple regression was used to test the effect of TQM on service quality in the United Kingdom sample including all predictor variables, and calculated  $P = .000$ ,  $F = 12.205$  is significant at .05 level, with moderate Pearson correlation with  $R = .851$  and  $R^2 = .723$ .

## 6.8 Chapter Summary:

This chapter has presented and analysed obtained data by the self-administrated questionnaires and semi-structured interviews. The researcher conducted 18 interviews in total, where eight were conducted in the UK, seven in Jordan and the final interview was conducted in Syria. Some statistical methods were used to analyse the data, starting with the descriptive analysis, to provide a summary of respondents' characteristics in addition to their company characteristics. The chapter included a link between the research objectives and the collected data. The data were divided into the research objectives, respectively. Each objective was clearly presented by discussing the relevant question and data collected by the respondents. However, analysing this data has required further statistical analysis; thus, the researcher studied many statistical analyses to understand and find out the most appropriate analysis to be used. Cronbach's Alpha was used to measure internal consistency and showed that the questionnaire has relatively high internal consistency with .977. Moreover, Independent sample T-Test analysis was used to compare sample means and to find out if the means of the two sample distributions differ significantly from each other. Multiple regression analysis was used to test the independent variable effects on the dependent variables and to calculate P-values, T-values, F, R, and  $\square$ . The result indicates that the TQM implementation in the UK is significant and has an impact on improving competitiveness in terms of profitability, market share and quality services, while in Jordan, the results show that TQM implementation is significant and has an impact on improving competitiveness in terms of market share, but it has no impact on improving profitability and quality services. Thematic approach was used to analyse the interviews, based on decoding the collected data and grouping it according to its relevance in relation to TQM CSF's and then analysing it for decoding again.

The results revealed that TQM success factors were proved statistically and clearly identified after identifying their effects on the dependent variables. These factors are top management commitment, quality culture, process planning and strategic quality management, employee empowerment, employee training and education, supplier chain management, customer satisfaction, information and communication technology, continuous improvement, performance measurement system for benchmarking and impact on society and environment.

The results show that Jordanian construction companies have not developed a clear definition of quality and the majority of employees are not aware whether their organisation has applied a quality system or not. Moreover, the majority of employees (75.2%) said that their organisations do not have a quality improvement programme and they lack the commitment of the management. The main objectives of quality improvement programmes are cost reduction, increased productivity and compliance with statutory, environmental and safety requirements. In the United Kingdom, all employees agreed that their organisations have developed a clear definition of quality and they are all aware of quality systems. The results show that 63.5% said that a quality improvement programme has been a part of corporate policy for some time and had the support of top management to improve quality. Also, there is a mix of quality improvement programmes: TQM and quality control. The main objectives of quality improvement programmes are increasing productivity, involvement of employees in the quality building effort and cost reduction. The interviewees stated that new continuous improvement system implemented Continuous Customer Care (CCC) to understand the relation between their internal and external customers to improve customer satisfaction.

The results have shown that all TQM (CSF'S) were discussed with 18 interviewees in both countries, but none mentioned the entire CSF's for TQM system implementation; however, they added more factors such as health and safety and social responsibility. The benefits of a TQM system, according to the Jordanian respondents, is based around financial improvement, while in the UK, the benefits are more related to customer satisfaction and defect reduction. Therefore, TQM implementation in Jordanian construction companies is still profit driven rather than client driven.

The main problems facing TQM implementation in the UK is related to the current economic recession, discussed in the second chapter. The economic recession has made it difficult for construction companies in what they are able to provide and which sub-contractors to work with, material selection and design, as well as ensuring being commercially competitive, ensuring repeat business and securing new jobs. In Jordan, employees and managers stated that their management reliance on quality process inspection rather than the quality of the final projects and the high level of centralization is considered as the main impediments of TQM system implementation.

In general, the respondents stated that dealing with defects, customers complaints and rework costs organisations a lot of money and damages organisation reputation and confidence in their employees and their system; therefore, a TQM system is perceived to be more beneficial to the construction companies.

## **Chapter Seven**

Discussion of Overall Quantitative and Qualitative Data and Findings

## **7.1 Introduction:**

After collecting the required data from the self-administrated and interviewer-administrated questionnaires, plus the semi-structured interviews, the data were decoded and analysed in the previous chapter to be discussed in relation to the research aims, objectives and research questions. Therefore, this chapter is concerned with data discussion and findings, by dividing the data discussions into main sections related to the research objectives. Section 7.2 deals with discussing the targeted sample characteristics. Section 7.3 deals with data discussion in relation to the research objectives, divided into five sections: Section 7.3.1 deals with finding out whether a TQM system is important for construction companies; Section 7.3.2 deals with defining the CSF's for TQM in the UK and the Jordanian construction companies; Section 7.3.3 deals with the external environmental factors and obstacles affecting TQM implementation in the UK and Jordanian construction companies; Section 7.3.4 deals with defining the benefits of applying TQM with construction companies in the UK and Jordan; and Section 7.3.5 deals with measuring the effect of the independent variables (eleven) CSF's on the dependent variables (profitability, market share and, quality services).

## **7.2 Characteristics of Questionnaire Respondents:**

This section aims to discuss the representation of the entire sample in the United Kingdom and Jordan, including the respondents' personal information (gender, age, qualifications, occupation and experience) to help the researcher understand the background and education level of each sample.

### **7.2.1 Respondents' Gender, Age, Qualifications, Occupation and Experience**

According to the entire sample, 97.2% of respondents were male and 2.8% were female. In Jordan, the survey showed that all respondents were male. This indicator reflects the fact that the construction industry in Jordan is still facing difficulties in terms of female employment, where the fact of female employment in the Jordanian construction industry is still not widely accepted. That might be related to three reasons. First of all, the Arabic culture depends on males in the social structure as the only financial suppliers for the household, where females are seen as full time housewives looking after the children and the house. Secondly, the management style

in Jordan is divided into traditional and modern management styles, where the traditional management style is totally against female employment in all sectors within the country. Thirdly, it is still not widely accepted in Jordan for a female to work in the construction industry as a result of family resistance related to cultural issues; however, it is important to mention that women in Jordan are given more rights by government compared with other Middle Eastern countries, where they work in the majority of industries but still face culture related problems.

In the United Kingdom, the result showed that three out of the entire UK sample were female. However, in the UK, the picture is slightly different in relation to female employment in the construction industry. The construction industry was highlighted by the Equal Opportunities Commission in 2001 to tackle gender barriers in the industry, and to give women more opportunities to work in the sector to change the fact that some women may be put off entering the construction industry by certain stereotypes about the sector. Female employment in the construction industry increased from 10.6% in 1997 to 14.3% in 2006 but, due the economic downturn, the percentage decreased to 6.2% in 2010. However, despite that, during the pilot-study, the researcher conducted a face-to-face semi-structured interview with a project manager in the Keir Group, an experienced female, with all kinds of project management experience. In general, the construction industry is seen as “difficult, dangerous and dirty”, according to the CIDB (2007), which puts off female employment from entering the construction sector, as they can find better jobs in a better working environment.

The age categories were presented in four levels, where 34.3% of participants were aged between 18 and 28 years; 44.4% were aged between 29 and 39; 14.8% were aged between 40 and 50; and 6.5% of participants were aged over 51. In Jordan, 35.7% of the sample were aged between 18 and 28 with the highest percentage, and 10.7% with the lowest percentage was recorded for the fourth group, over 51 years of age. In the UK, the highest percentage was recorded for the second group with 59.6% aged between 29 and 39, whereas the lowest percentage, 1.9%, was recorded for the fourth group, over 51 years of age. With the “Culture of Shame” among Jordanians which occurs as a result of the social stigma attached to menial jobs, Jordanians started to look down on certain types of jobs such as construction, where employee

monthly salary does not exceed £180 and this caused an increase in the international employment rate in the construction and manufacturing industry in Jordan of 5% to 400,000 by the end of 2006, according to the U.S Department of state, (2007). Therefore, the researcher believes that the majority of international employees start their early career in the Jordanian construction industry and then leave when they reach the age of 30 to go back to their own country, reducing the age percentage in the Jordanian construction over time.

In the UK, the figures showed a huge gap between the second age group of 29-39 and the third age group 40-50, by dropping down from 59.6% to 5.8%. The researcher believes that the majority of UK construction employees prefer to start their own business as private contractors after gaining the required experience while being employed in the construction industry.

Within the experience category, the result shows that employee retention is higher in Jordanian construction companies compared to the UK. In Jordan, almost half of respondents stated that they have been working for their organisation for more than six years with the higher percentage of 42.3%, whereas in the UK, the result shows that 51.9% of respondents have been working for their organisation for 4–5 years and 8.3% have worked for their organisation for more than six years. The researcher believes that high employee retention in Jordanian construction companies is not related to employee satisfaction; rather, it might be related to difficulties in securing a new job as international employees have a lack of relationships and there are few recruiting agencies in the Jordanian market. The researcher believes that in the United Kingdom, employees prefer to change their company or even start their own business after 4–5 years working experience.

Looking at participant qualifications, the results show that 48.1% of the Jordanian respondents have a high school certificate as the highest education level they reach, while in the UK, the results show that 78.8% went to college. The difference in the educational level between Jordan and the UK refers to many reasons as in the following. Students are only funded by the Jordanian government until the age of 15 and afterwards they have to pay tuition fees to be able to go to school and university. Moreover, higher education was not adopted by the Jordanian government until 1967, when students who wanted to continue their higher education had to travel overseas

which involved high cost. Despite the government effort to improve the educational system and education level for Jordanians, culture was considered as a barrier where children had to leave school and help the family financially. Additionally, the researcher has mentioned that the majority of workers in the Jordanian construction sector are international employees from neighbouring countries with similar educational systems and regimes. In the UK, the government plays a larger role in improving educational levels and qualifications for British citizens. The government provides the use of funding formulas and motivates students by improving the educational system to cope with new challenges which increased student higher education by 3% between 2006 and 2009, according to the Higher Education Statistics Agency, HESA (2009).

TQM is everybody's responsibility within an organisation. Thus, the researcher has targeted all parties within this research to study TQM from different perceptions. Starting with the pilot study stage, the researcher conducted interviews with project managers, designers and suppliers, while in the formal stage of data collection, interviews were conducted with chief executives, project managers, clients, and representatives of final users. The questionnaires were given to supervisors, engineers and builders to understand all party perceptions of TQM implementation within the construction companies.

### **7.2.2 Characteristics of Participants' Companies and Company Types:**

As mentioned previously, the undertaken research focused on large and medium size companies to collect the required data. However, the construction industry is classified into several types of company such as electro-mechanical, civil, infrastructure, and design. Thus, the research is concerned with collecting the required data from construction organisations registered as a Grade One contractor in both construction work and building maintenance, which is considered the highest grade in the category. In this way, the researcher ensured collecting more accurate and reliable data from the targeted companies as they have more experience in a wider range of construction work and more awareness of government rules and regulations in both countries, the United Kingdom and Jordan.

Within the UK, the researcher conducted eight interviews and five of the eight were conducted with privately held construction companies dealing with large size projects. One out of the eight operated in the housing sector and two interviewees were considered clients and final user representatives. In Jordan, the researcher conducted eight interviews, five of which were with privately held companies dealing with large size projects in Jordan. One of the eight was conducted with one construction company operating in Syria, and two with clients to understand their perceptions of quality.

### **7.3 Discussion of Findings:**

This section is concerned with discussing the findings in relation to the research objectives, respectively. The analysis is based on three elements: questionnaire findings, interview findings and relation to the literature of TQM, to find out if the research has achieved the research aims, objectives and supports the TQM literature, as follows.

#### **7.3.1 The Importance of TQM in Construction Companies**

To find out if the TQM system is fundamental to all organisations within the construction industry, and whether employees understand the benefits and the needs for TQM, 27 questions were asked to investigate employee perceptions of TQM and quality improvement and whether that reflects management perception of quality. Therefore, this section is divided into four subsections to gather more information about employee knowledge and perception of quality, and which methods their organisations use to apply quality in their organisations and whether the TQM system will be beneficial for their organisations.

The result shows that the majority of the Jordanian sample, 79.1% of employees, are aware of the TQM system, but their organisations have never implemented any quality improvement programme, while in the UK the result shows that all targeted organisations have implemented TQM to improve quality. The majority of the UK employees understand the benefits behind a quality system, but some are not aware of such a system in their organisation, which might be the result of a lack of top management commitment, lack of communication, or even reflect that the TQM

system was implemented for other reasons rather than quality improvement, such as expanding company operations locally and globally or enhancing reputation.

Of the Jordanian sample, 24.6% stated that TQM will not work for their organisation, even if they understood the benefits of TQM, which might be a result of their awareness of their management abilities and lack of knowledge of TQM, or their fear of accepting new challenges related to TQM implementation. Of the UK sample, 71.2% said that they are aware of TQM in their organisation but they are not aware if TQM has been implemented successfully, which reflects poor communication between management and employees or that employees have a different perception of quality. They perceive quality as improving construction project quality through eliminating defects and increasing profits.

The result shows that the majority of employees in the UK and Jordan agree that their organisations are able to improve profitability through satisfying their clients. They feel that a TQM programme would be beneficial for their organisations, even where the majority of them are not aware of the implementation process and results. Most feel that TQM is a philosophy used to eliminate defects and increase profits, which reflects that there is a lack of management commitment and communication. Moreover, the UK employees perceive quality as a competitive advantage through improving final project quality, where their organisations have adopted a system to measure customer and employee suggestions and satisfaction. In Jordan, employees agree that TQM is important for their organisation to improve final project quality and customer satisfaction, but their organisations have not yet taken steps towards TQM adoption.

To some extent, the interview results were found to support employee perceptions of TQM within the organisations. In the UK, the entire sample stated that TQM had been implemented for quite a long time because it is a key function for organisational success. The interviewees believed that the successful implementation of the TQM system would improve competitiveness throughout, improving performance, quality services, enhancing company reputation, and improving profitability in the short and long terms.

The results show that having a TQM system in place is a very important element for all construction companies, but that does not mean that the final project will be handed in defect free; rather, the TQM system would help to reduce defects and set a system to correct mistakes within the shortest time and lowest budget with the same quality results. TQM is perceived to be able to control the majority of the internal factors that might affect the construction project but it still fails to totally control the external factors such as economic recessions, government rules and regulations and weather.

The current economic environment has created a gap between client and contractor perceptions of quality, where contractors are not able to provide extra quality if they do not get paid for it, as it was a tool for competitiveness to satisfy their customer, enhance reputation, and ensure repeat business, as well as securing new jobs, as stated by (BAM). On the other hand, client decisions are not based around price or the lowest cost when choosing contractors; they are looking for extra quality that a certain contractor can provide, to bring value through quality to the project, which makes it harder for contractors to keep the balance between the current economic environment, customer satisfaction and being competitive. However, despite the current economic environment affecting the construction industry, three companies in the United Kingdom (BAM, Walter Lilly, and Bowmer and Kirkland) stated that customer satisfaction comes first and is considered more important than price because their aim is not to do a one time job with each client; instead, their aim is to secure repeat business and, thus, customer satisfaction. This is the most important aspect in a first project with a new client, which might remain the same during any repeat business, but both parties will get to know each other's requirements and expectations, improving profits in the long term by that.

TQM helps organisations to build long term relationships with suppliers, clients, designers and subcontractors and, thus, through this relation contractors are able to understand other parties' requirement and expectations and, therefore, develop an organisational strategy to improve their satisfaction. The long term relationship with clients and designers helps contractors to get involved early in the procurement process and, thus, negotiate certain project characteristics and try to avoid any

problems before starting the project, reducing by that defects and any delay that might occur in the future.

In the housing sector, the quality concept tends to be slightly different, as the TQM system is already in place by contractors, where they build houses to their quality standards and the clients have no say in the final quality unless they get involved early and are updated on a daily basis. However, according to the UK interviews, contractors in the housing sector state that they ensure the implementation of and provide high quality standards for their clients, not just because they are monitored by the British government quality standard, but because they are looking to satisfy their customers and thus enhance reputation.

In Jordan, the TQM system is perceived to be important for construction companies but is not considered fundamental, and the respondents stated that they have been working for a long time without having any formal quality system in place. They added that TQM implementation is considered slightly expensive as it requires time and effort. The results indicate that the Jordanian respondents do not understand the long term benefits of TQM, or they are afraid to take more responsibility, or even that they are financially driven instead of being quality or customer driven. Moreover, client lack of knowledge of the construction projects and quality concepts makes the contractor the main controller over the project. Therefore, it is important to mention that client power is very important in terms of quality improvement and adopting in the construction industry. Clients having the required knowledge of the construction project and quality have forced contractors to provide high quality projects, since contractors are not the only players. Moreover, being financially strong helps clients to receive the required quality within the required time, as quality levels are related to the available client budget. Therefore, contractors should not be the only controllers over the construction project where clients perceive high quality.

The literature has supported the previous results, where TQM is perceived to be fundamental for organisations in all industries. Intense competitive pressure in the construction industry requires new ways to improve performance and satisfy client needs. There appears to be increasing pressure by clients for construction companies to develop quality systems, or in some cases as a requirement for tender submissions, CIB (1994). The TQM system has been identified as one of important methods of

achieving the quality standards required in the construction industry, Atkin and Pothecary (1994). TQM helps to create a culture of trust, zeal for continuous improvement, teamwork, participation, continuous learning, and quality-mindedness; therefore, much research has been carried out in different countries such as the UK, Australia, the USA and Japan to understand the need for a TQM system in the construction industry, Shammass-Toma *et al.* (1998). The majority of those studies suggest that construction companies have to take a more serious step toward TQM implementation to improve customer satisfaction and boost organisational performance.

The construction industry, compared to other sectors such as the manufacturing and service sectors, is viewed as one with poor quality emphasis, Yusoff *et al.* (2006). Total Quality Management is increasingly being adopted within the construction industry as an initiative to solve quality problems within it and to meet the needs of customers continuously. It has been seen that TQM has the potential to improve business results, worker involvement and fulfilment, greater customer orientation and satisfaction, team working and better management of workers within an organisation. However, despite the various benefits of TQM adoption, companies have been continually struggling with its implementation since it requires a long time and a culture change, Antony (2009). Yong and Wilkinson (2001) state that TQM has to be implemented in the construction industry, whereby TQM principles should be applied beyond management levels by involving workers in the construction sites.

### **7.3.2 TQM CSF's in the Construction Industry**

This section aims to illustrate and discuss the Critical Success Factors of TQM implementation in the Jordanian and United Kingdom construction industries. The researcher has discussed the eleven CSF's of TQM in the construction industry which emerged from the literature review. Thus, this section involves dividing and discussing each factor separately, introducing the collected data from the interviews and questionnaires, linking and matching the findings with the literature review, and identifying the new CSF's that emerged from the interview and questionnaire data for the UK and Jordanian construction companies. These factors are:

- *Top Management Commitment*

The degree of support and visibility that top management offers in implementing a total quality environment is fundamental to the successful implementation of TQM with construction organisations. According to the Jordanian respondents, top management commitment has recorded a low rate among respondents where all the statements recorded a mean lower than 3.00, reflecting total disagreement about management support and visibility, explicitly towards TQM implementation. Moreover, Jordan lacked commitment from top management, which answers the question why TQM is still unable to be implemented within Jordanian construction companies. There was no inclination by management to allocate adequate time and resources for quality improvement, in addition to the lack of learning from previous mistakes. In the UK, the results were different; top management commitment recorded total satisfaction among respondents with a mean higher than 3.00. Top management has an inclination to allocate adequate time and resources for quality improvement, with an ability to learn from previous mistakes and avoid these to improve quality. The differences between the United Kingdom and Jordan in relation to top management commitment came from management understanding in the UK of the importance of their role in achieving organisational goals and improving customer satisfaction and company reputation due to the highly competitive nature of the construction industry and due to the high expectations by clients. In Jordan, lack of management understanding of their roles to improve customer satisfaction and the low expectations of clients create a lack of management commitment and support for quality improvement in the projects.

The previous results show the different views between the Jordanian employees and their managers, where managers stated that they are totally committed to quality improvement by communicating organisational vision with employees, providing feedback, motivating them and providing regular training to improve quality. In the UK, all interviewees stated that their management is totally committed to quality improvement which comes from looking at the commercial applications of not getting things right. Therefore, they believe that having regular meetings with clients, being committed to the local community, creating a quality culture, providing regular training to improve their employees, regular benchmarking and having quality planning are all considered as great economic benefits to the business and improve

quality and, thus, customer satisfaction. From the UK client perception, the interviewees stated that they saw contractor top management commitment towards quality throughout the project. Clients were kept informed on a regular basis during the project through regular meetings to keep them updated and to provide feedback about the project. In addition, contractors were committed to the local community and environment, meeting deadlines and providing the final project with high quality.

Low *et al.* (2004) mention that quality perception might differ among parties as every party measures quality achievement according to the success of the final project and, thus, each management defines quality achievement in relation to the perceived success of their project. Low *et al.* (2004) add that the quality concept can be translated into several dimensions such as reliability, performance, serviceability and conformance, which requires a highly committed management to deliver a high quality project to clients. The UK findings reflect the TQM literature in relation to the top management commitment.

Samson *et al.* (1999) state that top management commitment towards TQM is generally perceived as a fundamental factor in the successful implementation of quality systems. Landin (2000) and Chin *et al.* (2003) emphasise that top management commitment is one of the strongest predictors of the successful implementation of TQM in construction firms, while Low *et al.* (2004) argue that reducing prevailing problems of TQM implementation on construction sites is necessarily related to high levels of management commitment towards quality. Padhi (2009) perceives commitment towards quality as a manager requirement to provide an inspiring vision, instil values that guide subordinates, and take strategic directions that are understood by all employees.

In terms of quality awards, the Malcolm Baldrige National Quality Improvement Award recognises top management commitment as the driver for a quality success system within an organisation. Top management commitment is considered as a main driver for quality transformation for an organisation to improve competitiveness and market share for the Deming Prize, while EFQM stresses that management has a significant role in the quality improvement process within all organisations; thus top management has to be committed to quality improvement. The TQM system in the

UK construction companies is based on EFQM, where top management commitment is perceived to be the driver for quality improvement, towards customer satisfaction.

The King Abdullah II of Jordan Award for Excellence emphasises leadership capacity to direct the organisation effectively to achieve the organisational goals and provision of necessary resources, in addition to the leadership role in enhancing organisational core value, achieving missions and strategic goals. However, the results among the Jordanian respondents do not support this framework and the literature review, which might relate to many reasons such as the leadership style in developing countries, where leadership is considered to be more autocratic and, thus, the majority of employees are afraid to disagree with their managers, are task oriented and prefer to receive orders from their managers rather than take responsibility and be more creative, as argued by Limsila and Ogunlana (2008). Other reasons could be related to insufficient manager competencies to be able to deal with employees and the construction project. Therefore, the government role should not be limited to providing companies with a framework to improve their quality outputs; rather, government should be involved and support organisations to improve their managerial, technical and operational processes to achieve higher quality services. Education and training courses should be provided by government at managerial levels before training employees. TQM is perceived as a management philosophy more than an employee philosophy, where management has to take more responsibility to improve their quality to compete with international companies and provide similar or higher quality services, through cultural change, strategic planning and other serious steps towards the successful implementation of a TQM system.

- *Quality Culture*

Quality culture within construction project organisation has been hard to understand. It has been described as “variable”, something that an organisation has, “things” which belong to an organisation, or “root metaphor”, something an organisation is, or it is an assumed characteristic of the entire organisation, Seel (2000). Thus, these divergent views have generated the debate whether culture can be driven or influenced by specific factors such as top management commitment and project context.

The results revealed that there is a huge gap between Jordan and the UK in relation to the organisational quality culture. In Jordan, all statements recorded a very low rate with a mean less than 2.00. Respondents stated that their organisations are not willing to adopt any cultural changes to fit with changes in the business environment, and they lack the continuous creation of quality awareness among employees. In the UK, all statements recorded total agreement among respondents to the statements related to quality culture within their organisations with a mean higher than 4.00.

The interviewees in Jordan stated that they have been creating a quality culture to boost performance and to satisfy their clients, even if they did not have a formal quality system in place, which does not reflect employee beliefs that their organisations lack a quality culture towards quality improvement. They added that there are many factors influencing culture in the construction industry such as traditional management views and having sub-cultures within each organisation, making quality culture creation even harder. In the UK, all interviewees stated that their organisations have created a quality culture towards quality improvement and implementation. One out of the eight interviews in the UK (BAM) said that “*quality culture is more important than strategies, where having the right strategy without proper quality culture makes it impossible to implement organisational strategies*”. The majority of interviewees classified the determinants of construction organisation culture into two groups: those dependent on the project which vary from one project to another such as project manager, location, procurement approach; and those that are independent of the project such as organisational culture. The interviewees said that having different procurement routes affects cultural orientation; for instance, a partnering procurement route opens interaction, learning, innovation and productivity, whereas a design and build procurement route leads to greater commitment to the project because contractors and other stakeholders are involved early in the project.

The analysis revealed that some of the contextual factors do have an association with cultural outcomes such as number of workers on the construction site and the project size which were found, according to the interviews, to be positively associated with performance orientation. This implies that the more projects grow in size, the more organisations become performance oriented, where performance orientation deals with providing all participants with regular performance feedback to ensure

continuous improvement, providing more effort to protect people on site and an emphasis placed on schedule delivery. Furthermore, the result shows the relation between project complexity and being client orientated. It has been noted that as project complexity increases, so does client orientation because complexity influences project objectives in terms of quality, time and cost which, of course, makes clients more stringent in respect of these objectives. It was also clarified by interviewees that the more complexity increases, the more people have to work together to solve problems which improves communication and teamwork.

However, from the client point of view, interviewees stated that increasing workforce orientation can be increased when clients become more influential. Workforce orientation is about getting the best out of construction workers by developing a culture that makes it easy for all employees to contribute to the successful delivery of the projects. This association is influenced by the priority place by clients on health and safety or costs. As clients place more emphasis on health and safety, both team orientation and performance orientation improves. Conversely, as clients place more emphasis on cost, the more work orientation suffers.

The results reflects the research literature in terms of the relation between project culture and project features such as project size, location, complexity, participants involved, level of subcontractors and performance ethos, which implies that different cultural orientations are likely to exist for different projects. Yin, (2007) mentions that each organisation has a unique culture which differs from other organisations but, in general, all organisations within a specific industry are affected by the industry culture in a large scale and, thus, the organisational culture within all industries emerges from the industry culture. Purcell (1999) and Gerhart *et al.* (2000) mention that developing organisation culture towards being more supportive and positive will yield benefits to the project, team, individuals and organisational performance.

However, changing organisational culture requires huge effort and time and the previous section showed that there is a high level of turnover in the construction industry in the UK and Jordan. Therefore, management has to involve human resource management in the cultural change and strategic planning to ensure recruiting the right people, thus, improving employee retention. High employee retention helps organisations to develop a strong culture toward quality improvement.

- *Process Planning and Strategic Quality Management*

The strategic management process tends to be complex because it involves many different activities that are performed over considerable time frames and by different people. Thus, each organisation has different strategies related to their culture, working environment and management style.

The result revealed that Jordanian companies lack process planning and strategic quality planning, according to the questionnaire respondents, where all statements recorded a low rate with the mean lower than 3.00, while in the UK the statements recorded moderate rate with a mean higher than 3.00. In Jordan, the respondents stated that their organisations have not adopted general policies and effective development of goals; also, they said that there is no strategic quality planning for the long term quality journey, and there is a lack of principles in reviewing the formulation and implementation of strategies. In the UK, the results show that process planning and strategic quality management is fundamental for TQM in the construction industry, according to the respondents. This, again, reflects the gap between the Jordanian and the UK construction industries in relation to process planning and strategic quality management.

The interview findings show that a key aspect of strategic management is strategic planning, such as clarifying policies and principles, setting, missions, objectives and goals, searching for opportunities and threats. They added that strategic planning is different from one organisation to another. In Jordan, the interviewees stated that their strategic planning is based on cost leadership strategies which focus on the low cost of doing the job. Two out of eight interviewees (Modern Contractors for Construction & Arab Construction and Contracting Company) said that they needed to develop a better communication strategy for their organisation to be able to share knowledge and information to improve outputs. In the UK, the result shows that construction organisations have adopted different strategies from the Jordanian companies when they adopted the quality driven strategy based on best value and partnering criteria and, at the same time, did not ignore the cost element as main reason behind doing the business. The focus on partnering relationship strategy in the UK occurs as a result of increased integration of its supply chains. Moreover, one out of eight companies in the UK (Halcrow Group) mentioned that they are working towards changing their

performance measurement tool which is based on annual profits because it takes a short-term perspective and has failed to measure strategic performance in previous years. However, within both countries, the interviewees stated that they will be able to provide better quality outputs if they can network and benchmark their processes against each other through a communication network to learn from the mistakes of others and learn from the new ideas emerged.

TQM literature asserts the fact the organisations have to manage and plan their production process, in addition to creating long-range quality goals, as that leads to improve performance and thus customer satisfaction; therefore, process has to be strategically planned and managed to ensure long term sustainability and competitiveness, Sarshar *et al.* (2004). Moreover, Pheng and Hong (2005) state that the long term quality journey requires effective strategic planning that involves top management, lower level employee, supplier and subcontractor involvement, as well as customers care to be able to identify their requirements. However, it is important to mention that strategic planning often fails to deliver, as stated by Zairi (1999), because organisational strategic planning is seen as a blueprint locked away in senior executive filing cabinets.

Porter (1980) identifies different types of competitive strategies in relation to strategic planning such as customer focus and differentiation strategies. Porter adds that each type of organisational competitive strategy may be suitable under different circumstances, but the problems with many construction organisations is that they fall between two or more strategies which are considered as drawbacks in TQM implementation. In Jordan, strategic quality planning is classified as the second fundamental element of the King Abdullah II Award for Excellence Framework (2009) and examines organisational procedures and policies in relation to their strategic planning in terms of organisational goals, vision and mission, which might have been implemented by other sectors but have not been implemented in the Jordanian construction industry.

The current economic recession, explained in the second chapter, has hit the construction industry hard, and research estimates that the industry will be able to recover in 2014. The recession reflects the Zairi (1999) belief that strategic quality planning and process management often fail because they have not been

communicated to employees and they cannot predict and control the external environment.

- *Employee Empowerment*

Employee empowerment is a necessary condition for the successful implementation of TQM within an organisation, and it is a critical element because it galvanises employees to provide better job quality and participate more in the new business process, Handfield *et al.* (1998). The questionnaire results reveal that all statements related to employee empowerment recorded a total disagreement among Jordanian respondents with a mean lower than 2.00. Respondents stated that their companies control rather than empower, where employees are not encouraged to come up with new ideas and strategies to enhance their job. They also added that they do not have authority in their position to take necessary action when required. Moreover, they do not get involved in the decision making process by their management. In the United Kingdom, however, the results reveal that all statements recorded a total agreement among respondents with a mean higher than 4.00 and the respondents stated that their companies empower rather than control, and their management involve them in the decision making processes. In addition, they have been encouraged by their management to come up with new ideas and suggestions to enhance their job and, thus, they feel more confident to take necessary action when required which, of course, will improve performance and create a quality culture and a better working environment.

The interview results in Jordan reveal that managers are afraid to empower employees because of their low level of training and education and, once the Jordanian construction companies have adopted a cost driven strategy, management are afraid to empower their employees and give them the authority to make what might be a wrong decision which might cost the organisation a lot of money to rework. Jordanian managers said that they have tried to empower their employees before to a certain extent but that it did not work for them, possibly because employees were afraid to take more responsibility or because nobody made any suggestions.

In the UK, management demonstrated empowerment, encouraging and allowing their project managers to take full responsibility to make necessary decisions related to their projects such as cost saving suggestions, self implemented solutions and financial decisions, but they must ensure that they do not exceed the project budget. However, they have to refer the issue back to their management when they are not sure of the appropriate decision. Furthermore, the respondents added that they provided their employees with organisation strategic goals and made them feel that they are part of the team; thus, once the employees have received the required regular training on TQM principles, they can be authorized to take decisions and make suggestions to improve performance.

Greasley (2008) defines the two distinct perspectives on empowerment as structural empowerment and psychological empowerment perspectives. Structural empowerment refers to organisational structure, policies and practices that grant employees greater latitude to exert influence and take necessary decisions regarding their work, which refers to the notion of power sharing between employees and their management. The psychological empowerment perspective emphasises employee perceptions and cognitions and neglects the traditional management practices; thus, the emphasis is on perceptions, self-efficacy, competence, and beliefs in power. However, Jarrar and Zairi (2002) state that the future of work relies on knowledge workers, shown in this study as the majority of construction workers in the UK went to high school as the highest level of their education plan, while the competitive advantage of any organisation is their employees. Thus, organisations have to improve employee involvement in decision making and give them more authority and responsibility in their passion to take decisions to improve performance, which Jarrar and Zairi (2002) describe as best practices in total empowerment.

Psoinos and Smithson (2002) argue that even though absences and turnover have been used by some organisations to measure employee empowerment, it is still difficult to assess the economic benefits of empowerment because it is introduced as a part of a broader initiative such as TQM, and it is unlike organisational benefits which can be measured using organisational objectives. Koberg *et al.* (1999) and Spreitzer *et al.* (1997) state that employees who consider themselves empowered have reduced

ambiguity and conflicts in their role because, to a certain extent, they are able to control their own environment, which reduces emotional strain on the employees.

- *Employees Training and Education*

Employee training and education levels are considered a very important element in the construction industry as these are directly related to construction industry productivity levels; thus, education and training have been highlighted by many researchers during the last few years to improve construction workers skills and, thereby, improve productivity and client satisfaction.

The study asked respondents in the UK and Jordan construction companies six statements relating to employee training and education in relation to TQM implementation in the industry. The results show that Jordanian respondents totally disagreed with five out of six statements with a mean lower than 2.00, where they stated that their companies prefer supervision more than training and education and they do not receive regular training related quality, nor do they receive health and safety training. However, they agreed that training aims to enhance employee performance and skills, with a mean higher than 3.00. In the UK, the respondents totally agreed that their companies prefer training and coaching more than supervision; they receive regular training regarding quality and health and safety; they have training to improve company productivity; and they are provided with safety equipment. Thus, the results show that UK respondents feel more confident and secure while doing their job as they have received the required training, while in Jordan, employees are used to being supervised to do their job as their management does not believe in training and education to improve productivity since they see it as an extra cost. They believe that employees can learn from each other while doing the job through teamwork. Even though employees clearly understand the benefit of training, they still lack basic training and education. The Jordanian management beliefs might face difficulties in their implementation because employees are willing to share the experience and knowledge to a certain extent, which is an important requirement for culture change.

The interview results reveal that in the United Kingdom, management believes in training and education for construction workers as a tool for improving productivity, in addition to considering health and safety training as a priority before even starting the project. Moreover, the interviewees stated that their mission, vision and strategies would not work without giving employees the required training to be able to do their job right and improve performance. The difficulties occur in providing the required training for each employee as they have different qualifications and require different training to improve certain skills. Grouping employees into categories to understand their weaknesses and identify the required development takes some time but they believe this would be beneficial in the long term if management manages to improve employee retention. Furthermore, they added that responding to the rapid changes in the current business environment requires highly trained and educated employees and, thus, workforce skills do not become obsolete in an environment of change towards quality improvement. That reflects the UK understanding of the importance of training and education in the entire organisation in terms of improving productivity, enhancing company relations with suppliers, subcontractors, and client satisfaction. In Jordan, the majority of interviewees said that training and education is not required in the construction industry, as employees have to be guided by their supervisor to do the job. They believed that being part of a team can help employees to charge their knowledge, experience and thus improve their skills. However, at the same time, they mentioned that they do not have a framework to formulate their organisation and project culture towards improving knowledge sharing. When comparing Jordanian respondent beliefs with their management beliefs, the result shows a huge gap between both groups, whereby employees understand the need for training and required health and safety equipment and training, in addition to their beliefs that training and education can improve organisational productivity.

The research literature supports management beliefs that employee training and education improves organisational productivity and enhances their relation with their suppliers, subcontractors and clients. Rojas and Aramvareekul (2003) mention management skills and manpower issues in that they are the two elements with a great potential in affecting productivity performance. Arditi and Mochtar (2000) argue that inadequate levels of training and poor quality training provision cause poor quality projects and, thus, increase rework and defects which of course will affect

organisation productivity, reputation, and client satisfaction. This is the case in the Jordanian construction companies and, therefore, international construction companies are taking over the majority of the projects in the Jordanian market. Abdel-Wahabet *al.* (2008), in their study on productivity in the UK construction industry, found that there is a general consensus on skills development and training as it is directly related to improving productivity performance. However, they add that increasing workforce qualification levels and skills do not necessarily render an improvement in productivity performance within the industry; therefore, management has to play a large role in identifying their workforce skills shortage and point out the key skills which require further development.

- *Supplier Chain Management*

Supply chains can vary significantly in their complexity and diversity and can exist in many different forms within each industry. Construction supply chains on large projects involve hundreds of suppliers and a wide range of construction services. In addition to the reliance on a largely subcontracted workforce, these difficulties have increased the complexity of the supply chain network and delimited opportunities for process integration.

Within this research, respondents were asked to answer three questions relating to Supply Chain Management concerning TQM implementation and, in Jordan, statements recorded a low rate with a mean lower than 2.00. The respondents totally disagreed that their organisation has established good relations with suppliers to improve continuous improvement. Moreover, supplier materials are not tested before installation to ensure meeting client demand and high quality standards; nor do their organisations categorise suppliers to ensure dealing with first category suppliers. That might be caused as a result of management lack of knowledge of TQM tools and techniques and lack of education, with cost improvement being the main priority for management. In the UK companies, the respondents reflected total agreement towards their management strategies in relation to Supplier Chain Management with a mean higher than 4.00. The respondents agreed that their companies have established good relations with suppliers to make continuous improvements; supplier materials are tested before final installation; and their organisations categorise suppliers to ensure working with first category high quality standards.

In Jordan, the interview results confirmed employee respondents, as the Jordanian interviewees stated that they do not deal with regular suppliers and, thus, they do not categorise their suppliers to ensure working with high quality standard suppliers. In terms of establishing and sustaining long term relations with suppliers, the interviewees said that they ensure sustaining such relations with their international suppliers as some clients request specific materials which are not available in the Jordanian market. Thus, ensuring long term relations with international suppliers helps organisations to meet deadlines and provides customers with the requested quality. However, in the UK, the interviewees stated that establishing and sustaining long term relations with suppliers is one of their main criteria. Moreover, two interviewees (BAM and Walter Lilly) said that their management always emphasise supplier relationships by implementing the Purchasing Excellent Program system, “PEP”, with some companies to categorise suppliers into category one, two and three suppliers. Where they tend to place 75.0% of their work with category one, who are already aware of organisational quality standards, a health and safety and communication programme will ensure work flow and quality outputs. The researcher has noticed the link that United Kingdom organisations create between the majority of TQM critical success factors such as top management commitment, supplier long-term relationships, communication, information technology, and health and safety to ensure quality outputs and customer satisfaction.

The literature reflects the UK construction company experience in relation to TQM implementation. Cox (2004) mentions that supply chain management is frequently viewed from a perspective that seeks to position and strategically manage an organisation strongly within particular markets and, thus, it is primarily concerned with helping the organisation to understand the market and define what is required to compete in the market. Therefore, supply chain management cannot be separated from organisational strategic planning because they share similar activities to achieve organisational objectives such as competitiveness and increased market share, Green *et al.* (2004). Other researchers, Fernie and Thorpe (2007) discuss supply chain management from the operational perspective rather than the strategic perspective. They argue that the operational view is more concerned with efficiencies in operational activities within and across organisational boundaries, rather than market positioning. In other words, they believe that supply chain management draws upon

the use of relationships in achieving the objective of efficiency gains in transactions costs, logistics and inventory, as well as problem solving. They add that strategic and operation views of supply chain management cannot be separated, as their aims are to achieve organisational objectives.

Korczynski (2000) discusses the relation between supply chain long-term or partnering relationship and workload continuity. In such relations, levels of trust are likely to be high since an organisation can be more confident that suppliers will not exploit their vulnerabilities, which again reflects the UK previously mentioned “PEP” system which aims to categorise suppliers to improve the trust relation and, therefore, ensure workload continuity. This relationship needs top management support, an active information system and clear communication and networking between management, project management and suppliers to ensure meeting deadlines and satisfying clients. On the other hand, it is clearly apparent that participants in the UK are highly knowledgeable in how they make sense and understand the relationship between their organisation and suppliers which comes from having a quality culture in place and an active communication system.

- *Customer Satisfaction*

Within the construction industry, customer relationships and satisfaction have gained more attention recently because they have been perceived as an effective way to differentiate one construction company from competitors and gain competitive advantages and, at the same time, customer relations, satisfaction and retention are considered as key issues in organisational efforts towards improving quality.

The respondents in the UK and Jordan were asked to answer three questions in relation to customer satisfaction as a critical success factor in TQM implementation in the construction industry. The Jordanian results revealed total disagreement in relation to their company approaches towards customer satisfaction. The respondents said that their organisations do not perceive fulfilling customer needs as their priority. They also lack regular quality meetings with customers to keep them updated, which makes it worse as the feedback provided by clients cannot appear and occur until the end of the project which affects the success of the entire project, although they agreed that their organisations do not implement a systematic approach to add value to their

services to increase customer satisfaction. The results reflect a lack of communication between management and clients, where there are no regular meetings or feedback, in addition to not giving attention to client and final user needs and expectations. This might be caused as a result of client unawareness of their needs, as well as the absence of government control over quality in the Jordanian construction industry. Client absence during the procurement process and during the production phase refers to their lack of knowledge of TQM and control over their project. A further reason could be the nonexistence of a referencing approach in the Jordanian market where, in other countries such as the United Kingdom, client references are considered very important in securing new projects and enhancing reputation. Having a low level of knowledge of TQM by clients is directly related to their perception of final project quality. The problem arises when the clients choose the lowest bidder to do their project but, on the other hand, the contractors are profit driven rather than quality and customer driven.

In the United Kingdom, respondents revealed total agreement towards their organisation approaches in relation to customer satisfaction. They said that their organisation priority attention is given to fulfilling customer needs. They also agreed that there are regular meetings with customers to keep them updated on workflow, although they confirmed that their companies have implemented a systematic approach to add value to their services to increase customer satisfaction. The reason refers to organisation strategy, by being customer and quality driven, to improve customer retention and competitiveness.

In Jordan, the interview results again show lack of communication between management and employees, where employees stated that their management does not perceive customer satisfaction as their priority. The interviewees stated that customer satisfaction is very important to their organisation to ensure competitive advantage but, at the same time, the interviewees said that they do not have any systematic approach to add value to their services to improve customer satisfaction. Thus, this further reflects Jordanian construction companies being cost driven rather than being quality or customer driven and, as mentioned previously, profit is the main purpose behind doing business. Jordanian companies have to pay more attention to quality and

customers to ensure competitiveness in the long-term which will maximise profits through customer satisfaction and repeat business.

The Jordanian clients stated that they prefer to work with Jordanian companies instead of international companies but the problem is that clients are able to get better quality design and final projects when dealing with international firms, since the majority of Jordanian companies are unable to stick to the design, usually suggesting some modifications at the installation stage as a result of the lack of some construction materials within the Jordanian market. They added that the majority of the Jordanian construction companies lack the quality of understanding in both management and employees, which causes a lack of communication and meetings with contractors. However, when dealing with either Jordanian or international construction companies, clients have to hire their own site supervisor who will be on site in a daily basis and will report to the clients regularly. However, the difference is that international construction companies provide clients with regular meetings that include quality reports, and health and safety reports. Thus, international construction companies have taken over the Jordanian companies because they provide a higher quality project, or it might refer to client beliefs that international companies might be able to provide higher quality and better design.

In the UK, the interviewees said that their management main priority is to achieve customer satisfaction through implementing continuous improvement initiatives to maximize value. They added that the Continuous Customer Care programme (CCC) was implemented based on the philosophy of total quality management to help organisations to understand the relation between their internal customers (sites and departments) and their external customers (clients, suppliers, designers and third parties). Organisational commitment to the CCC programme is based on management beliefs that developing consistent customer focused procedures across the entire company is an essential ingredient in providing ongoing customer satisfaction. They added that through CCC, they will be able to measure performance, gaining more feedback by clients, suppliers and designers following the project completion. One company (Bowmer and Kirkland) interviewee in the UK stated that providing extra value to the project comes from avoiding serious mistakes which might cause any delay for the whole project. Thus, even though the contractors would be responsible

for any delay, it might affect the client reputation, such as a delay in building a new school for a university, or a new supermarket. Such a delay would affect client reputation and affect the relationship between client and contractor. Therefore, extra value based on making sure that the job is done on time, to budget and of a higher quality should be provided, which was confirmed by one interviewee at the University of Huddersfield.

From the UK client perception, two interviews were conducted with the University of Huddersfield as clients. The results show total satisfaction by clients about contractor approaches and strategies towards achieving high quality project. They added that the communication between contractors and clients was very active, as they have regular meetings every two weeks to discuss workflow and keep them updated with the next stages. The meetings involve clients, engineers, suppliers, project manager, finance manager and designer, ensuring the regular involvement of all parties in the communication process. Moreover, clients reflected on the snagging and feedback response by contractors as they always welcomed any feedback during the project and after the final completion. In terms of strategic planning and quality structure, clients stated that contractor strategic planning was totally successful as they managed to deliver the project on time with high quality standard, which occurred because they planned all their project phases and dealt with the external factors such as weather very professionally. In terms of local community and the environment, the client was happy in respecting the local community by keeping the noise level down, regular cleaning and recycling, in addition to working with local suppliers in Huddersfield and Yorkshire. Health and Safety rules and regulations were totally implemented by the client (BAM), which the researcher noticed himself during the onsite data collection process by receiving health and safety instruction and clothes, showing that a safe environment is maintained at the working site.

Therefore, the difference between the United Kingdom and Jordanian management approaches towards customer satisfaction is based upon management orientation of being profit driven in Jordan, while being customer driven in the United Kingdom to improve profits in the long-term, which improves competitiveness, profitability and market share. Therefore, it becomes clear that customer satisfaction is an on-going process and is directly related to all of the contractor's operation, which does not

make it random success factor for TQM implementation as it brings added value to the services contractor offers.

- *Management Information System (MIS)*

The current business environment has become more global and services oriented which has forced construction organisations to find new ways to improve quality, performance, fulfil changing client requirements and being competitive. Construction projects are highly complex, involving many distinct professions, making inter and intra-discipline communication and information flows between distinctive professionals often problematic, Mawdesley and Al-Jibouri (2010). Therefore, information and communication technology was widely anticipated to increase the effectiveness of project delivery, Finch (2000).

Respondents in the UK and Jordan were asked to respond to three statements related to the information and communication technology in their organisations. Among the Jordanian respondents, statements recorded a low rate with a mean around 2.00. The respondents stated that their organisations do not continuously improve communication between management, employees, suppliers and clients. Also, their organisations do not clearly communicate strategies and goals with employees. They added that they do not receive regular feedback to make performance developments. This might be caused as a result of management lack of knowledge of MIS benefits among management and using traditional methods to deal with the construction process such as cost control. In the United Kingdom, the statements recorded a total agreement among respondents with a mean around 4.00. The respondents stated that their organisation continually tries to improve communication, clearly communicates strategies and goals to employees, and employees receive regular feedback to make performance developments.

The interview results show once again the gap between Jordan and the UK in terms of MIS in the construction industry in relation to TQM implementation. The gap can be caused by many reasons such as Jordanian management lack of technology awareness, which influences MIS investment decisions. The Jordanian management lacks experience in terms of the adoption of MIS in their organisations and fails to gain expected business results. Interviewees in the Jordanian companies stated that the

majority of managerial staff and employees lack knowledge in technology, in addition to being unaware of the key potential of MIS innovation benefits which, of course, obscure the MIS investment opportunity. Technology immaturity and lack of confidence by management in the Jordanian companies have led to employee resistance to adopt any new technology, which appeared to be linked to their educational level, not receiving the required support from their management and being afraid to accept new challenges and responsibilities. Furthermore, communication among all parties within the construction project is an important element to ensure project success. In Jordan, the traditional management style still resists the idea of communicating goals and strategies with employees, where they prefer supervision and regular task allocation. Moreover, the interviewees stated that their top management is not able to take a risk by adopting MIS because it involves high cost and they would have to provide budget, support and operational training.

In the UK, the interviewee results show that organisation visions and policies affect their strategic MIS adoption and implementation; their vision functions as a long-term strategic objective of MIS adoption, while their policy enhances MIS implementation in terms of determining employee behavior. They added that top management support plays a fundamental role in MIS adoption decisions as it helps in developing employees and infrastructure for MIS adoption. On the other hand, the organisational ability to communicate the benefits of MIS through the use of technology influences MIS diffusion at the organisational level and, therefore, organisations have to perceive MIS as a motivator and develop employee knowledge of MIS benefits concerning their work practices. Moreover, the UK construction companies emphasise developing an information network among employees to share knowledge and information in relation to performance development and quality improvement. One manager (Halcrow Group) said that MIS has to be adopted properly in construction organisations by understanding the benefits behind it because immature technology leads to incomplete MIS function, and, therefore, affects decision making.

The literature provides evidence of successful implementation in the UK and explains Jordanian company belief that implementing MIS involves a high cost. Craig and Sommerville (2006) perceive the UK industry as highly non-collaborative, fragmented and distinctly unique. Therefore, improving performance and outcomes of

the construction projects requires changing the prevailing culture towards supporting continuous improvement by adopting collaborative working practices between clients and contractors, which facilitates information and knowledge sharing between projects and teams and across organisational boundaries. In Jordan, many construction organisations believe that they can exist and compete without the need for MIS technology and, therefore, they have not implemented MIS technology within their organisations. However, in practice, the project success in the construction sector is highly dependent on the efficiency and effectiveness of management ability to manage information flow and communication between all parties within the construction project; thus, the need for MIS technology tends to be very important to the project success, Peansupap and Walker (2006). Whyte *et al.* (2002) report that organisations have to understand the real benefits of MIS implementation and identify any constraints that might occur before diffusing the MIS initiative throughout their organisation, which helps organisations to overcome investment barriers and avoid any large cost caused by failure in the implementation of the MIS initiative.

- *Continuous Improvement*

Continuous improvement is considered a fundamental element for organisation success, as it consists of eliminating defects, reducing waste, managing production time and improving productivity and performance, Mjema *et al.* (2005).

The respondents were asked to reflect on three statements linked to continuous improvement in relation to TQM implementation in the construction industry. The respondents in Jordan totally disagreed with their organisation approaches towards continuous improvement. The respondents stated that their companies do not emphasise improvement over than maintenance; their management does not encourage continuous improvement creativity and innovation; and their management does not emphasise the best implementation of continuous improvement processes for all tasks at all levels. Statements recorded a low rate with a mean around 2.00. However, poor continuous improvement might be caused by the employees themselves rather than management, by their own perception of poor performance or even lack of self confidence towards certain tasks and new technology. In the UK, the respondents totally agreed with their organisation approaches towards continuous improvement. They stated that their organisation emphasises improvement rather than

maintenance, their management encourage continuous improvement creativity and innovation and also their management emphasises the best implementation of continuous improvement processes for all tasks at all levels. That reflects that the United Kingdom management has established a long-term relationship with employees, which creates an environment of trust and support of continuous improvement.

The interview results in Jordan reflect management perception of continuous improvement. They stated that there are many challenges to face continuous improvement in the construction industry such as employee educational level, employee loyalty, employee retention and the ability to accept new challenges and technology. They added that the continuous improvement process is a challenge for them. Some managers understood that, as long as the client was happy with the construction project process and results, there was no need to bring more challenges and difficulties by improving process and performance. This implies that more resources are required as are increases in production costs which would, thus, create more conflict in the organisations. On the other hand, the UK interviewees stated that customer satisfaction could not be achieved without continuous improvement initiatives by adding value to the construction project and materials. They added that continuous improvement is essential for all organisations and requires a highly committed management to provide employees with the required training and education, proper human resource management and support of innovation and communication to push employees to come up with new ideas for doing the job and improving performance. Some managers linked continuous improvement to employee satisfaction; they said that customer satisfaction can only be achieved by having loyal, qualified and satisfied employees. Moreover, it has been found that employee involvement in the decision making process, active communication channels and good relations between management and employees have a positive impact on the continuous improvement within the UK construction companies, where employees are more welcome to share their knowledge and provide solutions for production problems.

The results underline the Jordanian and UK manager attitudes towards continuous improvement initiative implementation. Attempting to use fewer resources and shortening deadlines are likely to generate performance problems; therefore, managers committed to continuous improvement have to focus on the long-term benefits of continuous improvement and create a high-performing production system rather than focusing on the project.

Mjema *et al.* (2005) argue that continuous improvement is considered a fundamental element for organisation success, as it consists of eliminating defects, reducing waste, managing production time and improving productivity and performance. Nilsson-Witell *et al.* (2005) emphasise that it is hard to generalise certain approaches for continuous improvement within the construction industry, as each construction project is different and has its own characteristics but, in general, continuous improvement is driven by knowledge and problem-solving activities. Therefore, it depends on employee ownership of the problem in relation to maintaining the flux of the improvement. Moreover, continuous improvement has proved to be associated with reducing costs by recovering the wasted capacity used to produce rejected products and, at the same time, it can be oriented to add value to the end customer by directing the continuous improvement process towards contributing to the quality dimensions such as conformance, performance, serviceability, reliability, durability and perceived quality, as stated by Gieskes and Broeke (2000).

- *Performance Measurement System for Benchmarking*

Strategic performance is very important in the construction industry because of its capability in coping with uncertainties, its role in the pursuit of company success and providing sustained improvement, Isik *et al.* (2010).

The questionnaire results show that respondents in the Jordanian construction companies totally disagreed with the statements related to their organisation methods of performance measurement systems for benchmarking. They stated that their companies do not adopt a self assessment system to improve performance, they do not have benchmarking against primary competitors and their companies do not track quality cost to reduce the cost of waste, rework and rejection. The statements recorded a low rate with a mean lower than 2.00. In the UK, the statements recorded a high rate

with a mean around 4.00. However, it is important to mention that performance could be measured differently by employee and management perceptions, where employees might base their performance measurement around traditional tools of performance measurement such as time, cost, health and safety and quality which, within the current business environment, is considered a required performance rather than an indicator of excellence. From the management perception, excellent performance might be measured by high performing teams, team integration, cultural issues and learning, where these elements tend to drive performance at the project level.

The interview results in Jordan show interviewee emphasis on cost, time and quality as a performance measurement. They stated that they measure performance by measuring the project cost against the original budget. Moreover, they added that project completion time is perceived a key in performance measurement by measuring the combination of time predictability and reduction in delivery time while keeping clients informed. These measurement factors placed cost and time ahead of quality as a tool of performance measurement.

In the UK interviews, managers stated that performance is measured according to two categories: subjective and objectives measures. Objective measures include time and cost, for example, while subjective measures include quality, satisfaction and functionality. Moreover, they stated that performance measurement is affected by many factors. They mentioned that country economic level in terms of unemployment rate, inflation, price indices and national rates affect the performance measurement for construction companies. Furthermore, the interviewees discussed the correlation between political conditions and the economy in terms of the power that political conditions have upon the overall economy which, in turn, affects the construction industry. International relations and government changes are considered potential factors affecting the political stability of the country from contactor and client perceptions. From the contractor point of view, a stable relationship with government in a healthy environment creates a delicate balance between the government policy and construction company operations and helps a company to obtain financial support, whereas client power refers to financial stability which, in return, enhances project performance and continuity.

Thus, performance measurement should not focus on financial measures but be extended to measure client power, external factors and organisational performance in relation to these factors. The literature supports the findings. Butcher and Sheehan (2010) mention that any organisation deciding to implement the TQM system has to understand that financial measures on their own are very limited in reflecting organisational performance. They add that UK construction companies have faced some impediments towards achieving high performance projects such as contractual relationships, teamwork, management behaviour, organisational stability, and understanding customer perception of quality performance. Evans (2005) describes the benchmarking process as: determining which functions to benchmark; identifying KPIs to measure; identifying the best-in-class companies; measuring performance against these companies; and taking any required action to improve performance and meet or exceed other company performances.

- *Impact on Society and Environment*

The questionnaire results show a total disagreement between Jordanian respondents in relation to the statements concerning the impact on society and the environment, with a low mean of less than 2.00. The respondents stated that their organisations do not pay attention to the environment and the local community and they added that product and material selection does not have an impact on the environment and society. The employee responses show that their organisations do not have rules and regulations for the environment and society, which might have occurred as a result of the absence of government rules and regulations, organisational culture and educational levels. In the UK, respondents totally agreed with the statements with a mean higher than 4.00, which reflects organisational commitment to their environment and the local community.

The interview results show that Jordanian managers referred the lack of commitment to their environment and society to high cost and the time required for the extraction of raw materials and research into new methods to protecting the environment. Moreover, they referred as well to the nonexistence of required equipment in the Jordanian market such as advanced equipment with no noise water spreading and dust screens. Furthermore, they stated that to finish the job on time, they have to work overtime and even during the night. However, the pollution effect on the environment

is irreversible; therefore, Jordan construction companies have to speed up the pace of protecting the environment during construction projects.

In the UK, the interviewees stated that protecting the environment and caring about the local community are at the heart of their organisations. Some managers (BAM, Bowmer & Kirkland, and Walter Lilly) stated that, as part of their management commitment to quality, they train their employees on environment protection approaches and educate them in the benefits behind these; they ensure the use of natural resources, the proper choice of environmental-friendly construction materials, clean technology, waste management and pollution control. They added that clients are looking for extra quality that contractors can provide, such as charity donation and social responsibility. Thus, some managers said that they try to work with as many local suppliers as they can, simply because it is part of their organisational social responsibility policy; they organize school visits to highlight dangers and promote the construction industry; they organise charity events and donate whatever they can to the local authority. Therefore, environmental protection is considered a competitive advance for construction companies in the UK as a result of improving client awareness of the importance of environmental protection.

Governments play a huge role in protecting the environment. In Jordan, there are no formal rules by government towards protecting the environment in the construction industry. The government should adjust the construction development rate in Jordan to a level which is acceptable for environmental protection. Additionally, the government should impose compliance by way of an environmental audit body and process, rather than just issuing regulations and standards. Thus, the traditional construction management approach in Jordan requires improvement in terms of environmental protection, rather than focusing on cost, time and quality.

The literature provides little evidence of any strategic management techniques used by construction companies toward environmental protection, or that the environment forms a part of organisational strategic planning, Brooks and Weatherston (2000). However, construction projects increasingly affect the environment with dust, visibility levels, contaminated water, noise and polluted air, Yip (2000). In terms of governmental regulations, the UK introduced the Building Amendments Regulation in 2003 to extend control on the environmental performance of buildings. In terms of

economic measures, businesses are profit-driven by nature and, therefore, any extra cost will not attract business real interests, as stated by Ofori *et al.* (2000) and Shen and Tam (2002).

- *Health and Safety*

The health and safety factor was not measured as a TQM critical success factor in the questionnaire but it was mentioned in one question to measure employee perception of safety compared to cost, scope, time and quality in order of importance. The result shows that safety was ranked as number four out of five, where five is less important in the UK and Jordan, followed by cost. However, in the interviews, health and safety was mentioned by eight interviewees as an important factor for TQM implementation within the construction industry. The eight interviewees were from the UK, whereas nobody in Jordan mentioned health and safety as a CSF for TQM implementation.

The UK interviewees stated that the construction industry has seen a revolution in the use of technology which has improved construction company performance and productivity, but this has been achieved at the expense of increased accident and injury rates, and most construction injuries have recorded these as a result of earth moving machines, which they consider heavy, big and noisy. They added that despite top management being totally committed to the health and safety of their employees, and despite the widespread implementation of many new regulations relating to health and safety, accidents involving construction equipment and plant remain consistently high.

The use of safety equipment and wearing protective clothing is crucial in reducing the effects of accidents on site, but problems appear when some employees are reluctant or neglect to wear it, even if they have been forced to by management. On the other hand, the provision of safety equipment alone does not improve safety on site, but there has to be a corporate culture to encourage it, and the risk of not wearing safety clothing must be clearly understood by employees. Moreover, managers stated that management involves employees in the safety program to train management and other parties, as they are more aware of onsite hazards than other parties and, therefore, management sets regular meetings regarding safety issues and the results show that the percentage has reduced and helped to improve accident prevention. However, it

should be noted that, even though eight managers emphasised health and safety on the construction site, two (Richmond Property and Halcrow Group) of them said it is important but is still not considered vital to success of a project. The result of the research shows that company size (large and medium) does not reflect injury percentages, but education and training programmes tend to play a stronger role in relation to injuries.

The literature provides evidence of health and safety problems in the construction industry. Dea and Flin (2001) state that leadership commitment enables organisations to facilitate organisational missions and visions of safety and develop values required for long-term success. They add that leadership commitment to safety is recognised as a fundamental component of an organization's safety culture. Lingard and Blismas (2006) argue that leaders have to show their commitment towards safety in the construction project through having clear and focus strategies and policies supported by plans, objectives, targets and processes to improve site safety. Niskanen (1994) states it is important for organisations that management participates in safety activities, but it is more important to encourage the involvement of the workforce. This is confirmed by a study by Mohamed, S. (2002) which describes the relationship between worker involvement in safety activities and the safety climate within organisations as positive.

### **Independent sample T-Test**

The Independent sample T-Test assesses whether the means of two groups are different from each other. It can be used when researchers compare two groups within the same population or different populations (the United Kingdom and Jordan). "The Independent sample T-Test is a procedure used for comparing sample means to see if there is sufficient evidence to infer that the means of the corresponding population distribution also differ", George and Mallery (2010). More specifically, this research study survey was conducted in the United Kingdom and Jordan and the two samples are measured on the Critical Success Factors for TQM implementation. Thus the Independent sample T-Test is used to determine if the means of the two sample (the United Kingdom & Jordan) distributions differ significantly from each other.

The Independent sample T-Test was used to test differences in TQM factors according to the sample, and it was found that the calculated p-value = 0.000 and t-values are significant at .05 level for all factors, which reflects that there are significant differences for TQM factors between the UK and Jordan, where these differences tend to increase in the UK sample.

### **7.3.3 External Environmental Factors and Obstacles of TQM Implementation**

This section aims to define the external factors and obstacles affecting TQM implementation in the UK and the Jordanian construction industry. In relation to the external factors of the Jordanian construction companies, the results show that the taxation system within the construction industry is considered slightly high, followed by the country economic level, which affects employee satisfaction in terms of health insurance and payment rate. Political relations between countries came in the third place, as it affects the import and export systems of construction materials, followed by the educational level within companies, and shipping policies since it involves third parties. In terms of customer satisfaction and local community culture, the respondents stated that customer satisfaction, quality culture, and local community culture is considered as external factors affecting TQM implementation in Jordan. However, they ranked government control over the minimum required quality level and government regulations towards meeting customer satisfaction as the least factors affecting quality implementation.

In the UK, the result shows that government regulations towards controlling the minimum quality level to meet customer satisfaction is considered the main external factor affecting TQM implementation in the construction industry. Moreover, the local community culture and their relations with clients and service quality are perceived as affecting TQM implementation. They added that the government role in enhancing political relations, economic levels, shipping policies and educational levels is also fundamental for the successful implementation of a TQM system, while customer expectation and the quality level they expect in exchange for their budget is perceived to have the minimum effect on TQM implementation.

The results indicated that there are many external factors affecting TQM implementation in both countries and these factors are related to governmental reasons, the environment and external customers. From the respondent point of view, more barriers related to the external factors are poor building materials or purchased parts, as well as the problems stemming from government such as government taxation system, regulations and control over quality levels. Moreover, the political relationship and its effect on the economic levels, import and export of construction materials and educational systems tend to have a strong effect on TQM implementation. Therefore, the respondents perceived that the government plays a fundamental role in improving TQM in the construction industry by enhancing political relations, which will affect the economic levels and quality culture within the industry. Looking at the Jordan position in the Middle East, the difficulty the government faces to enhance political relations has become clear but, as yet, it still does not affect the economic environment positively. It should be noted that the results in the UK indicate that contractor and client relationships have overcome the quality expectation, and they are working to provide extra services and quality concepts and levels to improve company competitiveness and client satisfaction.

The results relate to internal obstacles affecting TQM implementation in the construction companies, show that lack of expertise, schedules and costs are treated as the main priorities, and lack of education and training to drive the improvement process are the main internal obstacles affecting the TQM implementation in the Jordanian construction companies. The results indicate that lack of expertise in TQM and lack of training and education exists at all levels of an organisation, which might cause employee resistance towards adopting a quality culture and accepting more challenges related to performance improvement. TQM requires active communication channels and well educated workers; thus, even if the companies invest heavily in creating quality awareness and technology without having the proper training, management commitment and communication channels, the TQM initiative will fail.

*“The main impediments would be financial problem, because having such system and ensure it will be beneficial required certain amount of money and time as well, moreover, new technology have to be introduce to our employees, which required training and from the other hand”*

*Ahmad Jarwan  
National Engineering & Contracting Company (NECC)*

In the UK, the respondents stated that the emphasis on short-term objectives, lack of top management commitment and lack of employee commitment are the main internal obstacles affecting TQM implementation in the UK construction companies. A TQM implementation programme requires full commitment to quality by top management and employees. Lack of commitment in quality management is a major obstacle in quality improvement and it may stem from various reasons including limited experience and training of many employees and executives, preoccupation with short-term profits, and lack of long term objectives.

The interview results in the UK and Jordan show that there are many external factors and obstacles affecting TQM implementation in the construction industry. These factors are related to culture, economical levels and competitiveness. In terms of culture, TQM implementation into any organisation requires a culture change towards quality but changing organisational culture is a very difficult task, often faced by high employee and managerial resistance. International employment has taken place within the construction industry in the UK and Jordan. This raises the issue that people will have different cultures when they are in a different environment, and that creates problems in the construction industry such as the relationship between the individual and society, relations with authority, integrating into groups, ways of dealing with conflicts, including control of expression of feelings and aggression and the most important is the individual's concept of masculinity and femininity which has been long a problem in the UK and Jordanian construction industry. Moreover, international employment means that employees have a different education and background which affects the organisational policies and management commitment towards providing training and education for their employees in the majority of construction companies, due to languages differences and levels of education. The health and safety concept will be also different and each country applies different rules and regulations related to health and safety in the construction industry.

Commercial competitors are considered the biggest problem in the UK construction sector, as a result of the current economic climate which affects all industries worldwide. The current economic climate puts restrictions on what contractors are able to provide to their clients and which subcontractors they want to work with as they might be expensive. Thus, contractors have to make a balance between being

commercially competitive, dealing with the current economic climate, and providing high quality to satisfy customers. Therefore, contractors have to compromise on procurement, material selection and design, which is considered a hard job to do and might create quality problems and customer dissatisfaction. Furthermore, looking into the current economic climate from a construction company perspective shows that it affects the entire industry and makes it even harder to secure new projects or repeat business, creating financial problems for companies. Some managers stated that focusing on errors made by the workforce, who is responsible for a small percentage of mistakes where the existing system is being designed by management, is responsible for the majority of the unintended consequences.

The case in Jordan seems to be similar to other developing countries, where Jordanian participants perceive the major TQM implementation impediments as relying on inspecting the quality of process and outputs, rather than improving product quality. Relying on the quality control department rather than relying on management, supervisors, managers of purchasing and production workers, together with the use of technology has driven management to rely on technology to solve problems, which might be considered slightly expensive. Three out of eight interviewees in the Jordanian sample (National Engineering & Contracting Company, Samaha for Construction, and Middle East for Construction) said that applying a TQM system is expensive and that their organisations lack the expertise to deal with a TQM system, in addition to the education levels of employees requiring training courses to help them to understand the quality system. Furthermore, taking into consideration the characteristics of Jordan and developing countries, it was apparent that a high power distance exists in the construction industry which creates a conflict with several critical success factors for TQM implementation in terms of communication possibly being strongly impeded, where employee participation and involvement in decision making is non-existent, and they have to obey the decisions of their superiors, which renders bottom-up communication hardly existent and more difficult. Employee empowerment is in direct conflict with a culture in which workers are unable to be creative and innovative, where instead they wait to be told what to do and are afraid of expressing any disagreement with their superiors. Teamwork can also be perceived by employees of higher hierarchical levels as threat to their privilege and status.

Within the UK and Jordan, the construction industry seems to have a high level of masculinity rather than femininity, which again conflicts with some TQM critical success factors such as social responsibility and impact on society, which again relates to cultural issues in both countries. However, it is important to mention that the UK has taken many steps forward to improve the female working environment in the construction industry, while in developing countries the culture still resists women workers in the construction industry, as confirmed by Hofstede and Hofstede (2005). In their study of TQM implementation in India and the UAE, it was revealed that organisational and national culture, where the majority of the workforce is often multi-lingual and multi-national, with a high masculine percentage, cause cultural problems when tending to implement a TQM system. They added that, once all companies within the same industry are sharing the same economic climate, TQM implementation could be considered a competitive advantage for those companies who decided to implement it for quality improvement. Baidoun and Zairi (2003), in their study about TQM implementation in the Palestinian context, report that few studies have attempted to identify the essentials of TQM in developing countries. They state that organisational culture plays a fundamental role towards successful implementation of TQM. Therefore, management has to ensure creating a quality culture within the organisation to drive all employees to achieving high quality outputs to satisfy customers and enhance company reputation.

Lagrosen (2002) conducted a study in the UK, France, Italy and Germany to find out whether quality is or should be managed differently in different cultures. The study found that each country has a different national culture, and each organisation has a different organisational culture within the same country and, thus, TQM is totally different between organisations in the same industry. Temtime (2003) advocates that TQM implementation should be different for each organisation,; there is no “one-size-fits-all” approach in TQM and certain quality activities may be more appropriate for some organisations more than others.

Al-Khalifa and Aspinwall (2001), in their study on TQM in Qatar and other Arab oil producing countries, mention that the majority of these countries are a long way from maturity in terms of TQM implementation, referring to the external culture and climate such as in the very poor levels of communication, autocratic management and

a next to nonexistent knowledge about TQM. Prasad and Tata (2003) believe that educational, socio-cultural, political-legal and economic factors have a major influence on TQM implementation within an organisation.

#### **7.3.4 The Benefits of TQM Implementation**

Through looking at contractor (employees and management) and client perceptions, this section aims to explore the benefits of acquiring TQM. From the UK employee point of view, TQM could be beneficial for their organisation as it would increase company turnover, improve employee satisfaction, reduce customer complaints, motivate employees, and reduce operational defects. This reflects that employees understand the long-term benefits of TQM implementation within their organisation, where their organisation recognises their needs and provides them with the required training to improve performance and quality, reducing by that defects and costs and improving customer satisfaction. Employee understanding of the long term benefits of TQM indicates high management commitment and active communication channels between employees and management to work together towards quality projects and customer satisfaction.

From the management point of view, the UK construction companies understand that client choice of contractor is not based on low price, where it is not necessary for the lowest tender to do the job. They have established a long term relationship with clients to be able to understand their quality expectations and fulfil their requirements, by providing extra quality to satisfy their customers. This extra quality cannot be delivered without having an active and successful TQM in place through satisfying employees as major contributors to a successful TQM system. Therefore, management is committed to provide employees with the required training and education regarding quality improvement and health and safety, gathering their suggestions and measuring their satisfaction.

*“Benefits of TQM may not appear short term, however in the longer term, staff skills, processes and procedures and service provided to customers are surely to improve which will result in internal efficiency and customer satisfaction and retention, which are extremely important. TQM is a continuous process that ensures all internal processes and procedures are kept at their optimal levels, and depending on the level of Senior level management dedication to TQM, benefits may appear within a short to midterm period”*

*Jamal Al-Bahlawan  
Junada Syria*

Moreover, satisfying customers means that contractors are likely to repeat business with the same clients and gain reference letters which leads to securing new jobs, proved by the relation between the University of Huddersfield and “BAM Construct”, by taking over two projects with an estimated cost bidding price of £17m for each project. The University of Huddersfield’s trust of “BAM Construct” is based on the previous profile and experience and high level of satisfaction of the BAM final process and operational management and strategic planning to reduce the impact of internal and external factors and promote active communication channels, regular meetings and high quality projects within time and budget. Therefore, TQM successful implementation helps organisations to improve competition through improving profits, expanding market share and enhancing reputation and, most importantly, staying in business, providing by that more jobs to the local community, as their part of being committed to the local community.

*“Construction companies apply quality system to satisfy customer and thus maximise profits through enhancing reputation and repeat business”*

*Ghiath Kouzali  
Richmond Property*

Client perceptions depend on what sector they work in, their knowledge of quality and construction projects. However, understanding client expectations by contractors does not mean that client perceptions differ when building an industrial warehouse or hotel, as they expect high quality from contractors; but understanding their expectations helps contractors to develop a strategy to achieve these expectations within the available budget. One important point has to be considered by contractors, however, which is client power. This means that working with clients who are fully aware of their project, knowing what they expect out of it and their having previous experience of construction projects makes it harder to satisfy than other clients with less

experience of quality projects. Recently, clients pay more attention to their project by getting more involved in the procurement and development process, getting tendering reviews and health and safety performance checks, ensuring being committed to the local community and local suppliers, looking to see whether contractors can add extra value to the projects and, therefore, cost is not the highest concern of clients; quality and added value are also important. Such relations were discussed in an interview with Bowmer and Kirkland as they work for supermarkets such as ASDA and Tesco, considered powerful clients, as they have highly qualified and experienced operational teams to check the final project.

In Jordan, TQM implementation is seen as being beneficial for construction companies by being an effective system to reduce operational defects, improve customer relations and improve market share. The employee perception of TQM implementation indicates that they do not feel it would be beneficial for them as much as it would be for their organisations and clients. That reflects that their organisations have neglected their satisfaction, as a result of being financially focused on the customer. However, either way, employees cannot provide the required quality unless they are satisfied.

From the contractor perception, 20% of the targeted sample has a TQM in place; they perceive the TQM system as tool to reduce errors produced during the manufacture or services process, increase customer satisfaction and provide employees with the required training. Contractors felt the need for TQM to be able to compete and provide better services to satisfy their customers and, therefore, increase profits and market share. Although 60% of the targeted sample have not implemented a TQM system as they perceive it as an extra cost and do not feel the need for such a system in their organisation, that might relate to the lack of knowledge of TQM long term benefits, being cost oriented, lack confidence in their employees, or being afraid of taking risks and extra challenges once their customers are satisfied with their services.

Arora (1996) and Huarng (1998) discuss the benefits of TQM implementation in the construction industry; they state that TQM successful implementation helps organisations to reduce cost, time, waste, rework, and improve quality. Chew *et al.* (2008) state that, within the construction industry, resources alone are not sufficient to achieve competitive advantage and high performance and, therefore, contractors have

to make better use of available resources to improve profitability, quality services and market share. Johnson and Gustafsson (2000) said that, by improving construction company competitiveness through a TQM system, an organisation could improve revenues and reduce costs, enhancing by that business results and, thus, minimising inner cost and improving inner quality and raising productivity.

Karna *et al.* (2009) address the relation between TQM implementation and customer satisfaction in the construction industry. Their study revealed that TQM helps organisations and customers to work together towards quality achievement by getting the customer involved at an early stage of the project, keeping them updated, and establishing an active communication channel with clients. Moreover, providing employees with the required training helps them to understand their job and provide better quality to the project and, ensuring by that, satisfying the clients. Low *et al.* (2004) state that high quality services cannot be achieved without having high commitment by top management. They add that a TQM system should be based around highly committed management in their role of creating quality culture, setting quality plans and strategies, training and empowering employees. Therefore, TQM helps organisations to build a strong inner organisation culture where all employees work together towards achieving organisational goals, and provide a high quality construction project to ensure satisfying customers and improving profits, Limsila and Ogunlana (2008).

### **7.3.5 The Impact of TQM Implementation on Competitiveness**

To test the impact of TQM implementation on profitability within the UK and Jordanian construction companies, two questions were asked in the research questionnaire, located in the fourth section, relating to the benefits of TQM implementation. The respondents were asked to answer whether TQM implementation would “increase company turnover, and if it would save money” and, therefore, after calculating the mean of these two questions, the results were tested against TQM CSF’s using Multiple Regression.

According to the Jordanian respondents, the results show that TQM implementation does not have a significant impact on profitability, whereas in the United Kingdom, the results show that TQM implementation has a significant impact on profitability.

Employees believe that successful TQM implementation would improve company profitability through increasing company turnover and save money. Their beliefs reflect top management commitment to provide a quality culture through setting and communicating a quality plan and clear organisational vision and mission with employees, in addition to providing regular training towards improving performance and quality outputs which would result in satisfying customers and enhancing company reputation, thereby improving profitability.

The interviews reported that 50.0% of the Jordanian participants perceive TQM implementation as having a positive effect on improving profitability in the long term, while 50.0% perceive it as an extra cost. Of the sample, 25% stated that TQM implementation helps organisations to improve their profits, increase their turnover, reduce defects and, therefore, save money. Their beliefs are based on the fact that TQM implementation requires organisations to be customer driven rather than profit driven and, thus, continuous improvement, customer satisfaction, communication, management commitment, having strategic quality planning and satisfying employees would generate profits for the organisation in the long term, but it requires a cultural change. In the UK, all interviewees of the targeted sample stated that they had implemented a TQM system for a long time and they started to feel the benefits behind its successful implementation in relation to improving profitability, even though they did not see the difference at the beginning of the system implementation. They stated that profitability has improved as a result of having a good reputation, customer satisfaction and reducing defects. TQM implementation required a highly committed management to empower employees, train them and drive them towards a quality culture, enhancing by that construction project performance and quality, which generates customer satisfaction and enhances reputation. Customer satisfaction means more repeat business, in addition to securing reference letters to obtain new jobs, thereby improving profitability in the long term; but construction project profitability is affected by other factors such as project uncertainty and construction project cost.

Construction project revenue is measured at a fair value of the consideration received or receivable, which is affected by a variety of uncertainties that depend on the outcomes of future events, whereas estimates often need to be revised as events occur and uncertainties are resolved. Thus, contract revenue may decrease or increase from

one period to the next within a construction project. In some cases, some contract revenues may decrease as a result of penalties arising from delays in the project completion caused by the contractors. Moreover, construction project costs include labour costs, materials used in the project, supervision costs, cost of moving equipment and materials from and to sites, cost of design and technical assistance, estimated cost of rectification and claims from third parties. Furthermore, mobilisation advances are paid at the start of the construction project by the client so that contractors can mobilise the job to be done in the future, which is subject to adjustment in the running bills. In the final bill, all adjustments are done to close the matter, while the bank guarantee remains in custody up until the end of the specified period of satisfactory work.

The research results in the UK match what has been presented in the literature review in relation to TQM implementation impact on improving profitability. Haider (2008) states that TQM implementation has a significant impact on the company financial performance and cost control through setting a strategic quality plan to ensure meeting the deadline and avoiding any penalties which would reduce project revenue. Wisner and Eakins (1994) state that there is a strong positive relation between a TQM system and financial improvement, even though there is no guarantee of continual financial success in a highly competitive environment. Helton (1995) said that the majority of Malcolm Baldrige National Quality Award winners have seen an impressive improvement in their financial performance after TQM implementation.

According to the results gained from the UK and the Jordanian construction companies regarding the TQM implementation impact on profitability, a significant impact on improving construction company profitability was revealed in the United Kingdom, while not significant for the Jordanian construction companies.

*“having a quality system in place helps organisations to achieve customer expectation which will lead to repeat business with the same client and the same time getting reference letters, so it is not just the repeated business but it is also the reference they can supply to you which helps to get new work with other clients and that important in terms of improving competitiveness, profits, enhancing company's reputation, and expanding market share.”*

*Chris Galaga,  
BAM Construct United Kingdom Ltd*

The second factor is the TQM implementation impact on market share. Two questions were asked in the section related to the TQM benefits in the questionnaire survey. The respondents were asked to answer whether TQM implementation would increase company market share and if it would expand company activities overseas. Calculating the results 'mean' against TQM CSF's factors using Multiple Regressions shows that TQM implementation has a significant impact on increasing market share for the construction companies in the United Kingdom and Jordan.

According to the interviews, the results show that enhancing organisational performance through having a strategic quality plan towards quality improvement, providing employees with the necessary training to improve their skills and knowledge, and creating a quality culture would improve company performance and, therefore, strengthen the drive for construction companies, thereby facilitating their efforts to compete in world markets. Moreover, providing high quality construction projects has an impact on organisational reputation and customer satisfaction, which helps organisations to secure new jobs locally and internationally to improve market share and expand their business overseas.

In terms of the evolution of TQM, Liburd and Zairi (2001) argue that, during the 1990's, management focus moved from introspective and being product and services oriented, to being more market oriented through focusing on customer satisfaction. O'Regan (2002) discusses the fact that market share should not be perceived as a tool to measure organisational success or failure; rather, it has to be used to describe organisation position within the local and international market because the impact of market share is not always reflected in company performance or profitability. Tsang and Antony (2001) emphasise that improving market share cannot be achieved by only improving product and services quality, but also by improving employee skills and performance.

Several studies and research in the field of TQM have denied the relation between some of the TQM critical success factors with improving market share. They argue that some CSF's might have an impact on market share but others do not have any significant impact. Wilson and Collier (2000) found in their study that there is no correlation between some TQM factors such as leadership, human resource management and strategic planning in improving market share. A similar result was

found by Curkovic *et al.* (2000) who state that leadership commitment has no significant impact on improving market share.

To measure the TQM implementation impact on the service quality in the UK and Jordanian construction industries, the respondents were asked to answer four questions in relation to services quality. The respondents were asked to answer whether TQM implementation has an impact on service quality, reducing operation defects, meeting customer requirements and improving customer relations. The results show that TQM implementation has a significant impact on the quality services in the United Kingdom, while it has no impact on the Jordanian companies.

According to the interviews, there has been a change in client perception of construction projects, where they understand the risk behind paying too little for their construction projects. They (Park Inn Hotel, Movenpick Hotels and Resorts, and the University of Huddersfield) believe that paying too much might cause them to lose some money but, on the other hand, paying too little might cause losing everything because the contractors they choose to build their project are incapable of doing the project. Therefore, it is not advisable to choose the lowest bidder to do the job. This belief is based on client understanding of the importance of quality services. Contractors are working hard to improve their quality outputs by investing in human resources, new technologies, strategic planning and a quality structure. Moreover, construction companies are categorising suppliers and subcontractors to ensure providing high standards of construction materials and services.

Within the construction project, clients are looking for high quality projects within the available time and budget, where contractors are looking to satisfy their clients through internal improvement of their operations and their employee skills. Thus, construction companies are paying more attention to their employees and creating active communication channels between management, employees, suppliers, designers, subcontractors and clients to ensure involving all participants in the construction project, thus, reducing defects and improving quality services.

Harris and McCaffer (2001) argue that client long term interests lie in the high quality of their projects; the operations performed in the construction project must conform to the specifications established for the project. Speedy and low cost construction

projects should not be achieved at the expense of project quality. Poor quality performance results in more defects, increased rework and, therefore, significantly increased costs and schedule implications. Thus, quality must be considered in the process, products and final project to improve competitiveness. It has been argued by Palaneeswaran and Kumaraswamy (2000) that quality accreditation and past performance ratings are important indicators of contractor quality performance which has to be considered by clients before the actual start of the construction project.

*“Total quality management is very beneficial for our organisation, it helps in improving effectiveness and efficiency in our business and thus enhancing the value we deliver for our clients, improving by that our profitability and allowing us to provide greater rewards to employees and shareholders. Thus total quality system fundamental for our organisation and consider very beneficial and helps in improving reputation, profits, market share, performance, employees satisfaction through greater reward and finally improving customer satisfaction”*

*Samer EL-Jouzis  
Halcrow Group Ltd*

#### **7.4 Chapter Summary:**

This chapter discussed the results of the obtained data through research interviews and questionnaires. The results show that the TQM system is fundamental for the United Kingdom construction industry, while the majority of the Jordanian construction companies do not perceive it as an important system to improve competitiveness. The research defined the TQM CSF's for the construction industry and concluded that twelve factors are seen to be important for the successful implementation of TQM with the UK and Jordanian construction industries, respectively. These factors are: top management commitment; quality culture; process planning and strategic quality management; employee empowerment; employee training and education; supplier chain management; customer satisfaction; information and communication technology; continuous improvement; performance measurement and benchmarking; impact on society and environment; and health and safety. The previous factors were tested against the dependent variables (profitability, market share and quality services) to measure their impact on improving TQM implementation in the construction industry and the result revealed that TQM implementation would improve construction company competitiveness in the UK through improving profitability, market share and services quality from management and employee perceptions. In

Jordan, the result showed that TQM implementation has a significant impact on competitiveness through improving market share from management and employee perceptions, while having no impact on improving profitability and quality services.

TQM implementation is perceived to be beneficial for the UK construction companies in terms of improving employee satisfaction, increasing turnover, reducing customer complaints and operational defects and motivating employees, while in Jordan it is seen that TQM implementation would reduce operational defects, improve customer relations and improve market share. The research has also pointed out the external environmental factors and internal obstacles affecting TQM implementation. The result showed the UK companies perceive government regulation towards providing minimum quality levels, local community culture and their relations with clients and quality services, political relations, educational levels and economic environment as the most common factors affecting TQM implementation. In Jordan, the result showed that the taxation system, country economic level, political relations, employee educational levels and shipping policies have a significant effect on TQM implementation. The current economic environment has hit the construction industry hard during the period 2008 up to the present, and it is expected to recover by 2014. Therefore, the economic recession, which forced organisations to reduce their spending through taking action mainly in employee redundancies, is one of the major impediments that might delay or affect TQM implementation in the construction industry worldwide, . However, it is considered an opportunity for organisations to restructure their departments and make some cultural changes to reduce employee resistance, and revise their strategic planning process.

TQM has been implemented successfully in the United Kingdom and other countries in the construction industry and it has proved to be successful. Therefore, despite the previously mentioned internal and external impediments of TQM implementation in Jordan, management can overcome any problems and ensure the provision of high quality services. Therefore, the next chapter provides some recommendations for TQM implementation and discusses the pre-implementation stage, new models for TQM implementation, implementation processes, and sustainability.

# **Chapter Eight**

Recommendations, Conclusion, and Contribution

## **8.1 Conclusion:**

The research has investigated the importance of TQM implementation in the construction industry, based on a comparative study between the United Kingdom and the Jordanian construction sectors, to understand the reasons behind low competitiveness levels by the Jordanian companies against international companies operating in Jordan, and to investigate the reason behind the sudden drop in the quality scale in the Jordanian construction industry. The study revealed that, despite the fact that Jordanian government has been supportive towards the Jordanian economy and construction industry by supporting national and international investment and suggesting a new tax regime, Jordanian construction companies still fall behind the international construction companies in Jordan. Therefore, this research has been carried out to find out the main reasons behind the low level of competitiveness in these Jordanian firms, to provide a new TQM model and to provide recommendations to the Jordanian construction sector, based on an investigation into TQM implementation in United Kingdom construction companies.

Understanding the business environment in each country was important at the early stage of this research because it helped the researcher to understand the construction company business environment in the UK and Jordan and understand the internal and external factors affecting the construction industry. The study shows that there are some external problems affecting the construction industry in Jordan and the UK such as political relations and the economic recession which hit the economy in general and the construction industry in particular. After understanding the environmental factors affecting the construction industry in terms of the economic environment, education systems and levels, government rules and regulations, culture, social and political issues, the researcher discussed the TQM evolution and development since 1750, through the adoption of TQM in 1980, until now. The TQM evolution and development was studied in the manufacturing, services and construction industries to identify the reasons behind the failure or successful implementation of TQM in these sectors. Quality management gurus have not provided any framework for TQM implementation and, therefore, the researcher studied the different TQM frameworks generated by different countries in the form of quality awards to formulate a general list of TQM CSF's for all industries to be compared with the construction industry literature review and to find out the CSF's for TQM implementation in the

construction industry. These are: top management commitment; quality culture; process planning and strategic quality management; employee empowerment; employee training and education; supplier chain management; customer satisfaction; information and communication technology; continuous improvement; performance management system for benchmarking; and impact on the environment and society.

To collect more accurate and relevant information for the purpose of this research, primary data collection was carried out to support the secondary data collected. Sixteen construction companies and clients were interviewed and two hundred questionnaires were distributed to gather the required data within the United Kingdom and Jordan. One hundred and fourteen questionnaires were collected, where five questionnaires were not fully completed. Eighteen individual face-to-face semi-structured interviews were conducted with sixteen construction companies and clients in the United Kingdom and Jordan to collect the required primary data. The reason behind using these methods and not using others is mentioned in the methodology chapter. Following that, the collected data was translated, decoded, grouped and analysed in relation to the research objectives, respectively, to find out if the TQM system is fundamental for all construction companies, to investigate the critical success factors for TQM implementation in the construction industry, the external environmental factors and internal obstacles affecting TQM implementation, the benefits behind TQM implementation and the impact of the independent variables (TQM CSF's) on the dependent variables of profitability, market share, and quality services. To analyse the collected primary data, different statistical and analytical approaches were used. In terms of analysing the research interviews, a thematic approach was used to analyse the collected data. While SPSS was used to analyse the research questionnaire surveys and whereas descriptive analysis was used to understand respondents characteristics, an independent sample t-test was used to compare the critical success factors means of the two samples to identify the differentiation points between the two samples, and multiple regression was used to test the impact of the independent variables on the dependent variables.

## **8.2 Conclusion of Objective One:**

To investigate whether all construction organisations require a TQM system or should adopt a different system to provide constructive recommendations to support and improve TQM implementation and control in the Jordanian construction sector by investigating TQM practices and implementation in the United Kingdom.

The study shows that TQM implementation is fundamental for all construction companies seeking high performance, improved competitiveness and customer satisfaction. Thus, to be competitive in today's market, it is essential for construction companies to provide consistent quality and value to their customers through adopting the TQM system. Within the targeted sample, all construction companies in the UK have implemented the TQM system as a management plan to improve performance, competitiveness and customer satisfaction, based on continued improvement with a focus on quality as the main dimension of business. Through the successful implementation of TQM, construction companies are able to focus on meeting customer needs by providing quality services at a cost that provides value to the customers; view an organisation as an internal system with a common aim rather than as individual departments acting to maximise their own performance; recognise that everyone in the organisation is an owner/customer who is either internal or external; emphasise teamwork and a high level of participation by all employees; and focus on the way tasks are accomplished rather than simply what tasks are accomplished. However, having a TQM system in place does not mean that the company will be successful. Successful construction companies should have special characteristics which can be achieved through successful implementation of the TQM system such as striving for customer and employee satisfaction; striving for accident-free jobsites; recognising that customers provide the revenue while employees are responsible for the profits; training extensively; working hard at improving communication inside and outside the company; involving subcontractors and suppliers, requiring them to adopt the TQM system; and striving for continuous improvement.

In the UK, the results show that the TQM system is being increasingly adopted in construction companies to solve quality problems. The implementation of TQM based on cultural change, in addition to changing management behaviour, moves the organisations towards a TQM culture that focuses on quality as a key strategy to

satisfy customers. Construction organisations have understood that results cannot be gained overnight, and that organisations need time to adopt, change and learn to improve customer satisfaction through quality improvement, as well as achieving improvement in productivity and performance. Many successful implementation cases are being achieved within the construction industry and other sectors, and the benefits include improving competitiveness through improving profitability, market share and quality services in the United Kingdom construction companies. However, one of the reasons that makes the UK companies highly competitive is having a high budget with an actual progress plan and design; thus, they give more attention to the marketing element as an important aspect of their business, whereas Jordanian construction companies do not have a marketing department in their organisations. Within the current economic recession, UK construction companies have understood the need for customer satisfaction, through putting customer satisfaction first followed by generating profits. This belief is based on the fact that customer satisfaction helps companies to secure repeat business since it is considered difficult to secure new jobs in the current recession. Therefore, customer satisfaction has been given priority by UK construction companies by implementing the best methods to add value to the final project, through doing the job right and avoiding any delay or serious defects in the final project. Moreover, as part of their commitment to the local community and environment, the United Kingdom construction companies have implemented methods to support the local community and save the environment which tend to be the focus of clients in the United Kingdom.

In Jordan, the results show that time and cost, juxtaposed with the non-implementation of TQM and learning practices, can further aggravate quality failure in Jordanian construction companies, which in turn is manifested in customer dissatisfaction, rework, bad reputation, and reduced turnover. Construction companies have not pro-actively embraced the TQM system because it is mistakenly considered to be an extra cost and is perceived as programme of change. Those few who have implemented or tried to implement the TQM system have found that it has a significant impact on improving market share, but it does not have any significant impact on profitability and service quality, possibly because they have not realised the anticipated benefits that were initially expected. As a result, it would appear that the Jordanian construction companies have generally become parsimonious towards

investing in quality. Another important reason that has contributed to the quality demise in Jordanian construction companies is management impatience to see results from quality initiatives that they implemented. It appears that they lack top management commitment, which is the reason why TQM is not carried out or even failed to be implemented. Construction companies have not used any statistical approach to TQM because they are not familiar with such programme tools and feel that they need the time to finish the construction projects instead of providing the required training for their employees. Therefore, Jordanian construction companies should adopt the TQM system in their organisations during their daily operations to be able to compete with the high level of competitiveness in the Jordanian market by international construction companies and this should be through a proper adoption of the TQM system that continuously improves performance.

### **8.3 Conclusion of Objective Two:**

To define the CSF's for the construction industry, as managers and expertise have not yet agreed on how to apply TQM tools and techniques to their organisations, in addition to having different CSF's for each construction project.

- **Top management commitment**

Top management commitment is highlighted as one of the crucial requirements for a successful implementation of the TQM system by UK construction companies. The degree of support that management takes in the implementation of TQM is very critical to the success of TQM implementation because it will enable the employees to follow their management direction to provide high quality services to satisfy their customers. In Jordan, construction companies suffer from a lack of management commitment to satisfy customers and provide high quality services. The autocratic leadership style in Jordan is also considered as one of the impediments of TQM implementation. The vast majority of managers in Jordanian construction companies are not aware of the significant role that the commitment of top management could play in implementing the TQM system in their companies.

- **Quality culture**

One of the critical results of the study, which has emerged from the findings and discussion of the factor, is the adoption of an inappropriate organisational culture to support TQM implementation in the construction companies in Jordan. Nepotism is the main dimension related to the organisation culture that has emerged from the study. This dimension is considered to have a negative impact on the implementation of TQM in Jordanian construction companies. However, change can only take place when there is an understanding of the drivers of culture within the construction project organisation. UK construction companies have created the required culture for the successful implementation of TQM, based on communication, empowerment, knowledge sharing, teamwork, training and a clear understanding of the organisational mission and vision.

Jordan and the UK face the same problem concerning female employment in the construction industry, however. While in Jordan it is still not widely accepted for women to work in the industry because of family resistance and cultural issues, in the UK the picture is slightly different. The construction industry was highlighted by the Equal Opportunities Commission in recent years to tackle gender barriers in the industry and to give women more opportunity to work in the sector to stop them being put off entry by certain stereotypes about the sector.

- **Process planning and strategic quality management**

The findings related to process planning and strategic quality management show that construction companies in the UK consider process planning and strategic quality management as a critical factor in TQM implementation. Managers are fully aware of the need for an effective adoption of process planning and strategic quality management for gaining successful TQM implementation, where strategic planning is based on quality driven strategy based on best value and partnering criteria. In Jordan, strategic planning is based on cost leadership strategies which focus on the low cost of doing the job.

- **Employee empowerment**

Summarizing the key findings shows that there is a lack of understanding of the value of empowering employee suggestions and engaging them in company decision making in the Jordanian construction companies which indicates that employee empowerment in Jordan should be studied in more depth in relation to leadership commitment and organisational culture in the Jordanian context. In the UK, the management demonstrated empowerment, encouraging and allowing their project managers to take full responsibility in making the necessary decisions related to their projects such as cost saving suggestions, self implemented solutions and financial decisions.

- **Employee training and education**

The findings show that all UK construction companies provide training programmes for their employees at all levels, such as health and safety, communication skills, task acceleration, critical path analysis and leadership skills, with high priority and attention. In Jordan, the autocratic management style is obvious in relation to employee training and education, where managers do not believe that employees require any specific training as they can learn from each other when working as group; as well as this, important related financial decisions and task acceleration can be only made by managers.

- **Supplier chain management**

It can be concluded that supplier chain management is considered an important factor in TQM implementation in UK construction companies in terms of establishing long term relationships with suppliers by implementing the Purchasing Excellence Programme system, “PEP”, with some companies categorising suppliers into category one, two and three suppliers. Where they tend to place 75.0% of their work with category one suppliers who are already aware of organisational quality standards, a health and safety and communication programme will ensure work flow and quality output. In Jordan, construction companies tend to establish long relationships with suppliers based on cheaper price and availability of required construction

materials locally and internationally, but they do not use any system to categorise suppliers to ensure higher quality products and services.

- **Customer satisfaction**

The findings indicate that UK construction companies' priority attention is given to fulfilling customer needs by being customer and quality driven to improve customer retention and competitiveness through having regular meetings with customers to keep them updated on workflow and also by implementing a systematic approach to add value to their services to increase customer satisfaction, ensure repeat business and enhance reputation. In contrast, Jordanian construction companies are cost driven rather than quality or customer driven, which does not mean that customer satisfaction is not important but that priority is given to maximising profits rather than customer satisfaction and this does not help TQM implementation in Jordanian construction companies. The main reason for this can be referred to the organisational culture, vision, mission and top management commitment.

- **Information and communication technology**

It can be concluded that UK construction companies have adopted information and communication technology to increase the quality level of the final project and the services provided for clients which increases customer satisfaction by providing all the required information about the flow of the project any time. It also helps companies to ensure that all their information is safely stored and easily accessed any time, as well as helping in their strategic planning and supplier categorization, and reflecting customer and employee satisfaction. In Jordan, construction companies are found to face problems through a lack of information and communication technology use because Jordanian managers lack technology awareness and are unaware of the key potential of MIS innovation benefits which, of course, obscure the MIS investment opportunity and TQM implementation.

- **Continuous improvement**

This is one of the critical results of the study because TQM is a management philosophy and a continuous improvement approach to doing business through a new management model. Jordanian construction companies consider a continuous improvement process as a challenge that puts more strain on the company resources, as do increases in production costs which would, thus, create more conflict in the organisations. Nevertheless, the TQM philosophy evolved from the continuous improvement philosophy with a focus on quality as the main dimension of business. Therefore, for Jordanian construction companies to apply TQM in their organisation successfully, top management and all employees must be committed to quality improvement through restructuring their organisation mission and vision, establishing a quality culture and improving manager and employee educational level, retention, job security and loyalty. In UK construction companies, the results show that customer satisfaction could not be achieved without continuous improvement initiatives by adding value to the construction project and materials. Therefore, continuous improvement is essential for all construction organisations and it requires a highly committed management to provide employees with the required training and education, proper human resource management and support of innovation and communication to push employees to come up with new ideas for doing the job and improving performance.

- **Performance measurement system for benchmarking**

The results in Jordan show that Jordanian construction companies emphasise cost, time and quality as a performance measurement. They measure performance by measuring the project cost against the original budget, while project completion time is perceived a key in performance measurement by measuring the combination of time predictability and reduction in delivery time whilst keeping clients informed. These measurement factors place cost and time ahead of quality as a tool of performance measurement. In UK construction companies, performance is measured according to two categories: subjective and objectives measures. Objective measures include time and cost, for example, while subjective measures include quality, satisfaction and functionality. They perceive that performance measurement is affected by many factors; country economic levels in terms of unemployment rates,

inflation, price indices and national rates affect performance measurement for construction companies.

- **Impact on society and environment**

The results show that Jordanian managers referred their the lack of commitment to the environment and society to high costs and the time required for the extraction of raw materials and research into new methods to protect the environment. Moreover, they also referred to the nonexistence of required equipment in the Jordanian market such as advanced equipment with no noise water spreading and dust screens. However, the pollution effect on the environment is irreversible; therefore, Jordanian construction companies and the government have to speed up the pace of protecting the environment during construction projects. UK construction companies perceive protecting the environment and caring about the local community to be at the heart of their organisations. They train their employees in environment protection approaches and educate them in the benefits behind these; they ensure the use of natural resources, the proper choice of environmental-friendly construction materials, clean technology, waste management and pollution control.

- **Health and safety**

The results in the UK construction companies show that, despite top management being totally committed to the health and safety of their employees and despite the widespread implementation of many new regulations relating to health and safety, accidents involving construction equipment and plant remain consistently high. However, the provision of safety equipment alone does not improve safety on site; there has to be a corporate culture to encourage it. In Jordan, employees in construction companies suffer from a lack of safety equipment, training and corporate culture to encourage and improve safety on site.

#### **8.4 Conclusion of Objective Three**

To define the external environmental factors and obstacles that affect TQM implementation within the construction industry.

The results show that there are four main factors affecting the TQM implementation in the UK and Jordanian construction companies: government rules and regulations, environmental factors, economic factors and external customers. These factors have different effects on TQM implementation in the UK and Jordan. In Jordan, the results show that governmental policies of taxation and investment give more advantages to international construction companies over Jordanian construction companies. The economy's stability also affects the quality of the final project by Jordanian construction companies, which has a negative impact on TQM implementation in these construction companies. In the UK, economic stability and environmental factors are considered the most critical factors affecting TQM implementation in terms of the added value that construction companies can provide to the clients. The UK construction industry contracted unexpectedly in December 2010 as a result of poor weather. The external customers' culture and experience in the construction project and quality project still focuses on the final process in Jordan more than the product quality. In general, the education systems in the UK and Jordan provide the construction industry with well-educated and qualified staff able to provide effective TQM implementation.

#### **8.5 Conclusion of Objective Four**

To explore the benefits of acquiring a TQM system within an organisation.

The results show that TQM implementation within UK construction companies is beneficial from employee, management, and client points of view. UK employees perceive TQM implementation as a system to improve employee satisfaction, company turnover, reduce customer complaints, motivate employees, and reduce operational defects. From UK construction managers' point of view, TQM helps construction managers to establish long term relationships with clients to be able to understand their needs and requirements; thus, construction companies are able to fulfil customer needs and expectations within the required time, budget and quality. From the clients' point of view, TQM implementation is considered critical for their choice of contractors; thus, it is not important for the lowest tender to do the job, but it is more important how contractors can add value to the project.

In Jordan, TQM implementation is seen as being beneficial for construction companies by being an effective system to reduce operational defects, improve

customer relations and improve market share. The employee perception of TQM implementation indicates that they do not feel it would be beneficial for them as much as it would be for their organisations and clients. That reflects that their organisations have neglected their satisfaction, as a result of being financially focused on the customer. However, either way, employees cannot provide the required quality unless they are satisfied. From the contractors' point of view, they perceive TQM as a system to reduce defects, improve customer satisfaction and improve profits and market share. While clients in Jordan perceive TQM as a system to improve the quality of the project within the available budget and therefore prefer to work with international construction companies rather than Jordanian construction companies.

## **8.6 Conclusion of Objective Five**

To measure the impact of the independent variable (11) TQM CSF's on the dependent variables (profitability, market share and quality services).

One of the critical results of this study which has emerged is the impact of TQM implementation on improving company competitiveness. It can be concluded that TQM implementation in Jordanian construction companies would improve competitiveness through improving market share, while not improving profitability and service quality. In the UK, TQM implementation would improve competitiveness through improving profitability, market share and service quality.

## **8.7 Research Questions:**

With reference to the research question, it can be concluded that the TQM system is important for all construction companies because of its role in improving the performance of the final project, competitiveness and market share and customer satisfaction. Therefore, the TQM system can be used as a tool to improve

competitiveness and sustainable growth in construction companies in both the developed and developing countries. In terms of improving competitiveness, the TQM system can be used in construction companies to set a strategic quality plan to ensure meeting deadlines and avoiding any penalties which will reduce project revenue. This will enhance organisational performance and help to provide employees with the required training to improve their skills and knowledge which leads to the creation of a quality culture. Such a quality culture helps organisations to improve their working patterns, performance and their communication with suppliers, subcontractors and clients to ensure involving all parties in the development of the project and, thus, drive towards strengthening construction companies and by that, facilitating their efforts to compete in world markets. By providing high quality projects, construction companies can enhance their reputation nationally and internationally and be able to compete with international construction companies globally, which in turn will enhance company profits and market share.

With reference to the CSF's of TQM implementation in the construction industry, the two targeted groups, the United Kingdom and Jordan, placed a high level of importance on management commitment, quality culture, strategic planning, education and training, continuous improvement and benchmarking and measurement. Furthermore, both targeted groups agreed that the two least important TQM CSFs were social responsibility and impact on society and the environment, signifying that the respondent companies in Jordan had not put into place those factors they considered to be important.

### **8.8 Model Development:**

This section aims to propose a representative TQM implementation model for the Jordanian construction industry based on the findings of this research. The new model structures its main component on critical TQM factors identified in different TQM gurus, such as Shingo, Deming (Chapter 3) and TQM models in different countries such as the UK, Jordan, Australia and the USA, and literature reviews. The study was carried out in the UK and Jordan and indicated that there are eleven common TQM factors, as mentioned in Chapter 7. In addition, TQM implementation benefits were

taken into account in forming the new model. The role of the external environment is added to the model based on the important roles played by the government, weather, economy, and national culture in encouraging or discouraging companies in applying TQM in UK and Jordanian construction companies.

This new model focuses on the use of TQM critical success factors in the construction industry with a focus on TQM implementation impact on competitiveness (profitability, market share and quality services) towards improve customer satisfaction. Clearly the construction industry has much to gain from adopting TQM. The research results indicated that United Kingdom construction companies have a clear understanding of TQM implementation benefits as they have implemented TQM in their organisations, whereas Jordanian construction companies have an unclear understanding of the possible benefits of TQM implementation. Thus, if the short-term and long-term benefits of adopting TQM are made clearer, then the majority of internal barriers to its adoption can be more readily addressed. The model includes the external environmental factors affecting TQM implementation in the Jordanian construction industry, and the development stages are divided into three stages: pre-implementation, beginning implementation and sustainability.

It should be noted that the full development of the TQM system in Jordanian medium and large construction companies cannot be accomplished overnight; rather, it requires involvement and commitment at all levels by all participants in the construction project, in addition to years of extensive training to put all features of TQM system together successfully. However, the new model is based on studying the targeted sample construction company current models of TQM implementation to result in one model for the United Kingdom and one model for Jordan, thereby, to generate the new model, as shown in the following figure.

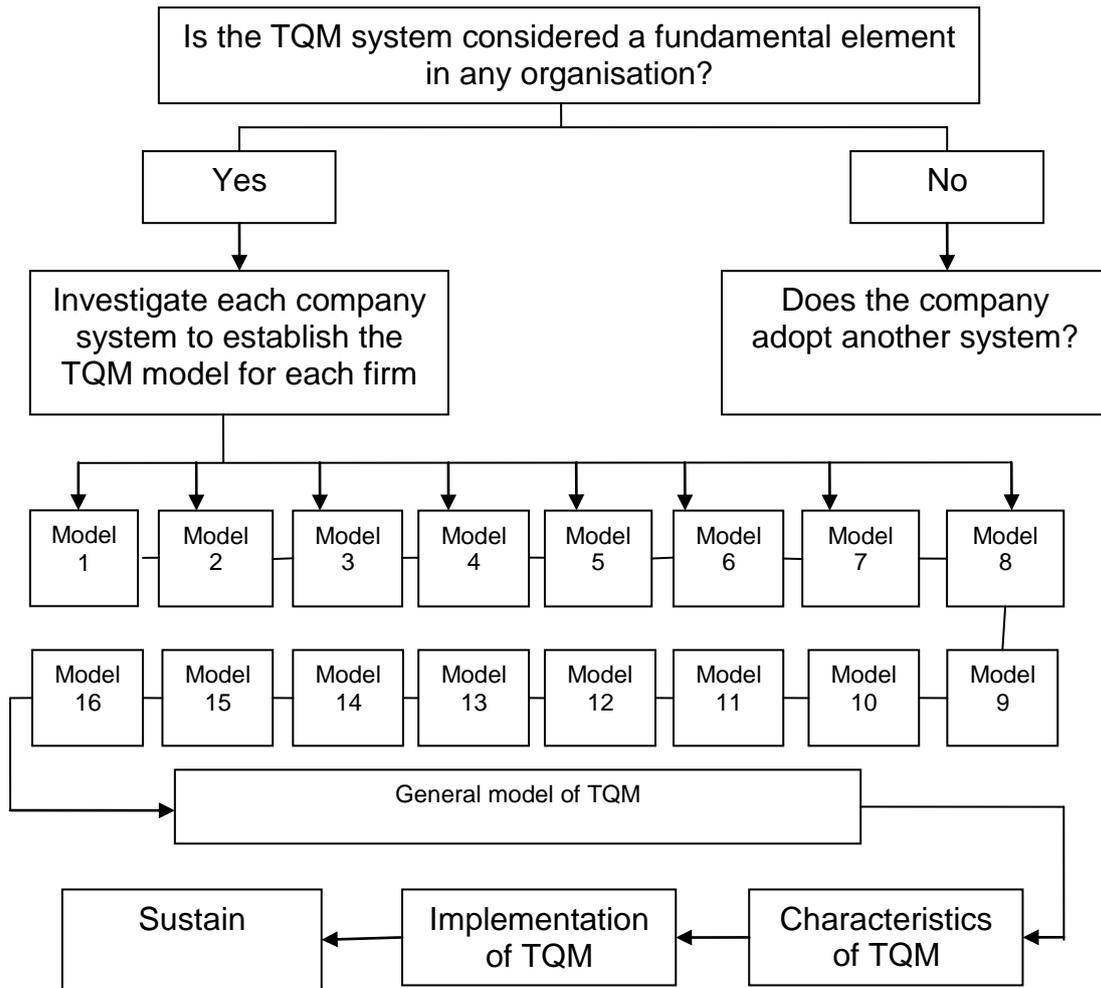
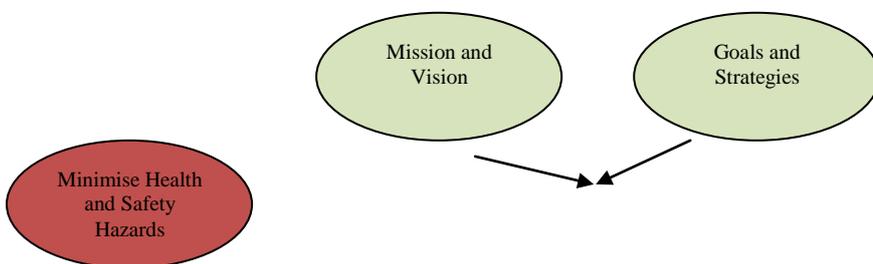


Figure (8.1) Model Development

### 8.9 The New Model:



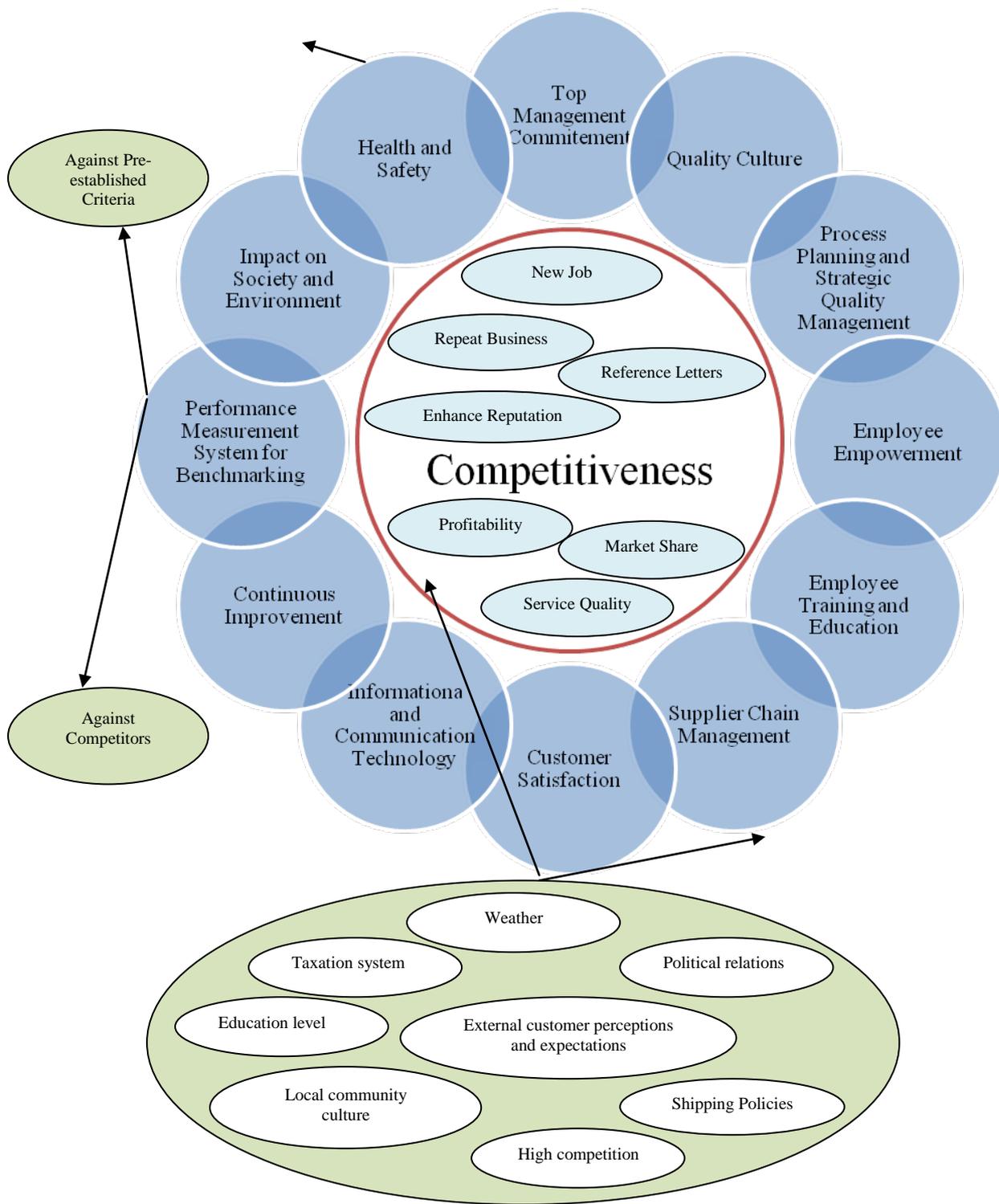


Figure (8.2) New TQM Implementation Model

### 8.10 Pre-Implementation stage

Adopting TQM for construction organisations requires commitment, time and effort by management and employees before even embarking the TQM system implementation. Some changes have to be made to ensure successful implementation of the TQM system. Therefore, the changes are related to management style, visions

and mission, organisational culture, communication methods and strategic planning, before embarking on the TQM system. First of all, the organisation management should have clear understanding of the reason for the change and be aware of the potential benefits of the TQM system. A strong belief by management that the TQM initiative will improve organisational performance and quality level is important and, therefore, the change should be perceived as the norm, rather than being perceived as a reactionary response to external market forces and economic, political, social and technological pressures. Despite the fact that each organisation has different characteristics that affect its operation and strategies and, thus, the TQM system cannot be copied, investigating competitors and other company experiences in relation to TQM implementation is important to learn from their mistakes and understand the obstacles that they faced during the implementation phase.

Once management has established a clear understanding of the TQM system and understand the benefits of TQM implementation for their organisation, management has to set a clear vision, mission and goals to be the driving force for all employees at all levels to achieve the organisation goals. TQM implementation requires organisations to change their culture so that they can readily adapt to and take advantage of quality practices. Cultural changes should involve changing the management style from an autocratic or old management style to a more modern management style, from being profit driven towards being customer and quality driven, where the roles of the CEO and management are to create an organisational quality culture in which TQM can exist. The organisation culture should be based on the belief that quality information must be used for improvement, not for employees' judgment; cooperation, not competition is the basis for working together; authority must equal responsibility; there must be rewards for results; employees must have secure jobs, but that does not mean avoiding their mistakes; there must be a climate of fairness; and compensation should be equitable. If construction organisations fail to change their culture, then TQM many not reap any tangible benefits for them.

As part of the new culture, management has to explain to their employees the reasons behind the change, explain the benefits and communicate the organisation's vision, mission and goals to motivate them to achieve all this by improving communication, recognition, secure jobs, reward schemes and providing them with the required training and education. Therefore, management has to identify their employees'

weaknesses and provide them with the right training and education to improve their skills and overall performance. Moreover, management should support strategic planning and process management to avoid or reduce the impact of any external factors, and be able to tackle any problem once it occurs. TQM should be integrated into the organisation strategic planning system and should be perceived as a continuous and embedded process; otherwise, employees will not perceive the TQM system as part of organisation's corporate vision for quality and so, consequently, lack enthusiasm for change. TQM implementation should not be considered as a one person or department personality. Management and employees should work together to ensure the successful implementation of the TQM system.

Organisations should support the development of the information and communication technology system and ensure that there is an active information department. The information department should collect and securely store information related to employee behaviour, attendance, turnover, health and safety, customer expectations and requirements, competitor strategies and new technology, costs, supplier categories and sub-contractors so that this can be analysed and support the organisation strategic planning to improve quality. To effectively address these important changes, construction organisations should embrace a degree of transformational change and implement a strategy that is customer value-focused. Such change should be driven by a shift in business strategy, whereby the organisational mission and core values are re-defined. However, managers should not be immediately or overly concerned with creating a new culture, as it is an ineffective way of creating a quality culture and it could increase extreme variation in the organisation's performance.

The pre-implementation stage is then concerned with establishing a team to lead and develop the TQM introduction process, and identifying or developing an appropriate facilitating framework for developing the implementation plan. Fulfilment of these objectives should then put the organisation in a position to identify the appropriate implementation actions that the organisation requires and to establish the priorities amongst them.

### **8.11 How to begin implementing the TQM system**

Achieving organisational goals and quality improvement is required to give quality improvement high priority and, therefore, management should indicate a complete commitment to quality improvement. The objectives of quality improvement are to satisfy clients, reduce costs, reduce waste, and improve competitiveness. Each project manager should identify the construction project stages and the requirements of each stage, which can be easily achieved during the procurement process by a total cooperation between all parties involved in the construction project. The construction project should be sliced into series of stages, where each stage has a groundbreaking start and ends with completion. In addition, there should be an alternative plan for each stage in case the management faces any problems as a result of some external or internal factors; thus, some stages can be accelerated and others can be delayed.

At each stage, a team goes to the jobsite and accomplishes its own work to be handed over to another crew, based on teamwork and active communication channels before and during the project, where people at all levels should cooperate in gaining and sharing knowledge about quality improvement and the business process. However, to avoid any overlap, management should establish responsibilities by defining the teams and clients; then define what each team has to deliver and establish responsibility for who is to accomplish the task (as a team). Each team is responsible for providing a high quality product to the clients, which has to be delivered with no botched work and no concealed errors. Merely relying on quality tasks and products is not the only responsibility of management. The supervisor's job is not to accept or reject faulty works, but to understand the root cause of the error and correct the cause. By setting up a datum, employees can evaluate their work against the datum and, therefore, quality improvement becomes everyone's responsibility.

The project actually begins before breaking ground for the building; it starts when the client decides to start the building. Therefore, contractors must understand the client needs and expectations from of the building. To do that, early involvement in the procurement process must be granted to ensure involving clients, designers and a representative team from the construction company. By doing that, management ensures continuous improvement and learning to avoid future mistakes by perceiving each project as part of a cycle to ensure continuous improvement. To improve competitiveness and reduce costs, employees have to become their own quality

inspector, which can be achieved through quality culture which is CEO and Senior Management team responsibility.

To ensure high customer satisfaction, meeting deadlines and reducing costs, regular meetings with clients should take place every two weeks to deal with their suggestions and snagging, provide them with regular feedback related to each phase, and ensure that they are satisfied with the operational and managerial process. Moreover, management should identify the measurement tools to regularly measure performance against competitors and against pre-established criteria, and communicate the results to employees. A corporate social responsibility policy should be installed in the organisation's core concept and strategy, and it must be understood by all employees to ensure supporting the local community. Finally, more attention needs to be given to health and safety. The construction sector has the highest death rate due to accidents on construction sites. This discourages workers, delays project progress, increases overall project costs, and reduces productivity.

### **8.12 Sustainability**

Any new technical or management approach is either accepted sincerely or rejected, based on the first few experiences with it. This means that the first impression of the initial phase of TQM implementation contributes significantly to the long-term confidence and support of all participants in a TQM approach. The principles of sustainability in the construction industry focus on a continuous improvement process in a way that the business environment will continue to support future construction activities as it presently does. Therefore, management has to focus on efficiency, regular training, active communication channels, employee recognition, storage and handling of materials and try to minimise waste to reduce costs, energy and resource consumption, as well as providing value for clients and end users. Management should build a trustworthy environment and minimise the gap between employers and employees, support constant learning, innovation and development.

### **8.13 SWOT Analysis of the new model:**

#### ***Strengths***

- This is the first model to be developed to assess the TQM implementation in the construction industry in Jordan.

- This model was built not only by considering the internal environment in construction companies, but also the role of external factors that affect TQM implementation.
- This model is based on the common Critical Success Factors of TQM implementation, based on evaluating TQM guru beliefs, quality awards and the literature review.
- It shows the positive effects of TQM implementation on company competitiveness as one of the major concerns for Jordanian construction companies to be able to compete with international construction companies operating in Jordan.
- This model can be implemented in different Middle Eastern countries with the same culture and business environment.

#### ***Weaknesses***

- This model was built and tested on construction companies in the UK and Jordan which may limit the model to construction companies which might mean it cannot to be used by other sectors in Jordan.

#### ***Opportunities***

- Government support and establishing the King Abdullah II of Jordan Award for Quality will motivate construction companies to be more competitive and customer oriented, thus, enhancing their opportunity of winning the prize and enhancing company reputations locally and globally.

#### ***Threats***

- Because Jordan is located in the middle of a conflict-ridden and unstable region and faces rapid changes in its economic, social, legal and business environment, this model might be limited to the current economy and business environment.

#### **8.14 Contribution:**

The findings are considered to make a significant contribution to knowledge in terms of the following:

- This research is considered to be the first study researching TQM in the Jordanian construction sector thus far and it will, therefore, provide valuable knowledge to Jordanian companies when applying TQM tools and techniques, by helping them to overcome the several barriers stopping them from implementing the TQM tools and techniques.
- This study shows that TQM implementation is fundamental for all construction companies worldwide to remain in business with the rapid changes in the business environment.
- This study provides up-to-date evidence of the TQM implementation impact on construction company competitiveness through profitability, market share and quality services.
- The study creates an awareness and understanding of the benefits of TQM implementation in the construction industry in the UK and Jordan.
- The study provides a clear understanding of the main obstacles behind the lack of TQM implementation in the Jordanian Construction sector and provides major recommendations to those companies to improve the implementation process and methods.
- This study is considered as a start or background for further studies which might be initiated in the future by other researchers in Jordan, the United Kingdom and other countries, in terms of providing up-to-date information and a summary of current and expected obstacles and barriers facing TQM implementation in the United Kingdom and Jordanian construction sectors.

#### **8.15 Research Limitations:**

- The TQM implementation impact on competitiveness is taken through the consequence of improvement brought about by purposeful changes in the

quality process. Therefore, it is possible that construction companies could prosper as a result of some other reasons rather than those brought about by the implementation of the TQM system.

- Observation approaches are considered an important approach for data collection in terms of observing management practices and performance but due to the time limitation of this research, the observation approach was neglected. Future research can be conducted using different methodologies that employ in-depth types of study, such as case study or/and observation.
- There is a lack of available literature on TQM implementation in the Middle East in general and Jordan in particular, especially in the field of construction.
- As a comparative study, the research involved interviewing international construction companies operating in the United Kingdom and Jordan to measure the differences of TQM implementation by the same company in different countries but due to the unavailability of securing such companies operating in the United Kingdom and Jordan, the research conducted one interview with an international company operating in the United Kingdom and Syria, since Syria has a similar culture and construction rules and regulations.

#### **8.16 Recommendations:**

- Management needs to show faith in their employees and improve their work relations, while employees should be motivated and supported to make

decisions regarding their work and be able to propose solutions related to work problems. Through improving project coordination and effective communication, workers must be motivated to improve their performance and skills.

- Contractors have to move away from their obsession with the bottom line, supporting teamwork and binding all parties together to achieve organisational goals. This should be reflected in reducing rework, as well as improving service quality.
- Human resource management should enhance training, motivation and retention of good employees, combined with support management and unions about the concept of TQM.
- Contractors need to focus on aspects of performance, time, the establishment of long-term partnerships with subcontractors and maintenance of a well-trained workforce to improve overall performance and quality services.
- Jordanian construction companies should embrace a degree of transformational change by adopting a customer focus strategy instead of a price focus strategy. The change should be driven by shifts in organisational strategy and redefining the organisational mission and core-values.
- Jordanian construction companies need a cultural change which cannot be achieved without changes to norms, beliefs and values. Change should not be immediate or of excessive concern, and the focus has to be upon changing the organisational core strategic issues. Otherwise that will cause an extreme variation in organisational performance.
- Corporate social responsibility is implemented in the United Kingdom, where each organisation has to submit an annual report explaining their contribution to the society in terms of social improvement, environment and community which can be used later by the public to decide whether the companies are suitable to invest in. Such a report has to be introduced to Jordanian

companies for their development so that they can compete with foreign companies and develop a niche in the world market.

- The Jordanian government has to incorporate environmental responsibility and awareness, particularly regarding the recycling of waste, into the school curriculum through the Ministry of Education.
- The Jordanian government has to work in conjunction with the Ministry of Public Work and Housing and the Ministry of the Environment to develop criteria for environmentally preferable products from developers.
- Construction and demolition materials are still not very marketable in Jordan; therefore, more effort should be taken to create a market for construction and demolition materials through providing sufficient funds for research and development.
- Reviewing the current structure in the Jordanian government services to increase the number of technically competent staff at the Local Planning Authorities to cope with the increased number of applications for land use conversion and subdivision should be implemented.
- More attention is needed in the marketing element within the Jordanian construction as it has a direct impact on improving organisational market share.

#### **8.17 Recommendations for further research:**

- Further research might focus on the measurement of TQM implementation in the construction companies in the form of IT software by defining the function of each process within the project and then defining the defects of each process by setting a control chart based on an upper level and lower level.
- Further research may study changes occurring in the construction business process due to the adoption of the TQM system. Different measurement tools need to be investigated instead of time, turnover or market share measures, in addition to the optimal methods to continually monitor the TQM system, so that a best practice strategy for TQM system adoption in the construction industry can be formulated.
- Further research may investigate the impact of external factors such as government rules and regulations, political relations, lack of equipment and tools in the market, and transportation delays on the TQM implementation, by focusing on government commitment to provide financial and technical support to reduce the effect of such factors on the TQM implementation and project success.
- The role of designers and the effect of the early involvement of contractors, clients and final users in the procurement process and design decisions of construction activities in relation to reducing defects and mistakes during the project and satisfying clients and final users and adding more value to the local community might be investigated.
- Further research is needed to focus on investigating the appropriate levels of financial and human resources assigned by the Jordanian construction companies to community relations, in terms of identifying the key skills that could enhance the construction site management teams and employees to deal with the public, in addition to exploring the psychological relationship actions taken and local community levels of acceptance or tolerance of construction site related impacts. Moreover, it could be considered to broaden the sphere of respondents by including final users and members of the local community.

- Further research may focus on gender division in the construction industry, understanding the reasons behind low levels of female employment compared with other industries, and find solutions to enhance the female working environment in the construction industry.
- A longitudinal research study may investigate TQM implementation in a broader sampling frame covering the Middle East or Europe to ascertain whether the same practices are evident across countries of different cultures, education systems and economic climates.
- Further research may investigate the perceived importance of other systems for improvement such as continuous improvement, Six Sigma and lean construction, considering the era post TQM implementation.
- Further research may investigate the necessity of marketing for the construction industry in Jordan, and its impact on improving construction company competitiveness and market share.
- If this research were to begin today, the main changes would be in the data collection methods, where observation methods would be beneficial to observe management and employee daily practice on site. However, the research might face some problems such as securing access to construction sites on a daily basis and the time required to collect the data which might need the entire time of any construction project.

Carrying out a PhD in the field of TQM and its applicability within the construction industry in the UK and Jordan, helped the researcher to develop a strategy throughout the research, which focused on time management, personal development, interview skills, communication skills, and researching skills, in order to provide the researcher with the starting point of being independent researcher. During the last four years, the researcher has ensured to keep up-to-date with any new ideas or publication related to this study, which helped the researcher to discover a wide range of publication and information related to this research and other related topics, which improved the researcher general knowledge and background. However, after completing the

research, the research will be able to link the academic part of the research with the practical part (family business in construction), due to the availability of suitable environment for the new model to be implemented, therefore this study could be considered as the starting point for other construction companies operating in the Jordanian market and other countries with similar culture, and roles and regulations. The application of the new model in the family business might help and motivate other construction companies who were afraid of taking the risk of implementing TQM for their companies, thus this research should encourage other companies in the construction sector in Jordan to improve their competitive advantage, which will create a competitive business environment in the Jordanian market leading to high quality services provided from the clients and final users.

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## Appendix (1):

### *The Deming Application Prize*

Items	Check Points
Policies	<p>Management, quality and quality control policies.</p> <p>Utilization of statistical methods.</p> <p>Methods for establishing policies.</p> <p>Appropriateness and consistency of policies.</p> <p>Communication and dissemination of policies.</p> <p>Checks on policies and status of their achievement.</p> <p>Their relationship long and short-term plans.</p>
The organisation and the operations	<p>Appropriateness of the delegation of authority.</p> <p>Clarity of authority and responsibility.</p> <p>Inter-departmental co-ordination.</p> <p>Committee activities.</p> <p>Utilization of Quality Control activities.</p> <p>Utilization of staff.</p> <p>Quality control diagnosis.</p>
Education and dissemination	<p>Educational plans and results.</p> <p>Understanding of quality control.</p> <p>Consciousness of quality and how it is managed.</p> <p>Education on statistical methods and the degree to which they are disseminated.</p> <p>Grasp of effects.</p> <p>Education of associated companies (especially group companies, vendors, contractors and distributors).</p> <p>The system of improvement suggestion and its status.</p> <p>Quality control activities.</p>
Information gathering, communication and its utilization	<p>Collection of external information.</p> <p>Inter-departmental communication.</p> <p>Information processing (statistical) analysis and utilization of information.</p> <p>Speed of communication.</p>
Analysis	<p>Selection of important issues and improvement themes.</p> <p>Utilization of statistical methods.</p> <p>Appropriateness of analytical methods.</p> <p>Utilization of analysis results.</p> <p>Linkage with industry-intrinsic technology.</p> <p>Action taken on improvement suggestions.</p>
Standardization	<p>System of standards.</p> <p>Methods of establishing revising and abolishing standards.</p> <p>Actual performance in establishing revising and abolishing standards.</p> <p>Contents of standards.</p> <p>Utilization of statistical methods</p> <p>Accumulation of technology.</p> <p>Utilization of standards.</p>
Control / management	<p>Management systems for quality and other related elements, such as cost and delivery.</p>

	<p>Control points and control items.</p> <p>Utilization of statistical methods and concepts, such as control charts.</p> <p>Contribution of Quality control circle activities.</p> <p>Status of management activities.</p>
Quality assurance	<p>New products and services development methods.</p> <p>Preventive activities for safety and product liability.</p> <p>Degree of customer satisfaction.</p> <p>Process design, analysis and process control and improvement.</p> <p>Process capabilities.</p> <p>Instrumentation and inspection.</p> <p>Management of facilities, vendors, procurement and services.</p> <p>Quality assurance system and its diagnosis.</p> <p>Utilization of statistical methods.</p> <p>Quality evaluation and audit.</p>
Effects	<p>Measurement of effects.</p> <p>Tangible effects such as quality, services, delivery, cost, profit, safety and environment.</p> <p>Intangible effects.</p> <p>Conformity of actual performance to planned effects.</p>
Future plans	<p>Concrete understanding of current situation.</p> <p>Measures for solving defect problems.</p> <p>Future promotion plans.</p> <p>Relationship between future plans and long-term plans.</p>

*European Quality Award criteria.*

Elements	Sub-elements	Percentage score
Leadership	<p>Visible involvement in leading quality management.</p> <p>A consistent total quality culture.</p> <p>Teams and individuals efforts recognition and appreciation.</p> <p>Support of total quality by provision of appropriate resources and assistance.</p> <p>Customer and suppliers involvements.</p> <p>Active promotion of quality management outside the organisation.</p>	100
Policy & strategy	<p>How policy and strategy are based on the concept of total quality.</p> <p>How policy and strategy are determined using relevant information.</p> <p>How policy and strategy are the basis of business plans.</p> <p>How policy and strategy are communicated.</p> <p>How policy and strategy are regularly reviewed and improved.</p>	80
People management	<p>Effectiveness of continuous improvement in people management.</p> <p>People recruitment, training, development and career progression.</p> <p>People involvement and participation in organisation quality and continuous improvement.</p>	90
Resources	<p>Financial resources.</p> <p>Information resources.</p> <p>Material Resources.</p> <p>Application resources.</p>	90
Process	<p>How key process are identified.</p> <p>How the organisation systematically manages its key and support processes.</p> <p>How process performance parameters, along with all relevant feedback, are used to review key processes and to set targets for improvement.</p> <p>How the organisation stimulate innovation and creativity in process improvement.</p> <p>How the organisation implements process changes and evaluates the benefits</p>	140
Customer satisfaction		200
People satisfaction		80
Impact on society		80
Business results		140
Total		1,000

## Appendix (2):

### *Semi-Structure face to face interview*

1. It has seen recently that organisations in construction industry have eschewed implementing TQM practices because they believe that the short-term benefits are relatively minimal. So do you consider TQM as a fundamental system within an organisation to achieve high quality services and improve customer satisfaction and retention?
2. Top management commitment and having a quality culture consider the most vital principles in TQM, because they often assume to have a strong relation with customer satisfaction and retention. So to what extent the top management is committed to quality, and do you adopt specific quality benchmarking, planning and communication system with an organisation?
3. If your company has adopted a TQM system, which of the following factors have been implemented and what are the reasons behind implementing those factors?
  - Top management/leadership commitment.
  - Quality culture.
  - Process planning
  - Strategic quality management
  - Employee empowerment.
  - Employee training and education.
  - Supplier chain management
  - Customer satisfaction.
  - Information and Communication technology (ICT).
  - Continuous Improvement.
  - Benchmarking
  - Impact on society and environment.
4. What are the benefits of applying TQM system within your organisation and does it influence company competitiveness?
5. What are the main impediments that may influence the adoption of TQM within your organisation in specific and the construction sector in general?
6. Since TQM organisation is basically a customer-oriented organisation. Do you believe in maximising customer satisfaction rather than internal efficiency?
7. Do you believe that the cost of TQM implementation could be higher than failure of achieving quality in terms in terms of rework, correcting errors, reacting to customer complaints, missing deadline, and having deficient project budget due to poor planning?
8. Do you believe it would be easy to generate awareness, educate, and change the attitudes of staff toward quality improvement, especially in the

construction industry, due to the nature and never-changing environment of construction project?

9. Previous studies found out that “ establishing healthy relations with suppliers greatly reduce business risk” so do you choose supplier based on price or quality? And in which way the relation with supplier could affect project quality, meeting deadline, and overall budget?

**An evaluation of the implementation of Total Quality Management (TQM)  
within the Construction sector in the United Kingdom and Jordan**

**Objectives:**

The main objective of the survey is to determine whether TQM implementation is fundamental, and whether the key features of TQM are implemented and understood by employees in the selected companies from the points of view of employees.

**Instructions:**

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

**Section (A): Personal Data:**

**1. Gender:**

- Male  Female

**2. Age group:**

- 18 - 28  29 – 39  
 40 – 49  Over 51

**3. Qualification:**

- Primary  High school  
 College/University  Post graduate

**4. Occupation:**

- Managerial  Supervision  
 Project manager  Engineer  
 Technical  Builder

**5. How long have you worked at this company?**

- Less than (1) year  (2) – (3) years  
 (4) – (5) years  More than (6) years

**Section (B): Your Knowledge of TQM:**

**6. Does your company implement a formal quality management system?**

- already implemented  in preparation  not planned

**7. In your view, which of these words best define quality? (Not limited to one answer).**

- Expensive  
 Satisfying internal customer (within the organisation)  
 Satisfying external customer (outside the organisation)  
 Appearance  
 Increased profit  
 Value for money  
 Teamwork  
 Partnership between organisation and supplier

**8. Do you think that TQM will (or does) work in your organisation?**

- Very well
- To some extent
- Will not work
- Cannot say

**9. Would a TQM program be beneficial to your organisation?**

- Yes
- No
- Cannot say

**10. TQM would be used to improve?**

- Project design
- Cost estimating
- Warranty claims
- Reduce change order
- Reduce claims
- Increased market share

**Section (C): Your Perception of Quality:**

**11. What is your organisation's perception of quality?**

- Elimination of defects
- A tool to increase profits
- A competitive advantage
- Others (please specify)

-----

**12. How would you rate the importance of product/service quality?**

- Very important
- Important
- Somewhat important

**13. How would you rate customer satisfaction?**

- Very important
- Important
- Somewhat important

**14. Please rank in order of importance (1, 2, 3, 4, 5) where 5 is the most important??**

- Cost -----
- Scope -----
- Time (Schedule) -----
- Quality -----
- Safety -----

**Section (D): Data Acquisition Methods:**

**15. How does your organisation solve problems?**

- Assign individual to solve
  - Set up multi-disciplinary team for each problem
  - A permanent team is available
  - Other (please specify)
- 

**16. Do you have a system for gathering customer suggestion?**

- Yes
- No
- Cannot say

**17. How do you measure customer satisfaction?**

- Not measured
  - Questionnaire surveys
  - By the number of complaints
  - Other methods (please specify)
- 

**18. Do you have a system for gathering employee suggestions?**

- Yes
- No
- Cannot say

**Section (E): Quality in your organisation:**

**19. Has your organisation developed a clear definition of quality?**

- Yes
- No
- Cannot say

**20. Does your organisation have a quality improvement program?**

- No (please go to next section of question)

- Such a plan is under consideration
- A quality improvement program has been implemented recently
- A quality improvement plan has been a part of corporate policy for some time now

**21. What type of quality improvement program do you have?**

- Total Quality Management (TQM)
  - ISO 9000
  - Quality Control / Quality Assurance
  - Others (please specify)
- 

**22. Which of the following factors provided the motivation to start TQM?**

- Pressure from competitors
- Demanding customers
- Your Company's Chief Executive
- Need to reduce costs and improve performance

**23. Your organisations quality improvement program can be described as?**

- There is no formal program
  - Periodic short-range solutions or motivational program
  - A formal program is underway with widespread employee awareness
  - Others (please specify)
- 

**24. Does your quality improvement plan have the full support of top management?**

- Yes
- No
- Cannot say

**25. The major objectives of your quality programs are?**

- Increase productivity
  - Cost reduction
  - Involvement of employees in the quality building effort
  - Compliance with statutory, environment and safety requirement
  - Others (please specify)
- 

**26. After the implementation of your quality improvement program, service/product quality has?**

- Drastically improved
- Improved

- Remained the same
- Decreased
- Cannot say
- Not applicable

**27. After the implementation of your quality improvement program , relationship with your customers and suppliers has?**

- Drastically improved
- Improved
- Remained the same
- Decreased
- Cannot say
- Not applicable

**Section (F): Critical Success Factors (CSF's):**

Please Mark the Appropriate Answer by (√), where

1. Extremely agree    2. Agree    3. Neutral.    4. Disagree    5. Extremely disagree

**Please indicate how you feel about the following statements.**

No	Critical Success Factors (CSF's)	1	2	3	4	5
	<b>Top Management Commitment</b>					
28	Top management Continually demonstrates their commitment to quality?					
29	Top management has an inclination to allocate adequate time and resources for quality improvement?					
30	Top management Learn from problems?					
	<b>Quality Culture</b>					
31	Your organisation is willing to adapt cultural change to fit with the changes in the business environment?					
32	There is an ongoing creation of quality awareness among employees?					
33	The creation of quality awareness among employees is ongoing process in your organisation?					
	<b>Process planning and strategic quality management</b>					
34	These are general policy development and effective development of goals in your organisation?					
35	There is strategic quality planning of the long term quality journey?					
36	TQM principles are used in reviewing the formulation and implementation of strategies?					
	<b>Employees empowerment</b>					
37	My company empower rather than control?					
38	Employees are encouraged to come up with new idea and suggestions to enhance their job?					
39	Employees have authority in their positions to make necessary					

	actions when required?						
40	Management involves employees in decision making process?						
	<b>Employees training and education</b>						
41	My company prefers training and coaching rather than supervision?						
42	I receive the required quality training regularly?						
43	Employees get trained to improve company outputs?						
44	Training aims to enhance employee performance and skills?						
45	Employees receive regular health and safety training?						
46	Safety equipments and clothes have been provided by company?						
	<b>Supply Chain Management</b>						
47	Company establishes good relations with suppliers which lead to continuous improvements?						
48	Supplier materials are conducted to examination before installation to ensure meeting clients demand and high quality standards?						
49	Your organisation categories suppliers to ensure dealing with first category with high quality standard?						
	<b>Customer Satisfaction</b>						
50	The priority attention has given to fulfill customer needs by my company?						
51	There is a regular quality meeting with customers, to keep them updated?						
52	My company has implemented a systematic approach to add value to its services to increase customer satisfaction?						
	<b>Information and communication technology</b>						
53	My company Continually tries to improve communications?						
54	Company clearly communicates its strategies and goals with employees?						
55	I receive regular feedback to make performance developments						
	<b>Continuous Improvement</b>						
56	Company emphasizes improvement rather than maintenance?						
57	Management encourage continuous improvement, creativity, and innovation						
58	Company emphasize the best implementation of continues improvement process for all tasks at all levels.						
	<b>Performance measurement system for benchmarking</b>						
59	My company adopts a self assessment system to improve performance?						
60	Competitive benchmarking is made against primary competitors?						
61	My company is tracking quality cost to reduce the cost of waste, rework, and rejection?						
	<b>Impact on environment and society</b>						
62	Your organisation construction activities are carried out in such a way as to minimize their impact (quicker, quieter, and cleaner) on other (the local community)?						
63	The selection of products and materials take full account of						

	their environmental impact (extraction of raw materials, and processing) including their potential for recycling?					
--	---	--	--	--	--	--

**Section (G): external environmental factors relation to TOM implementation:**

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

1. Extremely agree    2. Agree    3. Neutral.    4. Disagree    5. Extremely disagree

No		1	2	3	4	5
64	Government control over minimum required quality such as (Earthquake and lightning).					
65	Government regulation towards forcing companies to provide minimum quality to meet customers' satisfaction.					
66	Reduce tax for construction companies in order to provide higher quality level.					
67	Political relations between countries might affect companies exporting and importing system.					
68	Country economic level, might affect employees satisfaction in terms of health insurance and payment rate.					
69	Local community culture and their relations with clients and service quality.					
70	Education level, which supply the company with well educated and innovative employees					
71	Customer expectation, and the quality level they want in exchange of their budget and project.					
72	Shipping policies since it involves third party.					

**Section (H): Benefits of applying TQM with an organisation:**

**Which of the following describe the results of best implementation of TQM?**

Please Mark the Appropriate Answer by (√), where

1. Extremely agree    2. Agree    3. Neutral.    4. Disagree    5. Extremely disagree

No		1	2	3	4	5
73	Commitment by senior management and employees					
74	Meeting customers' requirements					
75	Improve customer relations					
76	Reduce operation defects					
77	Motivate employees					
78	Improve working climate					
79	Increase service quality					
80	Increase company market share					
81	Increase company turnover					
82	Improve employees satisfaction					
83	Reduce customers complaints					
84	Enhance company reputation					
85	Expand company activities overseas					
86	Save Money					
87	Invest in new technology and machines					
88	Build strong relation with suppliers					
89	Improve buyer/seller advance planning					
90	Improve suppliers satisfaction, quality and retention					

**91. *Obstacles in the implementation of TQM program?***

- Schedule and cost treated as the main priorities
- Emphasis on short-term objects
- Lack of education and training to drive the improvement process
- Lack of top-management commitment/understanding
- Lack of employees' commitment/understanding
- Tendency to cure symptom rather than get to the root cause of a problem
- Lack of expertise in TQM
- Current tendering/bidding climate

**Thank you**

**Appendix 3:**

**Appendix (3.1)**

**Gender**

			Gender		Total
			male	female	
Sample	Jordan	Count	53	3	56
		% within sample	94.6%	5.4%	100.0%
		% within Gender	50.5%	51.9%	100.0%
	United Kingdom	Count	52	0	52
		% within sample	100.0%	.0%	100.0%
		% within Gender	49.5%	.0%	48.1%
Total		Count	105	3	108
		% within sample	97.2%	2.8%	100.0%
		% within Gender	100.0%	100.0%	100.0%

**Age**

			Age				Total
			18-28	29-39	40-50	over 51	
sample	Jordan	Count	20	17	13	6	56
		% within sample	35.7%	30.4%	23.2%	10.7%	100.0%
		% within age	54.1%	35.4%	81.3%	85.7%	51.9%
	United Kingdom	Count	17	31	3	1	52
		% within sample	32.7%	59.6%	5.8%	1.9%	100.0%
		% within age	45.9%	64.6%	18.8%	14.3%	48.1%
Total		Count	37	48	16	7	108
		% within sample	34.3%	44.4%	14.8%	6.5%	100.0%
		% within age	100.0%	100.0%	100.0%	100.0%	100.0%

**Qualification**

					Qualification				Total
					Primary	high school	college	post graduate	

sample	Jordan	Count	12	26	10	6	54
		% within sample	22.2%	48.1%	18.5%	11.1%	100.0%
		% within Qualification	70.6%	86.7%	19.6%	75.0%	50.9%
United Kingdom	Kingdom	Count	5	4	41	2	52
		% within sample	9.6%	7.7%	78.8%	3.8%	100.0%
		% within Qualification	29.4%	13.3%	80.4%	25.0%	49.1%
Total		Count	17	30	51	8	106
		% within sample	16.0%	28.3%	48.1%	7.5%	100.0%
		% within Qualification	100.0%	100.0%	100.0%	100.0%	100.0%

### Occupation

			<i>Occupation</i>						
			Managerial	Supervision	Project Manager	Engineer	Technical	Builder	Total
sample	Jordan	Count	3	4	1	7	6	35	56

e	% within sample	5.4%	7.1%	1.8%	12.5%	10.7%	62.5%	100.0%
	% within Occupation	100.0%	100.0%	14.3%	70.0%	60.0%	47.3%	51.9%
United Kingdom	Count	0	0	6	3	4	39	52
	% within sample	.0%	.0%	11.5%	5.8%	7.7%	75.0%	100.0%
	% within Occupation	.0%	.0%	85.7%	30.0%	40.0%	52.7%	48.1%
Total	Count	3	4	7	10	10	74	108
	% within sample	2.8%	3.7%	6.5%	9.3%	9.3%	68.5%	100.0%
	% within job	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

			<i>Experience</i>				Total
			less than 1	2-3	4-5	more than 6	
sample	Jordan	Count	3	16	11	22	52
		% within sample	5.8%	30.8%	21.2%	42.3%	100.0%
		% within Experience	42.9%	45.7%	28.9%	91.7%	50.0%
United Kingdom		Count	4	19	27	2	52
		% within sample	7.7%	36.5%	51.9%	3.8%	100.0%

	% within Experience	57.1%	54.3%	71.1%	8.3%	50.0%
Total	Count	7	35	38	24	104
	% within sample	6.7%	33.7%	36.5%	23.1%	100.0%

### Appendix (3.2)

#### Q6: Does your company implement a formal quality management system?

			<i>Q6</i>			Total
			already implemented	in preparation	not planned	
Sample	Jordan	Count	5	11	41	57
		% within sample	8.8%	19.3%	71.9%	100.0%
		% within Q6	10.2%	68.8%	93.2%	52.3%
	United Kingdom	Count	44	5	3	52
		% within sample	84.6%	9.6%	5.8%	100.0%
		% within Q6	89.8%	31.3%	6.8%	47.7%
Total		Count	49	16	44	109
		% within sample	45.0%	14.7%	40.4%	100.0%
		% within Q6	100.0%	100.0%	100.0%	100.0%

#### Q7: In your view, which of the words best define quality?

			<i>Expensive</i>		Total
			No	yes	
sample	Jordan	Count	41	16	57
		% within sample	71.9%	28.1%	100.0%
		% within Q7a	48.8%	64.0%	52.3%
	United Kingdom	Count	43	9	52
		% within sample	82.7%	17.3%	100.0%
		% within Q7a	51.2%	36.0%	47.7%
Total		Count	84	25	109
		% within sample	77.1%	22.9%	100.0%
		% within Q7a	100.0%	100.0%	100.0%

			<i>Satisfying Internal customers</i>		Total
			No	yes	
sample	Jordan	Count	56	1	57
		% within sample	98.2%	1.8%	100.0%
		% within Q7b	54.9%	14.3%	52.3%
	United Kingdom	Count	46	6	52
		% within sample	88.5%	11.5%	100.0%
		% within Q7b	45.1%	85.7%	47.7%
Total		Count	102	7	109
		% within sample	93.6%	6.4%	100.0%
		% within Q7b	100.0%	100.0%	100.0%

			<i>Satisfying external customers</i>		Total
			no	yes	
sample	Jordan	Count	32	25	57
		% within sample	56.1%	43.9%	100.0%

	% within Q7c	60.4%	44.6%	52.3%
United Kingdom	Count	21	31	52
	% within sample	40.4%	59.6%	100.0%
	% within Q7c	39.6%	55.4%	47.7%
Total	Count	53	56	109
	% within sample	48.6%	51.4%	100.0%
	% within Q7c	100.0%	100.0%	100.0%

			<i>Appearance</i>		Total
			No	Yes	
sample	Jordan	Count	48	9	57
		% within sample	84.2%	15.8%	100.0%
		% within Q7d	54.5%	42.9%	52.3%
	United Kingdom	Count	40	12	52
		% within sample	76.9%	23.1%	100.0%
		% within Q7d	45.5%	57.1%	47.7%
Total		Count	88	21	109
		% within sample	80.7%	19.3%	100.0%
		% within Q7d	100.0%	100.0%	100.0%

			<i>Increased profit</i>		Total
			No	Yes	
sample	Jordan	Count	39	18	57
		% within sample	68.4%	31.6%	100.0%
		% within Q7e	45.9%	75.0%	52.3%
	United Kingdom	Count	46	6	52
		% within sample	88.5%	11.5%	100.0%
		% within Q7e	54.1%	25.0%	47.7%
Total	Count	85	24	109	
	% within sample	78.0%	22.0%	100.0%	
	% within Q7e	100.0%	100.0%	100.0%	

			<i>Value for money</i>		Total
			No	Yes	
sample	Jordan	Count	49	8	57
		% within sample	86.0%	14.0%	100.0%
		% within Q7f	53.3%	47.1%	52.3%
	United Kingdom	Count	43	9	52
		% within sample	82.7%	17.3%	100.0%
		% within Q7f	46.7%	52.9%	47.7%
Total	Count	92	17	109	
	% within sample	84.4%	15.6%	100.0%	
	% within Q7f	100.0%	100.0%	100.0%	

			<i>Teamwork</i>		Total
			no	yes	
sample	Jordan	Count	52	5	57
		% within sample	91.2%	8.8%	100.0%
		% within Q7g	51.0%	71.4%	52.3%
	United Kingdom	Count	50	2	52
		% within sample	96.2%	3.8%	100.0%
		% within Q7g	49.0%	28.6%	47.7%
Total		Count	102	7	109
		% within sample	93.6%	6.4%	100.0%
		% within Q7g	100.0%	100.0%	100.0%

			<i>Partnership between organization and supplier</i>		Total
			no	Yes	
sample	Jordan	Count	55	2	57
		% within sample	96.5%	3.5%	100.0%
		% within Q7h	52.4%	50.0%	52.3%
	United Kingdom	Count	50	2	52
		% within sample	96.2%	3.8%	100.0%
		% within Q7h	47.6%	50.0%	47.7%
Total		Count	105	4	109
		% within sample	96.3%	3.7%	100.0%
		% within Q7h	100.0%	100.0%	100.0%

**Q8: Do you think that TQM will (or does) work in your organization?**

	<i>Q8</i>	Total
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			very well	to some extent	will not work	cannot say	
sample	Jordan	Count	30	10	14	3	57
		% within sample	52.6%	17.5%	24.6%	5.3%	100.0%
		% within Q8	83.3%	100.0%	60.9%	7.5%	52.3%
United Kingdom	United Kingdom	Count	6	0	9	37	52
		% within sample	11.5%	.0%	17.3%	71.2%	100.0%
		% within Q8	16.7%	.0%	39.1%	92.5%	47.7%
Total		Count	36	10	23	40	109
		% within sample	33.0%	9.2%	21.1%	36.7%	100.0%
		% within Q8	100.0%	100.0%	100.0%	100.0%	100.0%

**Q9: Would a TQM programme be beneficial to your organization?**

			<i>Q9</i>			Total
			no	cannot say	yes	
sample	Jordan	Count	33	8	16	57
		% within sample	57.9%	14.0%	28.1%	100.0%
		% within Q9	84.6%	100.0%	25.8%	52.3%
United Kingdom	United Kingdom	Count	6	0	46	52
		% within sample	11.5%	.0%	88.5%	100.0%
		% within Q9	15.4%	.0%	74.2%	47.7%
Total		Count	39	8	62	109
		% within sample	35.8%	7.3%	56.9%	100.0%
		% within Q9	100.0%	100.0%	100.0%	100.0%

**Q10: TQM would be used to improve?**

			<i>Project design</i>		Total
			no	Yes	
sample	Jordan	Count	56	1	57
		% within sample	98.2%	1.8%	100.0%
		% within Q10a	52.3%	50.0%	52.3%
	United Kingdom	Count	51	1	52

Kingdom	% within sample	98.1%	1.9%	100.0%
	% within Q10a	47.7%	50.0%	47.7%
Total	Count	107	2	109
	% within sample	98.2%	1.8%	100.0%
	% within Q10a	100.0%	100.0%	100.0%

			<i>Cost estimating</i>		Total
			No	Yes	
sample	Jordan	Count	37	20	57
		% within sample	64.9%	35.1%	100.0%
		% within Q10b	45.7%	71.4%	52.3%
	United Kingdom	Count	44	8	52
		% within sample	84.6%	15.4%	100.0%
		% within Q10b	54.3%	28.6%	47.7%
Total		Count	81	28	109
		% within sample	74.3%	25.7%	100.0%
		% within Q10b	100.0%	100.0%	100.0%

			<i>Warranty claims</i>		Total
			No	Yes	
sample	Jordan	Count	50	7	57
		% within sample	87.7%	12.3%	100.0%
		% within Q10c	51.0%	63.6%	52.3%
	United Kingdom	Count	48	4	52
		% within sample	92.3%	7.7%	100.0%
		% within Q10c	49.0%	36.4%	47.7%
Total		Count	98	11	109
		% within sample	89.9%	10.1%	100.0%

			<i>Warranty claims</i>		Total
			No	Yes	
sample	Jordan	Count	50	7	57
		% within sample	87.7%	12.3%	100.0%
		% within Q10c	51.0%	63.6%	52.3%
	United Kingdom	Count	48	4	52
		% within sample	92.3%	7.7%	100.0%
		% within Q10c	49.0%	36.4%	47.7%
Total	Count	98	11	109	
	% within sample	89.9%	10.1%	100.0%	
	% within Q10c	100.0%	100.0%	100.0%	

			<i>Reduce change order</i>		Total
			no	Yes	
sample	Jordan	Count	52	5	57
		% within sample	91.2%	8.8%	100.0%
		% within Q10d	53.6%	41.7%	52.3%
	United Kingdom	Count	45	7	52
		% within sample	86.5%	13.5%	100.0%
		% within Q10d	46.4%	58.3%	47.7%
Total	Count	97	12	109	
	% within sample	89.0%	11.0%	100.0%	
	% within Q10d	100.0%	100.0%	100.0%	

			<i>Reduce claims</i>		Total
			no	Yes	

sample	Jordan	Count	36	21	57
		% within sample	63.2%	36.8%	100.0%
		% within Q10e	42.4%	87.5%	52.3%
	United Kingdom	Count	49	3	52
		% within sample	94.2%	5.8%	100.0%
		% within Q10e	57.6%	12.5%	47.7%
Total		Count	85	24	109
		% within sample	78.0%	22.0%	100.0%
		% within Q10e	100.0%	100.0%	100.0%

			<i>Increased market share</i>		Total
			no	Yes	
sample	Jordan	Count	41	16	57
		% within sample	71.9%	28.1%	100.0%
		% within Q10f	64.1%	35.6%	52.3%
	United Kingdom	Count	23	29	52
		% within sample	44.2%	55.8%	100.0%
		% within Q10f	35.9%	64.4%	47.7%
Total		Count	64	45	109
		% within sample	58.7%	41.3%	100.0%
		% within Q10f	100.0%	100.0%	100.0%

**Q11: What is your organization's perception of quality?**

			<i>Elimination of defects</i>		Total
			no	Yes	
sample	Jordan	Count	30	27	57
		% within sample	52.6%	47.4%	100.0%

		% within Q11a	43.5%	67.5%	52.3%
United Kingdom		Count	39	13	52
		% within sample	75.0%	25.0%	100.0%
		% within Q11a	56.5%	32.5%	47.7%
Total		Count	69	40	109
		% within sample	63.3%	36.7%	100.0%
		% within Q11a	100.0%	100.0%	100.0%

			<i>A tool to increase profits</i>		Total
			no	Yes	
sample	Jordan	Count	35	22	57
		% within sample	61.4%	38.6%	100.0%
		% within Q11b	49.3%	57.9%	52.3%
United Kingdom		Count	36	16	52
		% within sample	69.2%	30.8%	100.0%
		% within Q11b	50.7%	42.1%	47.7%
Total		Count	71	38	109
		% within sample	65.1%	34.9%	100.0%
		% within Q11b	100.0%	100.0%	100.0%

			<i>A competitive advantages</i>		Total
			no	Yes	
sample	Jordan	Count	47	10	57
		% within sample	82.5%	17.5%	100.0%
		% within Q11c	57.3%	37.0%	52.3%
	United	Count	35	17	52

Kingdom	% within sample	67.3%	32.7%	100.0%
	% within Q11c	42.7%	63.0%	47.7%
Total	Count	82	27	109
	% within sample	75.2%	24.8%	100.0%
	% within Q11c	100.0%	100.0%	100.0%

			Others		Total
			no	Yes	
Sample	Jordan	Count	56	1	57
		% within sample	98.2%	1.8%	100.0%
		% within Q11d	54.9%	14.3%	52.3%
	United Kingdom	Count	46	6	52
		% within sample	88.5%	11.5%	100.0%
		% within Q11d	45.1%	85.7%	47.7%
Total		Count	102	7	109
		% within sample	93.6%	6.4%	100.0%
		% within Q11d	100.0%	100.0%	100.0%

**Q12: How would you rate importance of product/service quality?**

			Q12			Total
			somewhat important	important	very important	
sample	Jordan	Count	3	8	46	57
		% within sample	5.3%	14.0%	80.7%	100.0%
		% within Q12	100.0%	72.7%	48.4%	52.3%
	United Kingdom	Count	0	3	49	52
		% within sample	.0%	5.8%	94.2%	100.0%

	% within Q12	.0%	27.3%	51.6%	47.7%
Total	Count	3	11	95	109
	% within sample	2.8%	10.1%	87.2%	100.0%
	% within Q12	100.0%	100.0%	100.0%	100.0%

**Q13: How would you rate customer satisfaction?**

			<i>Q13</i>			Total
			somewhat important	important	very important	
sample	Jordan	Count	1	6	50	57
		% within sample	1.8%	10.5%	87.7%	100.0%
		% within Q13	100.0%	54.5%	51.5%	52.3%
	United Kingdom	Count	0	5	47	52
		% within sample	.0%	9.6%	90.4%	100.0%
		% within Q13	.0%	45.5%	48.5%	47.7%
Total		Count	1	11	97	109
		% within sample	.9%	10.1%	89.0%	100.0%
		% within Q13	100.0%	100.0%	100.0%	100.0%

			<i>Cost</i>					Total
			1.00	2.00	3.00	4.00	5.00	
Sample	Jordan	Count	34	19	4	0	0	57
		% within sample	59.6%	33.3%	7.0%	.0%	.0%	100.0%
		% within Q14a	64.2%	42.2%	40.0%	.0%	.0%	52.3%
	United Kingdom	Count	19	26	6	1	0	52
		% within sample	36.5%	50.0%	11.5%	2.0%	0.0%	100.0%
		% within Q14a	35.8%	57.8%	60.0%	100.0%	100.0%	47.7%
Total		Count	53	45	10	1	0	109

	% within sample	48.6%	41.3%	9.2%	0.9%	0.0%	100.0%
	% within Q14a	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

			<i>Scope</i>					Total
			1.00	2.00	3.00	4.00	5.00	
sample	Jordan	Count	0	2	7	17	31	57
		% within sample	.0%	3.5%	12.3%	29.8%	54.4%	100.0%
		% within Q14b	.0%	100.0%	53.8%	39.5%	67.4%	52.3%
	United Kingdom	Count	5	0	6	26	15	52
		% within sample	9.6%	.0%	11.5%	50.0%	28.8%	100.0%
		% within Q14b	100.0%	.0%	46.2%	60.5%	32.6%	47.7%
Total		Count	5	2	13	43	46	109
		% within sample	4.6%	1.8%	11.9%	39.4%	42.2%	100.0%
		% within Q14b	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
			<i>Time (Schedule)</i>					Total
			1.00	2.00	3.00	4.00	5.00	
sample	Jordan	Count	5	19	20	9	4	57
		% within sample	8.8%	33.3%	35.1%	15.8%	7.0%	100.0%
		% within Q14c	83.3%	76.0%	69.0%	30.0%	21.1%	52.3%
	United Kingdom	Count	1	6	9	21	15	52
		% within sample	1.9%	11.5%	17.3%	40.4%	28.8%	100.0%
		% within Q14c	16.7%	24.0%	31.0%	70.0%	78.9%	47.7%
Total		Count	6	25	29	30	19	109
		% within sample	5.5%	22.9%	26.6%	27.5%	17.4%	100.0%
		% within Q14c	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

			<i>Quality</i>					Total
			1.00	2.00	3.00	4.00	5.00	
sample	Jordan	Count	3	0	10	27	17	57
		% within sample	5.3%	.0%	17.5%	47.4%	29.8%	100.0%
		% within Q14d	37.5%	.0%	34.5%	90.0%	48.6%	52.3%
United Kingdom	United Kingdom	Count	5	7	19	3	18	52
		% within sample	9.6%	13.5%	36.5%	5.8%	34.6%	100.0%
		% within Q14d	62.5%	100.0%	65.5%	10.0%	51.4%	47.7%
Total		Count	8	7	29	30	35	109
		% within sample	7.3%	6.4%	26.6%	27.5%	32.1%	100.0%
		% within Q14d	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

			<i>Safety</i>					Total
			1.00	2.00	3.00	4.00	5.00	
sample	Jordan	Count	15	17	16	4	5	57
		% within sample	26.3%	29.8%	28.1%	7.0%	8.8%	100.0%
		% within Q14e	40.5%	56.7%	57.1%	80.0%	55.6%	52.3%
United Kingdom	United Kingdom	Count	22	13	12	1	4	52
		% within sample	42.3%	25.0%	23.1%	1.9%	7.7%	100.0%
		% within Q14e	59.5%	43.3%	42.9%	20.0%	44.4%	47.7%
Total		Count	37	30	28	5	9	109
		% within sample	33.9%	27.5%	25.7%	4.6%	8.3%	100.0%
		% within Q14e	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

**Q15: How does your organization solve problems?**

			<i>Assign individual to solve</i>		Total
			no	Yes	
sample	Jordan	Count	3	54	57
		% within sample	5.3%	94.7%	100.0%
		% within Q15a	10.0%	68.4%	52.3%
	United Kingdom	Count	27	25	52
		% within sample	51.9%	48.1%	100.0%
		% within Q15a	90.0%	31.6%	47.7%
Total		Count	30	79	109
		% within sample	27.5%	72.5%	100.0%
		% within Q15a	100.0%	100.0%	100.0%

			<i>Set up multi-disciplinary team for each problem</i>		Total
			No	Yes	
sample	Jordan	Count	55	2	57
		% within sample	96.5%	3.5%	100.0%
		% within Q15b	60.4%	11.1%	52.3%
	United Kingdom	Count	36	16	52
		% within sample	69.2%	30.8%	100.0%
		% within Q15b	39.6%	88.9%	47.7%
Total		Count	91	18	109
		% within sample	83.5%	16.5%	100.0%
		% within Q15b	100.0%	100.0%	100.0%

			<i>A permanent team is available</i>		Total
			no	Yes	
sample	Jordan	Count	57	0	57

	% within sample	100.0%	.0%	100.0%
	% within Q15c	58.2%	.0%	52.3%
United Kingdom	Count	41	11	52
	% within sample	78.8%	21.2%	100.0%
	% within Q15c	41.8%	100.0%	47.7%
Total	Count	98	11	109
	% within sample	89.9%	10.1%	100.0%
	% within Q15c	100.0%	100.0%	100.0%

			<i>Others</i>		Total
			no	Yes	
sample	Jordan	Count	56	1	57
		% within sample	98.2%	1.8%	100.0%
		% within Q15d	51.9%	100.0%	52.3%
United Kingdom		Count	52	0	52
		% within sample	100.0%	.0%	100.0%
		% within Q15d	48.1%	.0%	47.7%
Total		Count	108	1	109
		% within sample	99.1%	.9%	100.0%
		% within Q15d	100.0%	100.0%	100.0%

**Q16: Do you have a system for gathering customer suggestion?**

			<i>Q16</i>			Total
			no	cannot say	yes	
sample	Jordan	Count	51	5	1	57
		% within sample	89.5%	8.8%	1.8%	100.0%
		% within Q16	100.0%	83.3%	1.9%	52.3%
United Kingdom		Count	0	1	51	52
		% within sample	.0%	1.9%	98.1%	100.0%

	% within Q16	.0%	16.7%	98.1%	47.7%
Total	Count	51	6	52	109
	% within sample	46.8%	5.5%	47.7%	100.0%
	% within Q16	100.0%	100.0%	100.0%	100.0%

**Q17: How do you measure customer satisfaction?**

			<i>Not measured</i>		Total
			no	Yes	
sample	Jordan	Count	15	42	57
		% within sample	26.3%	73.7%	100.0%
		% within Q17a	22.4%	100.0%	52.3%
	United Kingdom	Count	52	0	52
		% within sample	100.0%	.0%	100.0%
		% within Q17a	77.6%	.0%	47.7%
Total		Count	67	42	109
		% within sample	61.5%	38.5%	100.0%
		% within Q17a	100.0%	100.0%	100.0%

			<i>Questionnaire surveys</i>		Total
			no	Yes	
sample	Jordan	Count	57	0	57
		% within sample	100.0%	.0%	100.0%
		% within Q17b	64.8%	.0%	52.3%
	United Kingdom	Count	31	21	52
		% within sample	59.6%	40.4%	100.0%
		% within Q17b	35.2%	100.0%	47.7%
Total		Count	88	21	109
		% within sample	80.7%	19.3%	100.0%
		% within Q17b	100.0%	100.0%	100.0%

			<i>By the number of complains</i>		Total
			no	yes	
sample	Jordan	Count	48	9	57
		% within sample	84.2%	15.8%	100.0%
		% within Q17c	68.6%	23.1%	52.3%
	United Kingdom	Count	22	30	52
		% within sample	42.3%	57.7%	100.0%
		% within Q17c	31.4%	76.9%	47.7%
Total	Count	70	39	109	
	% within sample	64.2%	35.8%	100.0%	
	% within Q17c	100.0%	100.0%	100.0%	

			<i>Other methods</i>		Total
			no	yes	
sample	Jordan	Count	51	6	57
		% within sample	89.5%	10.5%	100.0%
		% within Q17d	50.0%	85.7%	52.3%
	United Kingdom	Count	51	1	52
		% within sample	98.1%	1.9%	100.0%
		% within Q17d	50.0%	14.3%	47.7%
Total	Count	102	7	109	
	% within sample	93.6%	6.4%	100.0%	
	% within Q17d	100.0%	100.0%	100.0%	

**Q18: Do you have a system for gathering employee suggestions?**

			<i>Q18</i>			Total
			no	cannot say	yes	
sample	Jordan	Count	56	1	0	57
		% within sample	98.2%	1.8%	.0%	100.0%
		% within Q18	90.3%	100.0%	.0%	52.3%
	United Kingdom	Count	6	0	46	52
		% within sample	11.5%	.0%	88.5%	100.0%
		% within Q18	9.7%	.0%	100.0%	47.7%
Total		Count	62	1	46	109
		% within sample	56.9%	.9%	42.2%	100.0%
		% within Q18	100.0%	100.0%	100.0%	100.0%

**Q19: Has your organization developed a clear definition of quality?**

			<i>Q19</i>			Total
			no	cannot say	yes	
sample	Jordan	Count	52	4	1	57
		% within sample	91.2%	7.0%	1.8%	100.0%
		% within Q19	100.0%	100.0%	1.9%	52.3%
	United Kingdom	Count	0	0	52	52
		% within sample	.0%	.0%	100.0%	100.0%
		% within Q19	.0%	.0%	98.1%	47.7%
Total		Count	52	4	53	109
		% within sample	47.7%	3.7%	48.6%	100.0%
		% within Q19	100.0%	100.0%	100.0%	100.0%

**Q20: Does your organisation have a quality improvement programme?**

	<i>No/yes</i>		Total
	No	yes	

sample	Jordan	Count	45	12	57
		% within sample	78.9%	21.1%	100.0%
		% within Q20a	100.0%	18.8%	52.3%
	United Kingdom	Count	0	52	52
		% within sample	.0%	100.0%	100.0%
		% within Q20a	.0%	81.3%	47.7%
Total		Count	45	64	109
		% within sample	41.3%	58.7%	100.0%
		% within Q20a	100.0%	100.0%	100.0%

			<i>Such a plan in under consideration</i>		Total
			No	yes	
sample	Jordan	Count	48	9	57
		% within sample	84.2%	15.8%	100.0%
		% within Q20b	58.5%	33.3%	52.3%
	United Kingdom	Count	18	34	52
		% within sample	34.6%	65.4%	100.0%
		% within Q20b	66.7%	41.5%	47.7%
Total		Count	82	27	109
		% within sample	75.2%	24.8%	100.0%
		% within Q20b	100.0%	100.0%	100.0%

			<i>A quality improvement plan has been implemented recently</i>		Total
			No	Yes	
sample	Jordan	Count	54	3	57
		% within sample	94.7%	5.3%	100.0%
		% within Q20c	59.3%	16.7%	52.3%
	United	Count	15	37	52

Kingdom	% within sample	28.8%	71.2%	100.0%
	% within Q20c	83.3%	40.7%	47.7%
Total	Count	91	18	109
	% within sample	83.5%	16.5%	100.0%
	% within Q20c	100.0%	100.0%	100.0%

			<i>A quality improvement plan has been a part of corporate policy for some time now</i>		Total
			No	Yes	
sample	Jordan	Count	57	0	57
		% within sample	100.0%	.0%	100.0%
		% within Q20d	63.3%	.0%	52.3%
	United Kingdom	Count	19	33	52
		% within sample	36.5%	63.5%	100.0%
		% within Q20d	100.0%	36.7%	47.7%
Total		Count	90	19	109
		% within sample	82.6%	17.4%	100.0%
		% within Q20d	100.0%	100.0%	100.0%

**Q21: What type of quality improvement programme do you have?**

			<i>Total Quality Management (TQM)</i>		Total
			0	No	
sample	Jordan	Count	4	8	12
		% within sample	33.3%	66.7%	100.0%
		% within Q21a	16.0%	20.5%	18.8%
	United Kingdom	Count	31	21	52
		% within sample	59.6%	40.4%	100.0%
		% within Q21a	79.5%	84.0%	81.3%
Total		Count	35	29	64

	% within sample	39.1%	60.9%	100.0%
	% within Q21a	100.0%	100.0%	100.0%

			<i>ISO 9000</i>		Total
			0	No	
sample	Jordan	Count	12	0	12
		% within sample	100.0%	.0%	100.0%
		% within q21b	20.7%	.0%	18.8%
	United Kingdom	Count	46	6	52
		% within sample	88.5%	11.5%	100.0%
		% within q21b	79.3%	100.0%	81.3%
Total		Count	58	6	64
		% within sample	90.6%	9.4%	100.0%
		% within Q21b	100.0%	100.0%	100.0%

			<i>Quality control / Quality assurance</i>		Total
			0	No	
sample	Jordan	Count	8	4	12
		% within sample	66.7%	33.3%	100.0%
		% within Q21c	16.3%	26.7%	18.8%
	United Kingdom	Count	41	11	52
		% within sample	78.8%	21.2%	100.0%
		% within Q21c	83.7%	73.3%	81.3%
Total		Count	49	15	64
		% within sample	76.6%	23.4%	100.0%
		% within Q21c	100.0%	100.0%	100.0%

			<i>Other quality systems</i>		Total
			0	no	
sample	Jordan	Count	12	0	12
		% within sample	100.0%	.0%	100.0%
		% within Q21d	20.0%	.0%	18.8%
	United Kingdom	Count	48	4	52
		% within sample	92.3%	7.7%	100.0%
		% within Q21d	80.0%	100.0%	81.3%
Total	Count	60	4	64	
	% within sample	93.8%	6.3%	100.0%	
	% within Q21d	100.0%	100.0%	100.0%	

**Q22: Which of the following factors provided the motivation to start TQM?**

			<i>Pressure from competitors</i>		Total
			No	Yes	
Sample	Jordan	Count	12	0	12
		% within sample	100.0%	.0%	100.0%
		% within Q22a	21.8%	.0%	18.8%
	United Kingdom	Count	43	9	52
		% within sample	82.7%	17.3%	100.0%
		% within Q22a	78.2%	100.0%	81.3%
Total	Count	55	9	64	
	% within sample	85.9%	14.1%	100.0%	
	% within Q22a	100.0%	100.0%	100.0%	

			<i>Demanding customers</i>	Total
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			No	Yes	
sample	Jordan	Count	6	6	12
		% within sample	50.0%	50.0%	100.0%
		% within Q22b	35.3%	12.8%	18.8%
	United Kingdom	Count	11	41	52
		% within sample	21.2%	78.8%	100.0%
		% within Q22b	64.7%	87.2%	81.3%
Total		Count	17	47	64
		% within sample	26.6%	73.4%	100.0%
		% within Q22b	100.0%	100.0%	100.0%

			<i>Your company Chief Executive</i>		Total
			No	Yes	
sample	Jordan	Count	9	3	12
		% within sample	75.0%	25.0%	100.0%
		% within Q22c	14.8%	100.0%	18.8%
	United Kingdom	Count	52	0	52
		% within sample	100.0%	.0%	100.0%
		% within Q22c	85.2%	.0%	81.3%
Total		Count	61	3	64
		% within sample	95.3%	4.7%	100.0%
		% within Q22c	100.0%	100.0%	100.0%

			<i>Need to reduce costs and improve performance</i>		Total
			No	Yes	
sample	Jordan	Count	9	3	12
		% within sample	75.0%	25.0%	100.0%
		% within Q22d	15.3%	60.0%	18.8%

United Kingdom	Count	50	2	52
	% within sample	96.2%	3.8%	100.0%
	% within Q22d	84.7%	40.0%	81.3%
Total	Count	59	5	64
	% within sample	92.2%	7.8%	100.0%
	% within Q22d	100.0%	100.0%	100.0%

**Q23: Your organization's quality improvement programme can be described as?**

			<i>There is no formal programme</i>		Total
			No	Yes	
sample	Jordan	Count	10	2	12
		% within sample	83.3%	16.7%	100.0%
		% within Q23a	17.9%	25.0%	18.8%
United Kingdom	Count	46	6	52	
	% within sample	88.5%	11.5%	100.0%	
	% within Q23a	82.1%	75.0%	81.3%	
Total	Count	56	8	64	
	% within sample	87.5%	12.5%	100.0%	
	% within Q23a	100.0%	100.0%	100.0%	

			<i>Periodic short-range solutions or motivational programme</i>		Total
			No	Yes	
sample	Jordan	Count	3	9	12
		% within sample	25.0%	75.0%	100.0%
		% within Q23b	12.0%	23.1%	18.8%
United Kingdom	Count	22	30	52	

Kingdom	% within sample	42.3%	57.7%	100.0%
	% within Q23b	88.0%	76.9%	81.3%
Total	Count	25	39	64
	% within sample	39.1%	60.9%	100.0%
	% within Q23b	100.0%	100.0%	100.0%

			<i>A formal programme is underway with widespread employee awareness</i>		Total
			No	Yes	
sample	Jordan	Count	12	0	12
		% within sample	100.0%	.0%	100.0%
		% within Q23c	25.0%	.0%	18.8%
	United Kingdom	Count	36	16	52
		% within sample	69.2%	30.8%	100.0%
		% within Q23c	75.0%	100.0%	81.3%
Total		Count	48	16	64
		% within sample	75.0%	25.0%	100.0%
		% within Q23c	100.0%	100.0%	100.0%

			<i>Others</i>		Total
			No	Yes	
sample	Jordan	Count	11	1	12
		% within sample	91.7%	8.3%	100.0%
		% within Q23d	17.5%	100.0%	18.8%
	United Kingdom	Count	52	0	52
		% within sample	100.0%	.0%	100.0%
		% within Q23d	82.5%	.0%	81.3%
Total		Count	63	1	64
		% within sample	98.4%	1.6%	100.0%
		% within Q23d	100.0%	100.0%	100.0%

**Q24: Does your quality improvement plan has the full support of top management?**

			<i>Q24</i>			Total
			No	cannot say	yes	
sample	Jordan	Count	4	1	7	12
		% within sample	33.3%	8.3%	58.3%	100.0%
		% within Q24	100.0%	20.0%	12.7%	18.8%
	United Kingdom	Count	0	4	48	52
		% within sample	.0%	7.7%	92.3%	100.0%
		% within Q24	.0%	80.0%	87.3%	81.3%
Total		Count	4	5	55	64
		% within sample	6.3%	7.8%	85.9%	100.0%
		% within Q24	100.0%	100.0%	100.0%	100.0%

**Q25: The major objectives of your quality programmes are?**

			<i>Increase productivity</i>		Total
			No	Yes	
sample	Jordan	Count	9	3	12
		% within sample	75.0%	25.0%	100.0%
		% within Q25a	23.1%	12.0%	18.8%
	United Kingdom	Count	30	22	52
		% within sample	57.7%	42.3%	100.0%
		% within Q25a	76.9%	88.0%	81.3%
Total		Count	39	25	64
		% within sample	60.9%	39.1%	100.0%
		% within Q25a	100.0%	100.0%	100.0%

			<i>Cost reduction</i>		Total
			No	Yes	
sample	Jordan	Count	3	9	12
		% within sample	25.0%	75.0%	100.0%
		% within Q25b	7.9%	34.6%	18.8%
	United Kingdom	Count	35	17	52
		% within sample	67.3%	32.7%	100.0%
		% within Q25b	92.1%	65.4%	81.3%
Total	Count	38	26	64	
	% within sample	59.4%	40.6%	100.0%	
	% within Q25b	100.0%	100.0%	100.0%	

			<i>Involvement of employees in the quality building effort</i>		Total
			No	Yes	
sample	Jordan	Count	11	1	12
		% within sample	91.7%	8.3%	100.0%
		% within Q25c	20.8%	9.1%	18.8%
	United Kingdom	Count	42	10	52
		% within sample	80.8%	19.2%	100.0%
		% within Q25c	79.2%	90.9%	81.3%
Total	Count	53	11	64	
	% within sample	82.8%	17.2%	100.0%	
	% within Q25c	100.0%	100.0%	100.0%	

			<i>Compliance with statutory, environment and safety requirement</i>	Total

			No	Yes	
sample	Jordan	Count	10	2	12
		% within sample	83.3%	16.7%	100.0%
		% within Q25d	16.9%	40.0%	18.8%
	United Kingdom	Count	49	3	52
		% within sample	94.2%	5.8%	100.0%
		% within Q25d	83.1%	60.0%	81.3%
Total		Count	59	5	64
		% within sample	92.2%	7.8%	100.0%
		% within Q25d	100.0%	100.0%	100.0%

			<i>Others</i>		Total
			No	Yes	
sample	Jordan	Count	11	1	12
		% within sample	91.7%	8.3%	100.0%
		% within Q25e	17.5%	100.0%	18.8%
	United Kingdom	Count	52	0	52
		% within sample	100.0%	.0%	100.0%
		% within Q25e	82.5%	.0%	81.3%
Total		Count	63	1	64
		% within sample	98.4%	1.6%	100.0%
		% within Q25e	100.0%	100.0%	100.0%

**Q26: After the implementation of your quality improvement programme, service/product quality has?**

			<i>Drastically improved</i>	Total
			No	
sample	Jordan	Count	12	12
		% within sample	100.0%	100.0%

	% within Q26a	18.8%	18.8%
United Kingdom	Count	52	52
	% within sample	100.0%	100.0%
	% within Q26a	81.3%	81.3%
Total	Count	64	64
	% within sample	100.0%	100.0%
	% within Q26a	100.0%	100.0%

			<i>Improved</i>		Total
			No	Yes	
sample	Jordan	Count	9	3	12
		% within sample	75.0%	25.0%	100.0%
		% within Q26b	25.0%	10.7%	18.8%
	United Kingdom	Count	27	25	52
		% within sample	51.9%	48.1%	100.0%
		% within Q26b	75.0%	89.3%	81.3%
Total		Count	36	28	64
		% within sample	56.3%	43.8%	100.0%
		% within Q26b	100.0%	100.0%	100.0%

			<i>Remained the same</i>		Total
			No	Yes	
sample	Jordan	Count	9	3	12
		% within sample	75.0%	25.0%	100.0%
		% within Q26c	18.0%	21.4%	18.8%
	United Kingdom	Count	41	11	52
		% within sample	78.8%	21.2%	100.0%
		% within Q26c	82.0%	78.6%	81.3%
Total		Count	50	14	64

	% within sample	78.1%	21.9%	100.0%
	% within Q26c	100.0%	100.0%	100.0%

			<i>Decreased</i>	
			No	Total
sample	Jordan	Count	12	12
		% within sample	100.0%	100.0%
		% within Q26d	18.8%	18.8%
	United Kingdom	Count	52	52
		% within sample	100.0%	100.0%
		% within Q26d	81.3%	81.3%
Total		Count	64	64
		% within sample	100.0%	100.0%
		% within Q26d	100.0%	100.0%

			<i>Cannot say</i>		
			No	Yes	Total
sample	Jordan	Count	7	5	12
		% within sample	58.3%	41.7%	100.0%
		% within Q26e	14.9%	29.4%	18.8%
	United Kingdom	Count	40	12	52
		% within sample	76.9%	23.1%	100.0%
		% within Q26e	85.1%	70.6%	81.3%
Total		Count	47	17	64
		% within sample	73.4%	26.6%	100.0%
		% within Q26e	100.0%	100.0%	100.0%

			<i>Not applicable</i>		Total
			No	Yes	
sample	Jordan	Count	11	1	12
		% within sample	91.7%	8.3%	100.0%
		% within Q26f	18.6%	20.0%	18.8%
	United Kingdom	Count	48	4	52
		% within sample	92.3%	7.7%	100.0%
		% within Q26f	81.4%	80.0%	81.3%
Total	Count	59	5	64	
	% within sample	92.2%	7.8%	100.0%	
	% within Q26f	100.0%	100.0%	100.0%	

**Q27: After the implementation of your quality improvement programme, relationships with customers and suppliers have?**

			<i>Drastically improved</i>	Total
			No	
sample	Jordan	Count	12	12
		% within sample	100.0%	100.0%
		% within Q27a	18.8%	18.8%
	United Kingdom	Count	52	52
		% within sample	100.0%	100.0%
		% within Q27a	81.3%	81.3%
Total	Count	64	64	
	% within sample	100.0%	100.0%	
	% within Q27a	100.0%	100.0%	

			<i>Improved</i>		Total
			No	Yes	
sample	Jordan	Count	9	3	12
		% within sample	75.0%	25.0%	100.0%
		% within Q27b	25.7%	10.3%	18.8%
	United Kingdom	Count	26	26	52
		% within sample	50.0%	50.0%	100.0%
		% within Q27b	74.3%	89.7%	81.3%
Total		Count	35	29	64
		% within sample	54.7%	45.3%	100.0%
		% within Q27b	100.0%	100.0%	100.0%

			<i>Remained the same</i>		Total
			No	Yes	
sample	Jordan	Count	9	3	12
		% within sample	75.0%	25.0%	100.0%
		% within Q27c	17.3%	25.0%	18.8%
	United Kingdom	Count	43	9	52
		% within sample	82.7%	17.3%	100.0%
		% within Q27c	82.7%	75.0%	81.3%
Total		Count	52	12	64
		% within sample	81.3%	18.8%	100.0%
		% within Q27c	100.0%	100.0%	100.0%

			<i>Decreased</i>	Total
			No	
sample	Jordan	Count	12	12
		% within sample	100.0%	100.0%

	% within Q27d	18.8%	18.8%
United Kingdom	Count	52	52
	% within sample	100.0%	100.0%
	% within Q27d	81.3%	81.3%
Total	Count	64	64
	% within sample	100.0%	100.0%
	% within Q27d	100.0%	100.0%

			<i>Cannot say</i>		Total
			No	Yes	
sample	Jordan	Count	7	5	12
		% within sample	58.3%	41.7%	100.0%
		% within Q27e	15.2%	27.8%	18.8%
United Kingdom	United Kingdom	Count	39	13	52
		% within sample	75.0%	25.0%	100.0%
		% within Q27e	84.8%	72.2%	81.3%
Total		Count	46	18	64
		% within sample	71.9%	28.1%	100.0%
		% within Q27e	100.0%	100.0%	100.0%

			<i>Not applicable</i>		Total
			No	Yes	
sample	Jordan	Count	11	1	12
		% within sample	91.7%	8.3%	100.0%
		% within Q27f	18.6%	20.0%	18.8%
United Kingdom	United Kingdom	Count	48	4	52
		% within sample	92.3%	7.7%	100.0%

	% within Q27f	81.4%	80.0%	81.3%
Total	Count	59	5	64
	% within sample	92.2%	7.8%	100.0%
	% within Q27f	100.0%	100.0%	100.0%

Appendix (3.3)

Sample	Jordan			United Kingdom			Total		
	Mean	N	Std. Deviation	Mean	N	Std. Deviation	Mean	N	Std. Deviation
<b>Top Management Commitment</b>									
Q28	2.4912	57	1.00219	3.8269	52	1.09761	3.1284	109	1.24053
Q29	2.1228	57	.94624	3.9038	52	.66449	2.9725	109	1.21304
Q30	2.2982	57	1.06846	4.3077	52	.85264	3.2569	109	1.39711
<b>Quality Culture</b>									
Q31	1.7719	57	.77960	4.1346	52	.79283	2.8991	109	1.42039
Q32	1.8596	57	.71810	4.1538	52	.84910	2.9541	109	1.39035
Q33	1.8070	57	.76622	4.3269	52	.78519	3.0092	109	1.48134
<b>Process Planning and Strategic Quality Management</b>									
Q34	2.2281	57	1.14981	3.9231	52	.92559	3.0367	109	1.34665
Q35	1.7321	57	.75054	3.8462	52	1.24278	2.7500	109	1.46693
Q36	2.0000	57	.88641	3.7885	52	1.24202	2.8532	109	1.39328
<b>Employees Empowerment</b>									
Q37	2.0000	57	.90633	4.0577	52	.99830	2.9817	109	1.40094
Q38	1.9298	57	.84218	4.3462	52	1.00751	3.0826	109	1.52223
Q39	2.0702	56	.90356	4.2115	52	.77552	3.0917	108	1.36451
Q40	1.6842	57	.71108	4.2500	52	.86035	2.9083	109	1.50641
<b>Employees Training and Education</b>									
Q41	1.6316	57	.69774	4.3654	52	.79283	2.9358	109	1.55917
Q42	1.6842	57	.68551	4.7308	52	.44789	3.1376	109	1.63564
Q43	1.7544	57	.78560	4.7500	52	.43724	3.1835	109	1.63393
Q44	3.4386	57	1.45182	4.4808	52	.72735	3.9358	109	1.27130
Q45	1.5439	57	.68322	4.3269	52	.92294	2.8716	109	1.61073
Q46	1.6491	57	.69414	4.1923	52	.92965	2.8624	109	1.51210
<b>Supply Chain Management</b>									
Q47	1.9123	57	.95020	4.4231	52	.66704	3.1101	109	1.50517
Q48	1.8246	57	.78200	4.2885	52	.63667	3.0000	109	1.42725
Q49	2.0351	57	.88570	4.0769	52	.85969	3.0092	109	1.34368
<b>Customer Satisfaction</b>									
Q50	2.0351	57	.98134	4.1154	52	.75806	3.0275	109	1.36395
Q51	2.0702	57	.86313	4.2115	52	.91473	3.0917	109	1.39138
Q52	1.6842	57	.71108	4.1923	52	.79307	2.8807	109	1.46392

<b>Information and communication technology</b>									
Q53	1.9464	57	.81842	4.3654	52	.86385	3.1111	109	1.47460
Q54	1.6316	57	.81573	3.9615	52	1.13693	2.7431	109	1.52391
Q55	2.0175	56	.69414	4.0769	52	.73688	3.0000	108	1.25462
<b>Continuous Improvement</b>									
Q56	2.3333	57	1.17006	4.0192	52	.91802	3.1376	109	1.35036
Q57	1.9123	57	.82982	3.8077	52	.95051	2.8165	109	1.29932
Q58	1.9825	57	.83434	3.7885	52	1.24202	2.8440	109	1.38226
<b>Performance measurement system for benchmarking</b>									
Q59	1.7895	57	.70043	3.8269	52	.90144	2.7615	109	1.29743
Q60	1.9825	56	.89625	4.4038	52	.82271	3.1376	108	1.48740
Q61	1.9107	57	.79262	4.4038	52	.86907	3.1111	109	1.49974
<b>Impact on environment and society</b>									
Q62	1.5965	57	.82071	4.0000	52	.94972	2.7431	109	1.49322
Q63	1.7018	57	.73107	4.4038	52	.84621	2.9908	109	1.56640

### T-Test

	Sample	N	Mean	Std. Deviation	Std. Error Mean
Top management Commitment	Jordan	57	2.3041	.88030	.11660
	United Kingdom	52	4.0128	.69220	.09599
Quality Culture	Jordan	57	1.7334	.12592	.01668
	United Kingdom	52	4.2051	.06565	.00910
Process planning and strategic quality management	Jordan	57	1.9868	.33511	.10985
	United Kingdom	52	3.8526	.77158	.00951

Employees empowerment	Jordan	57	1.9211	.59604	.07895
	United Kingdom	52	4.2164	.78751	.10921
Employees training and education	Jordan	57	1.9503	.50692	.06714
	United Kingdom	52	4.4744	.33840	.04693
Supplier chain management	Jordan	57	1.8240	.55628	.07368
	United Kingdom	52	4.2629	.58368	.08094
Customer satisfaction	Jordan	57	1.9299	.56118	.07433
	United Kingdom	52	4.1731	.63516	.08808
Information and communication technology	Jordan	57	1.8652	.19907	.02637
	United Kingdom	52	4.1346	.32652	.04528
Continuous Improvement	Jordan	57	2.0761	.69396	.09192
	United Kingdom	52	3.8718	.91031	.12624
Performance measurement system for benchmarking	Jordan	57	1.8943	.50724	.06719
	United Kingdom	52	4.2115	.75002	.10401
Impact on society and environment	Jordan	57	1.6492	.60324	.09168
	United Kingdom	52	4.2019	.80521	.10367

**Independent Samples Test**

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Top management Commitment	Equal variances assumed	.925	.338	-11.191	107	.000	-1.70873	.15269	-2.01141	-1.406
	Equal variances not assumed			-11.314	104.782	.000	-1.70873	.15103	-2.00819	-1.409
Quality Culture	Equal variances assumed	11.310	.001	-1.699	107	.000	-.03316	.01951	-.07184	.0055
	Equal variances not assumed			-1.745	85.960	.000	-.03316	.01900	-.07093	.0046
Process planning and strategic quality management	Equal variances assumed	7.328	.34	-34.561	107	.000	-2.18350	.01258	-1.8601	-1.591
	Equal variances not assumed			-34.089	89.137	.000	-2.18350	.012162	-1.8092	-1.530

Employee empowerment	Equal variances assumed	1.022	.314	-17.249	107	.000	-2.29529	.13307	-2.55909	-
	Equal variances not assumed			-17.033	94.684	.000	-2.29529	.13476	-2.56283	2.031
Employees training and education	Equal variances assumed	11.542	.001	-29.436	107	.000	-2.45454	.08338	-2.61984	-
	Equal variances not assumed			-29.964	98.313	.000	-2.45454	.08192	-2.61709	2.289
Supplier chain management	Equal variances assumed	.009	.923	-22.048	107	.000	-2.40789	.10921	-2.62440	-
	Equal variances not assumed			-21.999	104.926	.000	-2.40789	.10946	-2.62493	2.191
Customer satisfaction	Equal variances assumed	2.313	.131	-19.242	107	.000	-2.20502	.11460	-2.43219	-
	Equal variances not assumed			-19.132	102.268	.000	-2.20502	.11525	-2.43361	1.977
Information and communication technology	Equal variances assumed	5.802	.018	-35.183	107	.000	-1.80482	.05130	-1.90652	-
	Equal variances not assumed			-34.444	82.783	.000	-1.80482	.05240	-1.90905	1.703
Improvement	Equal variances assumed	2.628	.108	-11.864	107	.000	-1.83002	.15425	-2.13580	-
	Equal variances not assumed			-11.719	95.075	.000	-1.83002	.15616	-2.14002	1.524
Performance measurement system for benchmarking	Equal variances assumed	4.979	.028	-18.499	107	.000	-2.25142	.12171	-2.49268	-
	Equal variances not assumed			-18.183	88.420	.000	-2.25142	.12382	-2.49747	2.010
Impact on society and environment	Equal variances assumed	3.278	.067	-16.304	107	.000	-1.92550	.12592	-2.15952	-
	Equal variances not assumed			-16.073	79.062	.000	-1.92550	.12317	-2.15284	2.163

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Profitability)	-1.250	1.785		-.700	.486
	top management commitment	-.182	.095	-.346	-1.918	.058

Quality culture	1.567	.530	.262	2.955	.004
Process planning and strategic quality management					
Employees empowerment	.201	.125	.440	1.611	.110
Employees training and education	.000	.117	.000	-.002	.998
Supplier chain management	.000	.136	.000	.001	.999
Customer satisfaction	.200	.189	.408	1.058	.293
Information and communication technology	-.043	.146	-.065	-.291	.772
Continuous improvement	.009	.104	.018	.086	.931
Performance management system for benchmarking impact on society and environment	-.051	.184	-.108	-.278	.782

a. Dependent Variable: profitability within the entire sample.

#### Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Profitability)	-3.293	2.509		-1.312	.196
	Top management commitment	-.161	.161	-.204	-1.005	.320
	Quality culture	-1.255	.748	.408	3.016	.004
	Process planning and strategic quality management	-.476	.193	.372	1.072	.619

Employees empowerment	.267	.218	.229	1.223	.227
Employees training and education	-.101	.196	-.074	-.519	.606
Supplier chain management	-.263	.221	-.211	-1.193	.239
Customer satisfaction	.316	.312	.255	1.012	.317
Information and communication technology	.242	.455	.069	.532	.597
Continuous improvement	-.106	.190	-.106	-.556	.581
Performance measurement system for benchmarking	-.073	.322	-.053	-.225	.823
Impact on society and environment	-.201	.290	-.231	-.419	.574

a. Dependent Variable: profitability with Jordan

#### Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(profitability)	4.628	2.689		1.721	.093
	Top management commitment	.054	.109	.095	.490	.627
	Quality Culture	-.854	.714	-.144	-1.196	.238
	Process planning and strategic quality management	-.738	.625	.933	.929	.347
	Employees empowerment	.104	.127	.210	.813	.421
	Employees training and education	.114	.194	.099	.590	.559

Supplier chain management	.583	.153	.876	3.822	.000
Customer satisfaction	-.293	.185	-.479	-1.582	.121
Information and communication technology	.037	.182	.031	.205	.839
Continuous improvement	-.118	.099	-.276	-1.198	.238
Performance measurement system for benchmarking	.220	.181	.424	1.213	.232
Impact on society and environment	.093	.172	.541	-1.437	.391

a. Dependent Variable: profitability for the United Kingdom

#### Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Market share)	2.618	1.828		1.432	.155
	Top management commitment	-.328	.097	-.606	-3.371	.001
	Quality Culture	.475	.543	.077	.875	.384
	Process planning and strategic quality management	.519	.647	.029	.627	.351
	Employees empowerment	-.036	.128	-.077	-.283	.778
	Employees training and education	.016	.120	.033	.133	.894
	Supplier chain management	.207	.139	.438	1.485	.141
	Customer satisfaction	.030	.193	.060	.156	.877

Information and communication technology	-.163	.149	-.243	-1.087	.279
Continuous improvement	-.084	.107	-.162	-.786	.433
Performance measurement system for benchmarking	.363	.188	.746	1.928	.057
Impact on society and environment	.931	.265	.089	.292	.766

a. Dependent Variable: market share for the entire sample

#### Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Market Share)	.036	2.297		.016	.988
	Top management commitment	-.222	.147	-.291	-1.508	.138
	Quality culture	1.261	.684	.237	1.843	.072
	Process planning and strategic quality management	.657	.491	-.266	.350	.915
	Employees empowerment	-.048	.200	-.042	-.239	.812
	Employees training and education	.005	.179	.004	.029	.977
	Supplier chain management	.059	.202	.049	.294	.770
	Customer satisfaction	-.207	.286	-.173	-.725	.472
	Information and communication technology	.663	.416	.196	1.591	.118
	Continuous improvement	-.313	.174	-.324	-1.797	.079

Performance measurement system for benchmarking	.379	.295	.286	1.286	.205
Impact on society and environment	.202	.381	.393	1.094	.371

a. Dependent Variable: market share for Jordan

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Market share)	10.247	2.848		3.598	.001
	Top management commitment	-.048	.116	-.062	-.414	.681
	Quality culture	-1.614	.756	-.199	-2.133	.039
	Process planning and strategic quality management	-.1372	.697	-.217	-2.562	.219
	Employees empowerment	-.124	.135	-.183	-.917	.364
	Employees training and education	-.421	.205	-.267	-2.049	.047
	Supplier chain management	.629	.162	.689	3.894	.000
	Customer satisfaction	.309	.196	.368	1.575	.123
	Information and communication technology	-.672	.193	-.412	-3.478	.001
	Continuous improvement	-.227	.104	-.387	-2.173	.036
	Performance measurement system for benchmarking	.318	.192	.447	1.654	.106
	Impact on society and environment	.026	.138	.346	-1.437	.136

a. Dependent Variable: market share for the United Kingdom

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Service quality)	.201	1.507		.133	.894
	Top management commitment	-.053	.080	-.115	-.667	.506
	Quality culture	1.270	.448	.239	2.837	.006
	Process planning and strategic quality management	-.355	.368	-.511	-.980	.072
	Employees empowerment	.146	.105	.361	1.390	.168
	Employees training and education	-.065	.099	-.156	-.658	.512
	Supplier chain management	.143	.115	.351	1.247	.215
	Customer satisfaction	-.203	.159	-.470	-1.277	.204
	Information and communication technology	-.559	.123	-.969	-4.533	.000
	Continuous improvement	.078	.088	.176	.892	.375
	Performance measurement system for benchmarking	.323	.155	.768	2.078	.040
	Impact on society and environment	.245	.189	-.538	.915	.336

a. Dependent Variable: service quality for the entire sample

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		

1	(Services quality)	.508	1.911		.266	.792
	Top management commitment	-.161	.122	-.278	-1.316	.194
	Quality culture	1.168	.569	.288	2.052	.046
	Process planning and strategic quality management	.658	-.983	-.347	-1.094	.366
	Employees empowerment	.155	.166	.181	.933	.356
	Employees training and education	-.075	.149	-.074	-.502	.618
	Supplier chain management	-.061	.168	-.066	-.360	.720
	Customer satisfaction	-.296	.238	-.325	-1.244	.220
	Information and communication technology	-.157	.346	-.061	-.455	.651
	Continuous improvement	.220	.145	.299	1.518	.136
	Performance measurement system for benchmarking	.394	.245	.392	1.606	.115
	Impact on society and environment	.211	.572	-.237	-1.944	.217

a. Dependent Variable: service Quality for Jordan

#### Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Service quality)	-.607	2.940		-.206	.838
	Top management commitment	.276	.119	.332	2.313	.026

Quality culture	.789	.781	.090	1.011	.318
Process planning and strategic quality management	.658	.633	.247	-1.339	.257
Employees empowerment	.187	.139	.256	1.342	.187
Employees training and education	-.141	.212	-.083	-.667	.508
Supplier chain management	.832	.167	.843	4.982	.000
Customer satisfaction	-.342	.202	-.378	-1.691	.098
Information and communication technology	-.554	.199	-.314	-2.779	.008
Continuous improvement	-.241	.108	-.381	-2.233	.031
Performance measurement system for benchmarking	.359	.198	.468	1.812	.077
Impact on society and environment	.238	.651	.326	-1.447	.065

a. Dependent Variable: service quality for the United Kingdom

#### Appendix (3.4)

Sample	Jordan			United Kingdom			Total		
	Mean	N	Std. Deviation	Mean	N	Std. Deviation	Mean	N	Std. Deviation
Q64	3.0702	57	.96102	4.5962	52	.72110	3.7982	109	1.14487
Q65	2.8772	57	1.13500	4.6731	52	.64841	3.7339	109	1.29559
Q66	4.5088	57	.68460	4.4423	52	.57440	4.4771	109	.63240
Q67	4.4561	57	.70888	4.4423	52	.75182	4.4495	109	.72631
Q68	4.4737	57	.62977	4.5962	52	.60260	4.5321	109	.61717
Q69	4.2982	57	.70622	4.5769	52	.49887	4.4312	109	.62903
Q70	4.4035	57	.75261	4.3269	52	.73354	4.3670	109	.74113
Q71	4.2982	57	.70622	4.0577	52	.66902	4.1835	109	.69609
Q72	4.3860	57	.75010	3.7115	52	.77552	4.0642	109	.83083

**Q91: Obstacles in the implementation of TQM programme?**

			<i>Schedule and cost treated as the main priorities</i>		Total
			.00	1.00	
Sample	Jordan	Count	37	20	57
		% within sample	64.9%	35.1%	100.0%
		% within Q91a	45.1%	74.1%	52.3%
	United Kingdom	Count	45	7	52
		% within sample	86.5%	13.5%	100.0%
		% within Q91a	54.9%	25.9%	47.7%
Total	Count	82	27	109	
	% within sample	75.2%	24.8%	100.0%	
	% within Q91a	100.0%	100.0%	100.0%	

			<i>Emphasis on short-term objectives</i>		Total
			.00	1.00	
Sample	Jordan	Count	44	13	57
		% within sample	77.2%	22.8%	100.0%
		% within Q91b	53.0%	50.0%	52.3%
	United Kingdom	Count	39	13	52
		% within sample	75.0%	25.0%	100.0%
		% within Q91b	47.0%	50.0%	47.7%
Total	Count	83	26	109	
	% within sample	76.1%	23.9%	100.0%	
	% within Q91b	100.0%	100.0%	100.0%	

			<i>Lack of education and training to drive the improvement process</i>		Total
			.00	1.00	
Sample	Jordan	Count	42	15	57
		% within sample	73.7%	26.3%	100.0%
		% within Q91c	47.7%	71.4%	52.3%
	United Kingdom	Count	46	6	52
		% within sample	88.5%	11.5%	100.0%
		% within Q91c	52.3%	28.6%	47.7%
Total	Count	88	21	109	
	% within sample	80.7%	19.3%	100.0%	
	% within Q91c	100.0%	100.0%	100.0%	

			<i>Lack of top management commitment / understanding</i>		Total
			.00	1.00	
Sample	Jordan	Count	46	11	57
		% within sample	80.7%	19.3%	100.0%
		% within Q91d	53.5%	47.8%	52.3%
	United Kingdom	Count	40	12	52
		% within sample	76.9%	23.1%	100.0%
		% within Q91d	46.5%	52.2%	47.7%
Total	Count	86	23	109	
	% within sample	78.9%	21.1%	100.0%	
	% within Q91d	100.0%	100.0%	100.0%	

			<i>Lack of employees commitment / understanding</i>		Total
			.00	1.00	
Sample	Jordan	Count	45	12	57
		% within sample	78.9%	21.1%	100.0%
		% within Q91e	51.7%	54.5%	52.3%
	United Kingdom	Count	42	10	52
		% within sample	80.8%	19.2%	100.0%
		% within Q91e	48.3%	45.5%	47.7%
Total	Count	87	22	109	
	% within sample	79.8%	20.2%	100.0%	
	% within Q91e	100.0%	100.0%	100.0%	

			<i>Tendency to cure symptom rather that get to the root cause of a problem</i>		Total
			.00	1.00	
Sample	Jordan	Count	44	13	57
		% within sample	77.2%	22.8%	100.0%
		% within Q91f	47.8%	76.5%	52.3%
	United Kingdom	Count	48	4	52
		% within sample	92.3%	7.7%	100.0%
		% within Q91f	52.2%	23.5%	47.7%
Total	Count	92	17	109	
	% within sample	84.4%	15.6%	100.0%	
	% within Q91f	100.0%	100.0%	100.0%	

			<i>Lack of expertise in TQM</i>		Total
			.00	1.00	
Sample	Jordan	Count	34	23	57
		% within sample	59.6%	40.4%	100.0%
		% within Q91g	40.0%	95.8%	52.3%
	United Kingdom	Count	51	1	52
		% within sample	98.1%	1.9%	100.0%
		% within Q91g	60.0%	4.2%	47.7%
Total	Count	85	24	109	
	% within sample	78.0%	22.0%	100.0%	
	% within Q91g	100.0%	100.0%	100.0%	

			<i>Current tendering climate</i>		Total
			No	Yes	
Sample	Jordan	Count	56	1	57
		% within sample	98.2%	1.8%	100.0%
		% within Q91h	51.9%	100.0%	52.3%
	United Kingdom	Count	52	0	52
		% within sample	100.0%	.0%	100.0%
		% within Q91h	48.1%	.0%	47.7%
Total	Count	108	1	109	
	% within sample	99.1%	.9%	100.0%	
	% within Q91h	100.0%	100.0%	100.0%	

Appendix (3.5)

Sample	Jordan			United Kingdom			Total		
	Mean	N	Std. Deviation	Mean	N	Std. Deviation	Mean	N	Std. Deviation
Q73	4.2500	57	.69413	4.4615	52	.69906	4.3519	109	.70133
Q74	4.5263	57	.73449	4.2885	52	.93592	4.4128	109	.84120
Q75	4.5439	57	.68322	4.3077	52	.87534	4.4312	109	.78607
Q76	4.5614	57	.68184	4.6154	52	.56547	4.5872	109	.62673
Q77	4.2632	57	.95481	4.6731	52	.51340	4.4587	109	.79968
Q78	4.2982	57	.86530	4.4038	52	.72110	4.3486	109	.79787
Q79	4.5263	57	.68414	4.4038	52	.72110	4.4679	109	.70144
Q80	4.3158	57	.82717	4.5385	52	.50338	4.4220	109	.69780
Q81	4.3333	57	.74001	4.8846	52	.32260	4.5963	109	.64001
Q82	3.9123	57	1.02261	4.7308	52	.44789	4.3028	109	.89757
Q83	4.3158	57	.71108	4.7115	52	.49849	4.5046	109	.64727
Q84	4.2105	57	.79590	4.3846	52	.52966	4.2936	109	.68452
Q85	4.0351	57	.94425	4.5000	52	.64169	4.2569	109	.84331
Q86	4.1754	57	.94723	4.5577	52	.63904	4.3578	109	.83359
Q87	4.1404	57	1.02537	4.4231	52	.53674	4.2752	109	.83745
Q88	4.1228	57	1.03631	4.4231	52	.49887	4.2661	109	.83491
Q89	4.1228	57	.94624	4.5769	52	.53674	4.3394	109	.80760
Q90	4.0877	57	.91184	4.4615	52	.87361	4.2661	109	.90923

**Appendix (4)**

Interviewee Characteristics					
	<i>Company Name</i>	<i>Company Size</i>	<i>Type</i>	<i>Name and Job Title</i>	<i>Interview Location</i>
Jordan	Arab Construction & Contracting Company	1,900 employees	Privately Held	Project Manager	Company Offices (Amman)
	<b>Modern Contractors for Construction Company</b>	2,350 employees	Privately Held	CEO	Company Offices (Amman)
	National Engineering & Contracting Company (NECC)	1,600 employees	Privately Held	CEO	Company Site (Amman)
	Samaha for Construction	1,350 employees	Privately Held	Project Manager	Company site (Amman)
	Junada Syria	890 employees	Privately Held	Project Manager	Company Site (Amman)
	Middle East for Construction	400 employees	Privately Held	Project Manager	Company offices (Amman)
	Movenpick Hotels and Resorts	Over 250 employees	Client	Department of Construction and Delivery	Dead Sea (Jordan) branch
	Safeway Supermarket	2,000 employees	Client	Department of Construction and Delivery	Company offices (Amman)
	United Kingdom	BAM Construct United Kingdom Ltd deals with more governmental projects and railways	2,800 employees	Privately Held	Project Manager
BAM Nuttall United Kingdom Ltd deals with private projects		2,800 employees	Privately Held	Project Manager	Company Offices (Leeds)
Richmond Property		1,000 employees	Privately Held	Manager	Company Offices (Manchester)
Halcrow Group Ltd		4,813 employees	Privately Held	Project Manager	Company Offices (London)
Walter Lilly & Co Ltd		1,640 employees	Privately Held	Site Manager	Company Offices (London)
Junada United Kingdom		1,340 employees	Privately Held	Site Manager	Company Offices

					(Bristol)
	Bowmer and Kirkland group Manchester	1,400	Privately Held	Project Manager	Company Offices (Manchester)
	The Rezidor Hotel Group, Park Inn Hotel by Radisson	30,000	Client	Hotel Manager	Manchester branch
	Manager of the Business school of Huddersfield University , also represents student (final client) feedback	School Manager The Business School Over 150 members of staff	Client	School Manager (the business school)	University of Huddersfield
	Huddersfield University Deputy Director of Estates & Facilities	Deputy Director of Estates & Facilities	Client	School Manager (the business school)	University of Huddersfield
Total	Eighteen Companies				

## Appendix (5) Companies profiles

### Halcrow Group

<b>Industry:</b>	Construction Industry
<b>Type:</b>	Privately Held
<b>Company size:</b>	4,813 employees
<b>Founded:</b>	1998
<b>Halcrow Group Net-profits</b>	<b>2010£m</b> <b>2009 £m</b> <b>2008 £m</b> 10,152          8,968          20,200
<b>Website:</b>	<a href="http://www.halcrow.com/">http://www.halcrow.com/</a>
<b>Headquarters:</b>	London Vineyard House 44 Brook Green W6 7BY United Kingdom Phone: 0044-207-602-7282 Fax: 0044-207-603-7282
<b>Projects:</b>	Birmingham Airport - due diligence Clyde Arc Bridge: Glasgow Abbey Stadium Redevelopment - fire safety engineering A303 Improvement Scheme, Stonehenge Tunnel - fire safety Ashton Market Hall, Ashton-under-Lyne Battersea Power Station Development
<b>Interviewee:</b>	Site Manger – Samer EL-Jouzis

## Richmond Property

<b>Industry:</b>	Construction Industry						
<b>Type:</b>	Privately Held						
<b>Company size:</b>	1000 employees						
<b>Founded:</b>	2001						
<b>Richmond Property Net-Profits</b>	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;"><b>2010£m</b></td> <td style="text-align: center;"><b>2009 £m</b></td> <td style="text-align: center;"><b>2008 £m</b></td> </tr> <tr> <td style="text-align: center;">0.73</td> <td style="text-align: center;">0.52</td> <td style="text-align: center;">1.48</td> </tr> </table>	<b>2010£m</b>	<b>2009 £m</b>	<b>2008 £m</b>	0.73	0.52	1.48
<b>2010£m</b>	<b>2009 £m</b>	<b>2008 £m</b>					
0.73	0.52	1.48					
<b>Website:</b>	<a href="http://www.richmond-property.com/">http://www.richmond-property.com/</a>						
<b>Headquarters:</b>	3 Elm Grove Didsbury, Manchester, M20 6PL Telephone: 01614346666 Fax: 01614482111						
<b>Projects:</b>	Major property development (Manchester)						
<b>Interviewee:</b>	Site Manger – Mr Ghiath Kouzali						
<b>Interview Duration:</b>	40 minutes						

## Walter Lilly

<b>Industry:</b>	Construction Industry						
<b>Type:</b>	Privately Held						
<b>Company size:</b>	1640 employees						
<b>Founded:</b>	1924						
<b>Walter Lilly Net-profits</b>	<table style="width: 100%; border: none;"> <thead> <tr> <th style="text-align: left;"><b>2010£m</b></th> <th style="text-align: left;"><b>2009 £m</b></th> <th style="text-align: left;"><b>2008 £m</b></th> </tr> </thead> <tbody> <tr> <td>32.807</td> <td>21.300</td> <td>47.926</td> </tr> </tbody> </table>	<b>2010£m</b>	<b>2009 £m</b>	<b>2008 £m</b>	32.807	21.300	47.926
<b>2010£m</b>	<b>2009 £m</b>	<b>2008 £m</b>					
32.807	21.300	47.926					
<b>Website:</b>	<a href="http://www.walterlilly.co.uk/">http://www.walterlilly.co.uk/</a>						
<b>Headquarters:</b>	Walter Lilly Waddon House 283 Stafford Road Croydon Surrey CR0 4NN Telephone: 020 8730 6200 Fax: 020 8730 62 47						
<b>Projects:</b>	University of Sussex University of Oxford University of Surrey Royal Botanic Gardens, Kew National Physical Laboratory						
<b>Interviewee:</b>	Site Manger – Tony Phillips						
<b>Interview Duration:</b>	Email Interview						

**Kier Group  
(Pilot Test)**

<b>Industry:</b>	Construction Industry						
<b>Type:</b>	Public limited company						
<b>Company size:</b>	10.700 employees						
<b>Founded:</b>	192						
<b>Kier Group Net-profits</b>	<table border="1"> <thead> <tr> <th>2010£m</th> <th>2009 £m</th> <th>2008 £m</th> </tr> </thead> <tbody> <tr> <td>43.760</td> <td>38.722</td> <td>50.000</td> </tr> </tbody> </table>	2010£m	2009 £m	2008 £m	43.760	38.722	50.000
2010£m	2009 £m	2008 £m					
43.760	38.722	50.000					
<b>Website:</b>	<a href="http://www.kier.co.uk">http://www.kier.co.uk</a>						
<b>Headquarters:</b>	<p>Tempsford Hall Sandy Bedfordshire SG19 2BD Telephone: 01767 640111 Fax: 01767 640002</p>						
<b>Projects:</b>	<p>Hilton hotel – Liverpool Marriot Hotel – Leicester Sainsbury’s - Newport</p>						
<b>Interviewee:</b>	Senior Planner – Nicola Oakley						
<b>Interview Duration:</b>	35 minutes						

## Bowmer and Kirkland Group

<b>Industry:</b>	Construction Industry						
<b>Type:</b>	Privately owned						
<b>Company size:</b>	7.500 employees						
<b>Founded:</b>	1923						
<b>Bowmer and Kirkland Group Net-profits</b>	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; width: 33%;"><b>2010£m</b></th> <th style="text-align: left; width: 33%;"><b>2009 £m</b></th> <th style="text-align: left; width: 33%;"><b>2008 £m</b></th> </tr> </thead> <tbody> <tr> <td>20.662</td> <td>16.691</td> <td>30.330</td> </tr> </tbody> </table>	<b>2010£m</b>	<b>2009 £m</b>	<b>2008 £m</b>	20.662	16.691	30.330
<b>2010£m</b>	<b>2009 £m</b>	<b>2008 £m</b>					
20.662	16.691	30.330					
<b>Website:</b>	<a href="http://www.bandk.co.uk">http://www.bandk.co.uk</a>						
<b>Headquarters:</b>	<p><b>North West Regional Office</b>  3 Christie Way  Christie Fields  Manchester M21 7QY  Reg No. 701982  <b>Tel:</b> +(44) 0161 434 3311  <b>Fax:</b> +(44) 0161 434 1344</p>						
<b>Projects:</b>	Ericsson head offices – Coventry Phoenix high school Radisson Blu Hotel, Castle Donington						
<b>Interviewee:</b>	Site manager – Oliver Scott						
<b>Interview Duration:</b>	55 minutes						

## Arab Construction & Contracting Company

<b>Industry:</b>	Construction and Design								
<b>Type:</b>	Privately Held								
<b>Company size:</b>	1,900 employees								
<b>Founded:</b>	1963								
<b>Arab Construction &amp; Contracting Company Net-profits</b>	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%;"></th> <th style="width: 33%; text-align: center;">2010</th> <th style="width: 33%; text-align: center;">2009 £m</th> <th style="width: 33%; text-align: center;">2008 £m</th> </tr> </thead> <tbody> <tr> <td></td> <td style="text-align: center;">1.350</td> <td style="text-align: center;">0.900</td> <td style="text-align: center;">1,100</td> </tr> </tbody> </table>		2010	2009 £m	2008 £m		1.350	0.900	1,100
	2010	2009 £m	2008 £m						
	1.350	0.900	1,100						
<b>Website:</b>	<a href="http://arabccc.com/index.php?pg=SG9tZStQYWdl">http://arabccc.com/index.php?pg=SG9tZStQYWdl</a>								
<b>Headquarters:</b>	<p>Amman  Jordan  Tel.: (962 - 79) 830004  Fax (962 - 6) 4630447  P.O. Box 2277 Amman 11181 Jordan</p>								
<b>Projects:</b>	<p>Ministry of Education  Amman Water Network  Cairo Amman Bank Headquarters  Arab Banking Corporation  Amman Sheraton Hotel  Holiday Inn Amman Hotel  Le Meridien Hotel</p>								
<b>Interviewee:</b>	Site Manger – Mohammad Baidas								
<b>Interview Duration:</b>	49 Minutes								

### Modern Contractors for Construction Company

<b>Industry:</b>	Construction Industry		
<b>Type:</b>	Privately Held		
<b>Company size:</b>	950 employees		
<b>Founded:</b>	1986		
<b>Modern Contractors for Construction Company Net-profits</b>	<b>2010£m</b> 5.275	<b>2009 £m</b> 6.300	<b>2008 £m</b> 7 .100
<b>Website:</b>	Not Available		
<b>Headquarters:</b>	<p>Madrid Building                  2nd Floor                  Khalid Bin Al Walid Street                  Jabal Al Hussein Area                  P.O. Box 921216                  Amman 11192                  Jordan                  Tel: (+962 77) 620 7283</p>		
<b>Projects:</b>	<p>Aqaba Beach Resort.                  Le Royal Hotel                  Amman Pediatric Hospital                  New Australian Embassy in Amman                  Upgrading of Queen Alia Airport                  The Military Camps site in Zarqa</p>		
<b>Interviewee:</b>	Site Manger – Haytham Bahlawan		
<b>Interview Duration:</b>	35 Minutes		

### National Engineering & Contracting Company (NECC)

<b>Industry:</b>	Construction & Engineering		
<b>Type:</b>	Privately Held		
<b>Company size:</b>	800 employees		
<b>Founded:</b>	1967		
<b>National Engineering &amp; Contracting Company Net-Profits</b>	<b>2010£m</b> 2,741	<b>2009 £m</b> 1,300	<b>2008 £m</b> 1,832
<b>Website:</b>	<a href="http://www.necc.jo/">http://www.necc.jo/</a>		
<b>Headquarters:</b>	Amman Jordan (00962 77) 643 8802 P.O.Box : 2340		
<b>Projects:</b>	Jordan steel factory extention. El-Hassa-Ma'an railway project. Jordan valley free zone industrial park. Duleil main water supply		
<b>Interviewee:</b>	Site Manger – Ahmad Jarwan		
<b>Interview Duration:</b>	30 Minutes		

### Samaha for Construction

<b>Industry:</b>	Construction Industry		
<b>Type:</b>	Privately Held		
<b>Company size:</b>	1650 employees		
<b>Founded:</b>	1994		
<b>Samaha for Construction Net-Profits</b>	<b>2010£m</b> 2.112	<b>2009 £m</b> 0,984	<b>2008 £m</b> 2.982
<b>Website:</b>	Not Available		
<b>Headquarters:</b>	Amman Jordan 7 <sup>th</sup> Circle Tel: (00962 79) 99999859		
<b>Projects:</b>	Jordan Trade Centre Greek Melkite Cathedral Jordan Commercial Centre Aqaba Gulf Hotel Holiday Inn Resort		
<b>Interviewee:</b>	Site Manger – Hamzeh Al-Zu'bi		
<b>Interview Duration:</b>	32 Minutes		

## BAM Construct United Kingdom

<b>Industry:</b>	Construction Industry						
<b>Type:</b>	Privately Held						
<b>Company size:</b>	2,800 employees						
<b>Founded:</b>	2002						
<b>BAM Construct UK Net-Profits</b>	<table style="width: 100%; border: none;"> <tr> <td style="text-align: center;"><b>2010£m</b></td> <td style="text-align: center;"><b>2009 £m</b></td> <td style="text-align: center;"><b>2008 £m</b></td> </tr> <tr> <td style="text-align: center;">1,038.2</td> <td style="text-align: center;">1,133.6</td> <td style="text-align: center;">1,059.4</td> </tr> </table>	<b>2010£m</b>	<b>2009 £m</b>	<b>2008 £m</b>	1,038.2	1,133.6	1,059.4
<b>2010£m</b>	<b>2009 £m</b>	<b>2008 £m</b>					
1,038.2	1,133.6	1,059.4					
<b>Website:</b>	<a href="http://www.bam.co.uk/">http://www.bam.co.uk/</a>						
<b>Headquarters:</b>	<p>London  3rd Floor  Bishops House,  25-29 Fulham High Street,  SW6 3JH  Telephone: 0207 751 3900  Fax: 0207 751 3901</p>						
<b>Projects:</b>	<p>Creative Arts Building: Huddersfield  Business School: Huddersfield  Network, Haymarket, Edinburgh  InterPoint, Haymarket, Edinburgh  The Building, Chiswick, London  Birley Fields, Manchester  Latitude, Leeds</p>						
<b>Interviewee:</b>	Site Manger – Mr Chris Gallaga						
<b>Interview Duration:</b>	45 minutes						